RMI Major Courses Syllabi

Year 1 courses

- Introduction to radiography & medical imaging

Year 2 courses

- Radiobiology & protection
- Radiographic anatomy & positioning 1
- Radiographic anatomy & positioning 1 Lab
- Principles of medical imaging
- Principles of medical imaging Lab
- Radiographic anatomy & positioning 2
- Radiographic anatomy & positioning 2 Lab
- Mammographic imaging
- Digital image processing and analysis
- Digital image processing and analysis Lab
- Pre-clinical placement1
- Patient care in Radiography
- Radiography and contrast imaging
- Radiography and contrast imaging Lab

Year 3 courses

- Angiographic and interventional procedures
- Angiographic and interventional procedures Lab
- Ultrasound imaging
- Ultrasound imaging Lab
- CP2
- Magnetic Resonance Imaging
- Magnetic Resonance Imaging Lab
- Computed tomography imaging
- Computed tomography imaging Lab
- Nuclear medicine imaging
- CP3
- Radiographic pathology interpretation
- Radiographic pathology interpretation Lab

Year 4 courses

- Sectional imaging anatomy
- Sectional imaging anatomy Lab
- Quality management for medical imaging
- Quality management for medical imaging Lab
- CP4A
- CP4B
- CP5A
- CP5B
- CP5C

- CP5D
- Advanced topics in Ultrasound (Elective course)
- Advanced topics in CT (Elective course)
- Advanced topics in MRI (Elective course)
- Research project

RMI 111 Introduction to radiography and medical imaging

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: NA

Course co-Requisite: NA

Instructor: Mustafa Alhasan

Contact: Mustafa.alhasan@fchs.ac.ae

Course Description:

This course will be given for fresh students (year1) to introduce them to the imaging science. Medical imaging terminology, types of radiation and different imaging modalities used in hospitals with basic description will be covered. students will be introduced to the imaging services in the UAE. At the end of this course, student is expected to have a general and basic knowledge of imaging science before progressing to advanced years.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Define basic medical imaging terminology
2. Identify different imaging modalities
3. Demonstrate an understanding of Ionizing and non-ionizing radiation
4. Describe the role of radiographer in clinical settings

Recommended Textbooks and Readings:

- Arlene Adler, Richard Carlton, Introduction to Radiologic Sciences and Patient Care, 7th edition, 2018
- Suzanne Easton, An Introduction to Radiography, 2009
- Nadine Barrie Smith, Andrew Webb, Introduction to Medical Imaging: Physics, Engineering and Clinical Applications, 2011

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Quiz 1 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 4
2. Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 8
3. Assignment (written assignment of 1000 words)	10%	Week 10
4. Quiz 2 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 12
5. Presentation (oral power point presentation of 15 min)	10%	Week 13
6. Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
Total	100%	

Course Outline:

Week No.	Topic
1	History of radiography
2	Physical principles of radiation science
3	Radiographic terminology
4	Quzi1
5	The role of the radiographer
6	Radiology department in clinical settings
7	Introduction to radiation safety
8	Midterm Exam
9	Introduction to general radiography
10	Introduction to CT scan Assignment
11	Introduction to MRI
12	Quiz 2
13	Introduction to US Presentation
14	Introduction to NM
15	UAE diagnostic imaging services
16	Final Exam

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

RMI 212 Radiobiology & Protection

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: GRD 144 Physics for Health Professions, RMI 111 Introduction to radiography & medical imaging

Course Co-Requisite: NA

Instructor: Mustafa Alhasan

Contact: Mustafa.alhasan@fchs.ac.ae

Course Description:

This course is designed to provide students (2nd year, 1st semester) with important information about the biological effects of ionizing radiation and radiation protection to ensure safe practice of radiography. It covers different aspects of radiation protection such as personnel and patient protection, protection methods, and acute and chronic radiation effects imaging. Topics developed by radiation safety department at the federal authority for nuclear regulation (FANR) in the UAE will be covered.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Demonstrate an understanding of radiobiology history
2. Explain the physical principles underpinning the radiation protection cardinal rules
3. Explain mechanisms for acute and chronic radiation effects
4. Implement and evaluate appropriate radiation safety strategies and radiation protection measures in the context of diagnostic x-rays.

Recommended Textbooks and Readings:

- Steve Forshier, 2009, Essentials of Radiation: Biology and Protection, 2nd edition, Delmar

- Bushong, S.C., 2017, Radiologic Science for Technologists, 10th edition, Mosby/Elsevier; St Louis
- Bushong, S.C., 2017, Radiologic Science for Technologists: The Workbook and Laboratory Manual, 10th edition, Mosby/Elsevier; St Louis
- Bushberg, J.T., Seibert, J.A. Leidholdt Jr, E.M. and Boone, J.M., 2012, The Essential Physics of Medical Imaging, 3rd edition, Lippincott Williams & Wilkins, Philadelphia.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Quiz 1(mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 4
2. Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 8
3. Assignment (written assignment of 1000 words)	10%	Week 10
4. Quiz 2 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 12
5. Presentation (oral power point presentation of 15 min)	10%	Week 13
6. Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
Total	100%	

Course Outline:

Week No.	Topic
1	Radiobiology History
2	Law of Bergonie and Tribondeau
3	Effects of Oxygen and Hydrolysis of Water
4	Radiation units Quiz 1
5	Cellular Effects of Radiation
6	Dose-Response Relationships
7	Target Theory
8	Effects of Initial Exposure to Radiation Midterm Exam
9	Effects of Long-term Exposure to Radiation
10	Protection of Personnel Assignment
11	Dose-Limiting Recommendations
12	Protection of Patients Quiz 2
13	Gonadal Shielding Presentation
14	The Pregnant Patient
15	UAE FANR radiation safety regulations
16	Final

RMI 221 Radiographic Anatomy & Positioning 1

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: GRD 111 Anatomy and Physiology A

Course Co-Requisite: RMI 222 Radiographic Anatomy & Positioning 1 lab

Instructor: Wijdan Alomaim

Contact: Wijdan.Alomaim@fchs.ac.ae

Course Description:

This course is designed to provide students with the requisite knowledge and understanding of the scientific, technological and radiographic principles associated with radiography of the upper and lower limbs.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Determine appropriate radiographic protocols consisting of radiographic projections and exposure techniques for specific clinical problems related to the upper and lower limbs and the status of the patient.
2. Evaluate the resultant images in terms of technical quality and positioning criteria
3. Demonstrate an understanding of appropriate problem-solving strategies for less than optimal radiographic projections and exposure techniques
4. Assess the appropriateness of supplementary projections in the light of the clinical problem
5. Distinguish the anatomical features and recognize associated common radiologic pathologies.

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.

- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Imaging Test (Anatomical labeling of X-ray images)	20%	Week6
2. Methods Test (Positioning techniques description)	20%	Week 7
3. Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 13
4. Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
Total	100%	

Course Outline:

Week No.	Topic	Radiographic Analysis
1	Lecture 1 : Course Introduction Lecture 2 : Radiographic Fundamentals	Analysis 1: Introduction to radiographic Analysis

	Lecture 3 : Radiographic Principales Lecture 4: Radiographic Analysis	
2	Lecture 5: Hand Radiography	Analysis 2: Hand
3	Lecture 6: Imaging – X-ray Generation Lecture 7: Imaging – Dose/Exposure Lecture 8: Imaging – Grids, Noise and Spatial Resolution Lecture 9: Imaging - Exposure	
4	Lecture 10: Digit Radiography Lecture 11: Wrist Radiography	Analysis 3: Digits
5	Lecture 12: Image Quality Lecture 13: Forearm & Elbow Radiography	Analysis 4: Wrist
6	Lecture 14: Upper Limb Review Imaging Test	Analysis 5: Forearm/Elbow
7	Lecture 15: Foot Radiography Lecture 16: Toes and Calcaneus Radiography Methods Test 1	Analysis 6: Foot & Toes
8	Lecture 17: Ankle Joint Radiography	
9	Lecture 18: Tibia, Fibula and Subtalar Radiography	Analysis 7: Ankle & Calcaneus
10	Lecture 19: Knee Joint Radiography	Analysis 8: Knee 1
11	Lecture 20: Femur, Knee & Patella Radiography	Analysis 9: Knee 2
12	Lecture 21: Lower Limb Review	Analysis 10: Analysis Review

13	Lecture 22: Summary and Assessment Examples Midterm Exam	
14-15	Revision	Revision of all course material.
16	Final Exam.	

RMI 222 Radiographic Anatomy & Positioning 1Lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours:2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 221 Radiographic Anatomy & Positioning 1
Instructor: Wijdan Alomaim

Contact: Wijdan.Alomaim@fchs.ac.ae

Course Description:

This is a practical lab course designed to provide students with the requisite knowledge and understanding of the scientific, technological and radiographic principles associated with radiography of the upper and lower limbs. It utilizes the lab equipment including human phantoms, general radiography machine to demonstrate the radiographic position of the related organ and to identify the anatomical appearance using viewing boxes and computer monitors.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Position an adult patient for the radiographic projections identified in the protocols
2. Demonstrate an understanding of appropriate problem-solving strategies for less than optimal radiographic projections and exposure techniques associated with radiographic examinations of the upper and lower limbs.
3. Assess the appropriateness of supplementary projections in the light of the clinical problem
4. Position the patient for the supplementary projections

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.

- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Laboratory Report 1 (Students carry out a practical session and are then assessed on written report)	30%	Week9
2.Laboratory Report 2 (Students carry out a practical session and are then assessed on written report)	30%	Week13
3.Radiographic Projection Test 1 (positioning techniques description)	20%	Week8
4.Radiographic Projection Test 2 (positioning techniques description)	20%	Week12
Total	100%	

Course Outline:

Week No.	Topic

1	Laboratory 1 : Introduction to RMI Lab
2	Laboratory 2 : Hand Anatomy and positioning using human phantoms and general radiography machine
3	Laboratory 2 : Hand part 2 Anatomy and positioning using human phantoms and general radiography machine
4	Laboratory 3 : Digits Anatomy and positioning using human phantoms and general radiography machine
5	Laboratory 4 : Wrist / Scaphoid Anatomy and positioning using human phantoms and general radiography machine
6	Laboratory 5 : Forearm & Elbow Anatomy and positioning using human phantoms and general radiography machine
7	Laboratory 6 : Foot & Toes Anatomy and positioning using human phantoms and general radiography machine
8	Laboratory 7 : Ankle Anatomy and positioning using human phantoms and general radiography machine Radiographic Projection Test 1
9	Laboratory 8 : Lower Leg & Calcaneus Anatomy and positioning using human phantoms and general radiography machine Laboratory Report 1
10	Laboratory 9 : Knee 1 Anatomy and positioning using human phantoms and general radiography machine
11	Laboratory 9 : Knee 2 Anatomy and positioning using human phantoms and general radiography machine
12	Radiographic Projection Test 2
13	Laboratory Report 2

14	Revision

RMI 213 Principles of medical imaging

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: RMI 111 Introduction to radiography and medical imaging

Course Co-Requisite: RMI 214Principles of medical imaging lab

Instructor: Mustafa Alhasan

Contact: Mustafa.alhasan@fchs.ac.ae

Course Description:

This course will discuss the physical aspects of imaging equipment used to image patients in the hospital. In addition, exposure factors, patient dose and image optimizations will be covered. This course includes laboratory sessions where student should apply the knowledge acquired during theory classes. At the end of this course, student is expected to understand the physical components of imaging equipment, types of different image receptors, physics of radiation, type of image artefacts and exposure techniques.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain electromagnetic spectrum
2. Describe the structure of X ray imaging system
3. Demonstrate an understanding of the principles of X-ray tube
4. Manipulate the exposure factors
5. Identify image artefacts
6. Demonstrate an understanding of technique chart
7. Differentiate between various imaging receptor
8. Demonstrate an understanding of the effect of scatter radiation

Recommended Textbooks and Readings:

- Bushong, S.C., 2017, Radiologic Science for Technologists, 11th edition, Mosby/Elsevier; St Louis
- Bushong, S.C., 2017, Radiologic Science for Technologists: The Workbook and Laboratory Manual, 10th edition, Mosby/Elsevier; St Louis

- Bushberg, J.T., Seibert, J.A. Leidholdt Jr, E.M. and Boone, J.M., 2012, The Essential Physics of Medical Imaging, 3rd edition, Lippincott Williams & Wilkins, Philadelphia.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Quiz 1 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 4
2. Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 8
3. Assignment (written assignment of 1000 words)	10%	Week 10
4. Quiz 2 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 12
5. Presentation (oral power point presentation of 15 min)	10%	Week 13
6. Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
Total	100%	

Course Outline:

Week No.	Topic	Content
1	Lecture 1 : Essential Concepts – 1 Lecture 2 : Essential Concepts – 2 Lecture 3: Structure of Matter	Nature of Our Surroundings Matter and Energy Sources of Ionizing Radiation Discovery of X-rays Development of Modern Radiology Reports of Radiation Injury Basic Radiation Protection Standard Units of Measurement Mechanics Terminology for Radiologic Science
2	Lecture 4 : Electromagnetic Energy Lecture 5 : Electricity and Magnetism Lecture 6: Electromagnetic Induction	Photons Electromagnetic Spectrum Wave-Particle Duality Matter and Energy Electrostatics Electrodynamics Magnetism Electromagnetism
3	Lecture 7 : X-Ray Imaging System Lecture 8 : The X-Ray Tube Lecture 9: X-Ray Production	Autotransformer Exposure Timers High-Voltage Generator External Components Internal Components X-ray Tube Failure Rating Charts Electron Target Interactions X-ray Emission Spectrum Factors Affecting the X-ray Emission Spectrum
4	Lecture 10 : X-Ray Emission Lecture 11 : Interaction with Matter Quiz 1	X-ray Quantity X-ray Quality Five X-ray Interactions with Matter Differential Absorption Contrast Examinations Exponential Attenuation

5	Lecture 12: Film-Screen Radiography	History of Film- Screen Imaging system
6	Lecture 13 : X-Ray Image Quality	Definitions Film Factors Geometric Factors Subject Factors Tools for Improved Radiographic Image Quality Production of Scatter Radiation
7	Lecture 14 : Scatter Radiation Control	Control of Scatter Radiation Grid Performance Grid Types Grid Problems Grid Selection
8	Lecture 21N : X-Ray Attenuation Lecture 22N : Detection of X-Rays – 1 Lecture 23N : Detection of X-Rays – 2 Midterm Exam	
9	Lecture 24 : Computers in Imaging Lecture 25 : Computed Radiography	
10	Lecture 26 : Digital Radiography Assignment	
11	Lecture 27 : Radiographic Technique	
12	Lecture 28 : Viewing the X-Ray Image Quiz 2	
13	Presentation	
14	Lecture 30 : Radioactive Decay	

15	Revision	
16	Final Examination Week	

RMI 214 Principles of medical imaging lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 213Principles of medical imaging

Instructor: Mustafa Alhasan

Contact: Mustafa.alhasan@fchs.ac.ae

Course Description:

This is a practical lab course will discuss the physical aspects of imaging equipment used to image patients in the hospital. In addition, exposure factors, patient dose and image optimizations will be covered. students will be introduced to the X-ray imaging system components; control console, x-ray tube and generator and conduct experimental sessions to demonstrate the effect of radiation and the image formation.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain electromagnetic spectrum
2. Describe the structure of X ray imaging system
3. Demonstrate an understanding of the principles of X-ray tube
4. Manipulate the exposure factors
5. Identify image artefacts
6. Demonstrate an understanding of technique chart
7. Differentiate between various imaging receptor
8. Demonstrate an understanding of the effect of scatter radiation

Recommended Textbooks and Readings:

Bushong, S.C., 2017, Workbook for Radiologic Science for Technologists: Physics, Biology, and Protection, 11th edition, Mosby/Elsevier; St Louis,

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Lab reports (Students carry out a practical session and are then assessed on written report)	50%	continuous
2. Written exam (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week4
3. Presentation (oral power point presentation of 15 min)	20%	Week 8
4. Assignment (written assignment of 1000)	20 %	Week 10
Total	100%	

Course Outline:

Week No.	Topic
1	Lab 1: Electromagnetic Energy demonstration using X-ray and US
2	Lab 2: The X-ray Imaging System components using physical general x-ray machine
3	Lab 3: The X-ray Tube components and function demonstration using the control console
4	Lab 4: X-ray Production using imaging receptors Written exam
5	Lab 5: X-ray Interaction with Matter to demonstrate effect of radiopaque and transparent material on X-ray image

6	Lab 6: Concepts of Image Quality using lab phantoms with different kVp and mAs settings
7	Lab 7: Control of Scatter Radiation experiment with different distances and lead aprons effects
8	Lab 8: Screen-Film Radiography Vs Digital system processing experiment Presentation
9	Lab 9: Screen-Film Radiographic Artifacts demonstration using X-ray images
10	Assignment
11	Lab 11: Digital Radiography contrast control using the control console
12	Lab 12: Digital Radiographic Artifacts simulation and manipulation
13	Revision

RMI 223 Radiographic Anatomy & Positioning2

Credit Hours: 3

Contact Hours:3

Course Pre-Requisite: RMI 221 Radiographic Anatomy & Positioning1

Course Co-Requisite: RMI 224 Radiographic Anatomy & Positioning2 lab

Instructor: Wijdan Alomaim

Contact: Wijdan.Alomaim@fchs.ac.ae

Course Description:

This course is designed to provide students with the requisite knowledge and understanding of the scientific, technological and radiographic principles associated with radiography of the respiratory system, shoulder and pelvic girdles, the vertebral column, the bony thorax and plain abdomen.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe the radiographic projections and body positions underpinning general radiographic examinations of the respiratory system, shoulder and pelvic girdles, the vertebral column, the bony thorax and plain abdomen
2. Select appropriate radiographic protocols consisting of radiographic projections positioning techniques and exposure factors to produce high quality projection(s) that will aid the diagnostic process
3. Position an adult patient, accounting for his/her clinical presentation, for the radiographic projections identified in the protocol
4. Evaluate the resultant radiograph/s in terms of technical quality and positioning criteria
5. Distinguish anatomical features on resultant images and recognize common radiologic pathologies or traumatic appearances in terms of the clinical question

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Imaging Test (Anatomical labeling of X-ray images)	20%	Week5
2.Methods Test (positioning techniques description)	20%	Week 11
3.Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week8
4.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week14
Total	100%	

Course Outline:

Week No.	Topic	Radiographic Analysis
Week2	Radiography of the Abdomen Part 1	
	Radiography of the Abdomen Part 2	
	Abdomen Image analysis	Review Abdomen Analysis

Week3	Radiography of the Hip	
	Hip Image analysis	Review Hip Analysis
	Radiography of the Femur and Knee	
Week4	Femur and Knee Image analysis	Review Femur and Knee Analysis
	Radiography of shoulder 1	
	Radiography of shoulder 1	
Week5	Shoulder Image analysis	Review Shoulder Analysis
	Radiography of the Chest	
	Imaging Test	
Week6	Chest Image analysis	Review Chest Analysis
	Radiography of Cervical spine	
	Cervical spine Image analysis	Review Cervical Spine Analysis
Week7	Radiography of Thoracic Spine	
	Thoracic Spine Image analysis	Review Thoracic Spine Analysis
	Radiography of Lumbar Spine	
Week8	Lumbar Spine Image analysis	Review Lumbar Spine Analysis
	Midterm Exams	
	Radiography of the Sacrum and Coccyx	

Week9	Sacrum and Coccyx Image analysis	Review Sacrum and Coccyx Analysis
	Radiography of Respiratory Tract	
	Radiography spine summary& revision	
Week10	Respiratory Tract Image analysis	Review Respiratory Tract Analysis
	Radiography of Bony Thorax Ribs	
	Bony Thorax Ribs Image analysis	Review Bony Thorax Ribs Analysis
Week11	Radiography of the Bony Thorax Sternum	
	Bony Thorax Sternum Image analysis	Review Bony Thorax Sternum Analysis
	Methods Test 1	
Week12-13	Revision	
Week14	Final Exams	

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FATIMA COLLEGE OF HEALTH SCIENCES

RMI 224 Radiographic Anatomy & Positioning 2 Lab

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 223 Radiographic Anatomy & Positioning 2

Instructor: Wijdan Alomaim

Contact: Wijdan.Alomaim@fchs.ac.ae

Course Description:

This is a practical lab course designed to provide students with the requisite knowledge and understanding of the scientific, technological and radiographic principles associated with radiography of the respiratory system, shoulder and pelvic girdles, the vertebral column, the bony thorax and plain abdomen. It utilizes the lab equipment including human phantoms, general radiography machine to demonstrate the radiographic position of the related organ and to identify the anatomical appearance using viewing boxes and computer monitors.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Position an adult patient for the radiographic projections identified in the protocols
2. Demonstrate an understanding of appropriate problem-solving strategies for less than optimal radiographic projections and exposure techniques associated with radiographic examinations of the respiratory system, shoulder and pelvic girdles, the vertebral column, the bony thorax and plain abdomen.
3. Assess the appropriateness of supplementary projections in the light of the clinical problem.
4. Position the patient for the supplementary projections.

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Laboratory Report 1 (Students carry out a practical session and are then assessed on written report)	20%	Week4
2.Laboratory Report 2 (Students carry out a practical session and are then assessed on written report)	20%	Week10
3.Radiographic Positioning Test 1	30%	Week6
4.Radiographic Positioning Test 2	30%	Week12
Total	100%	

Course Outline:

Week No.	Topic
1	Laboratory 1 : Introduction to RMI Lab

2	Laboratory 2 : Abdomen Anatomy and positioning using phantoms and X-ray imaging system
3	Laboratory 3 : Hip Anatomy and positioning using phantoms and X-ray imaging system
4	Laboratory 4 : Femur and Knee Anatomy and positioning using phantoms and X-ray imaging system Laboratory Report 1
5	Laboratory 4 : shoulder Anatomy and positioning using phantoms and X-ray imaging system
6	Radiographic Positioning Test 1
7	Laboratory 5 : Chest Anatomy and positioning using phantoms and X-ray imaging system
8	Laboratory 6: Cervical spine & Thoracic Spine Anatomy and positioning using phantoms and X-ray imaging system Laboratory Report 1 (Deadline)
9	Laboratory 7 : Lumbar Spine & Sacrum and Coccyx Anatomy and positioning using phantoms and X-ray imaging system
10	Laboratory 8: Respiratory system Anatomy and positioning using phantoms and X-ray imaging system Laboratory Report 2
11	Laboratory 9 : Bony Thorax Ribs & Bony Thorax Sternum Anatomy and positioning using phantoms and X-ray imaging system
12	Radiographic Positioning Test 2
13	Laboratory Report 2 (Deadline)
14	Revision

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

RMI 225 Mammographic imaging

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: RMI 221 Radiographic Anatomy & Positioning 1

Course co-Requisite: NA

Instructor: Wijdan Alomaim

Contact: Wijdan.Alomaim@fchs.ac.ae

Course Description:

This course is designed to provide students with the requisite knowledge and understanding of the scientific, technological and radiographic principles associated with Mammography. This course describes the key features to the imaging of the breast including physical principles and methodology and introduces newer technologies such as tomosynthesis.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe the instrumentation, relevant protocols, positioning and methods employed in mammography imaging.

Recommended Textbooks and Readings:

- Gilda Cardenosa (2017) Breast imaging companion, 4th edition, Churchill Livingstone. Philadelphia : Wolters Kluwer
- Shirley M Long; Louise C Miller; Margaret A Botsco; Linda L Martin;(2010), Handbook of mammography, 5th ed. Edmonton: Mammography Consulting Services

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Imaging Test (anatomical labeling of X-ray images)	20%	Week13
2.Presentation (oral power point presentation of 15 min)	20%	Week 5
3.Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week8
4.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16
Total	100%	

Course Outline:

Week No.	Topic
Week1-2	Mammography Introduction
Week3	Mammography Imaging
Week4	Mammography Communication skills
Week5	Presentation
Week6	Routine positions of the Mammography1+2
Week7	Additional Imaging
Week8	Midterm Exam
Week9	Other Breast imaging techniques

Week10	Pathology 1
Week11	Pathology 2
Week12	Pathology 3
Week13	Imaging Test
Week14-15	Revision
Week16	Final exams

RMI 215 Digital Image processing & analysis

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: RMI 213 Principles of medical imaging

Course Co-Requisite: RMI 216Digital Image processing & analysis lab

Instructor: Christopher Hayre

Contact: Christopher.Hayre@fchs.ac.ae

Course Description:

This course provides the students with the skills, knowledge and judgment to understand the array of technological innovations pertinent to digital imaging. This will enable students to understand the complexities of image acquisition and data manipulation.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Review and apply the scientific principles, technological characteristics and relevant applications of digital imaging systems used in vascular and non-vascular studies
2. Describe the general applications of information technology in medical imaging and its relationship to digital based imaging systems
3. Use a range of basic digital image processing routines in general or digital vascular imaging

Recommended Textbooks and Readings:

- John C. Russ, The Image Processing Handbook, 6th Ed, CRC Press 2011

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assignment (written assignment of 1000 words)	20%	Week4
2.Written Exam 1 (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week8
3.Written Exam 2 (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week12
4.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week15
Total	100%	

Course Outline:

Week No.	Topic	Content
1	Introductory lecture – topics and assessment for module	
2	Digital imaging – Computed Radiography	Processes of CR imaging – image formation
3	Digital imaging – Indirect Digital Radiography	Processes of IDR imaging – image formation
4	Digital imaging – Direct Digital Radiography Assignment	Processes of DDR imaging – image formation
5	Comparing imaging modalities opportunities for dose reduction	Explore digital latitude - danger for dose creep but also potential for image optimization.

6	Analogue to digital conversion process	Discuss the ADC processes and how this can impact on image quality.
7	Exposure trade-offs – time/quality & dose/quality.	X-ray spectrum and intensity – producing an image as good as needed and keeping doses ALARA.
8	Exam 1	Exam 1
9	Exposure latitude and LUTs	Discuss exposure latitude and LUTs with students
10	PACS and DICOM	Discuss role of PACS and DICOM in digital age of radiography
11	Windowing and Grey Scale	Discuss the role of windowing and grey scales of an image
12	Telemedicine/Teleradiology Exam 2	Discuss the role of telemedicine and teleradiology in contemporary healthcare
13	Image Review Session	Reflect on content learnt – offer open seminar
14	Assay submission	Students have time to work on their assigned and submit at the end of this week.
15	Final Exam	Final Exam to be undertaken by students.

RMI 216 Digital Image processing & analysis lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 215 Digital Image processing & analysis

Instructor: Christopher Hayre

Contact: Christopher.Hayre@fchs.ac.ae

Course Description:

This is practical lab course provides the students with the skills, knowledge and judgment to understand the array of technological innovations pertinent to digital imaging. By utilizing lab equipment such as digital imaging system, PACS and image software like image J and DICOM, students will be able to understand the complexities of image acquisition and data manipulation.

Course Learning Outcomes

Upon completion of this course, students will be able to:

1. Review and apply the scientific principles, technological characteristics and relevant applications of digital imaging systems used in vascular and non-vascular studies
2. Describe the general applications of information technology in medical imaging and its relationship to digital based imaging systems
3. Use a range of basic digital image processing routines to enable quantitative and qualitative image analysis

Recommended Textbooks and Readings:

- John C. Russ, The Image Processing Handbook, 6th Ed, CRC Press 2011

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Laboratory report 2,000 words -group work.	50%	continuous
2.Exam 1 (mixed exam of MCQ and essay questions about covered topics, 60 min)	30%	Week4
3.Presentation (oral power point presentation of 15 min)	20%	Week10
Total	100%	

Course Outline:

Week No.	Topic
1	Introduction to lab digital imaging equipment systems
2	SID effect on Image quality using x-ray imaging system
3	mAs effect on the image contrast using x-ray imaging system
4	kVp effect on the image contrast using x-ray imaging system Exam 1
5	Collimation effect using x-ray imaging system
6	PACS lab equipment components and functions
7	Image J applications using lab computers
8	DICOM applications using PACS system
9	Conventional Vs digital images demonstration

10	Revision
11	Student feedback

RMI 261 Pre-clinical placement 1

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 9

Course Pre-Requisite: RMI 221Radiographic Anatomy & Positioning 1

Course Co-Requisite: NA

Instructor: Sahana Kotian

Contact: Sahana.Kotian@fchs.ac.ae

Course Description:

This is a pre-clinical course delivers the initial professional and clinical radiographic knowledge that will be foundational in subsequent related courses as the student progresses along the Novice-to-Expert continuum of development. Lab simulation equipment using human phantoms for imaging, will improve student's imaging skills including positioning, x-ray tube and couch manipulation before joining hospitals to handle patients.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe the professional standards and ethics context theories of the psychosocial impact on human behavior
2. Describe and justify the radiographic projections and body positions underpinning general radiographic examinations
3. Describe the radiographic exposure factors of general radiographic examinations
4. Evaluate the resultant radiograph/s in terms of technical quality and positioning criteria
5. Distinguish anatomical features on radiographic images
6. Position a phantom for the radiographic projections identified in the protocol

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.

- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Lab Report (Students carry out a practical experiment and are then assessed based on the written report)	40%	continuous
2.Clinical Assessments (1-2) Clinical aspects of imaging including clinical justification, position, exposure factors and the image quality	30%	Week7-8-15
3.Objective Structured Clinical Examination (OSCE) Comprehensive oral and written exam to measure the overall clinical imaging skills of students	20%	Week16
4.Professionalism & Attendance Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously	10%	continuous
Total	100%	

Course Outline:

Week No.	Topic
1	Introduction to Radiography

2	Safety of radiographer
3	Demonstrations & Practice: 1. Radiographic projections of hand
4	2. Radiographic projections of Digits
5	3. Radiographic projections of Wrist, scaphoid & carpal tunnel
6	4. Radiographic projections of forearm & elbow
7	Clinical assessment 1
8	Clinical assessment 1
9	5. Radiographic projections of foot
10	6. Radiographic projections of toes & Calcaneus
11	7. Radiographic projections of Ankle joint
12	8. Radiographic projections of tibia fibula & subtalar joints
13	9. Radiographic projections of knee joint
14	10. Radiographic projections of distal femur & patella
15	Clinical assessment 2
16	Objective Structured Clinical Examination

RMI 241 Patient care in radiography

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: RMI 221 Radiographic anatomy & positioning 1

Course Co-Requisite: NA

Instructor: Sahana Kotian

Contact: Sahana.Kotian@fchs.ac.ae

Course Description:

This course will introduce the necessary skills needed for student to handle and manage patients professionally and related health ethical issues in the radiography department. At the end of this course, student is expected to understand procedures and techniques regarding patient safety, infection control and to apply code of ethics by respecting patient's privacy and confidentiality. UAE department of health diagnostic imaging services regulations regarding patent care will be covered.

Course Learning Outcomes

Upon completion of this course, students will be able to:

1. Describe patient radiation safety
2. Explain confidentiality and patient's privacy in imaging settings
3. Demonstrate an understanding of patient request and consent forms
4. Define the process of infection control
5. Manage patient transfer and positioning techniques
6. Explain health ethical related issues in imaging settings

Recommended Textbooks and Readings:

Ruth Ann Ehrlich, Dawn M Coakes, Patient Care in Radiography: With an Introduction to Medical Imaging, 2017.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
Quiz1(mixed exam of MCQ and essay questions about covered topics, 20-30 min)	20%	Week 4
Quiz2 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	20%	Week 8
Assignment (written assignment of 1000 words)	20%	Week 12
Final exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
Total	100%	

Course Outline:

Week No.	Topic
1	The Healthcare Delivery System
2	Professional Attitudes and Communications
3	Infection Control Concepts
4	Quzi1
5	Response to Patient's Personal and Physical Needs
6	Patient Transfer
7	Medication Information
8	Quiz2

9	Bedside Radiography: Special Conditions and Environments
10	Radiography in Surgery
11	Patient Assessment
12	Assignment
13	Emergency Response
14	Special Imaging Modalities
15	UAE regulations for patient assessment, ethical considerations and patient's rights and responsibilities
16	Final

RMI 226 Radiography and contrast imaging

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: RMI 223 Radiographic anatomy & positioning 2

Course Co-Requisite: RMI 227 Radiography and contrast imaging Lab

Instructor: Sahana Kotian

Contact: Sahana.Kotian@fchs.ac.ae

Course Description:

The courses focuses on mobile imaging, accident and emergency imaging, pediatrics, geriatrics and radiography of the skull including dental imaging. It also facilitates the ongoing development of broader general radiographic skills of the appendicular and axial skeleton. Additionally, it provides students with the essential elements of contrast and therapeutic imaging of the gastrointestinal genito-urinary and hepato-biliary systems with the emphasis upon digital fluoroscopic systems and the professional role of the radiographer in managing these systems and implementing the procedures.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Eexplain the physical principles underpinning mobile x-ray systems and how they apply in clinical situations in the hospital wards and operating theatres
2. Explain the physical principles underpinning digital fluoroscopic imaging systems, image intensifiers, dual energy X-ray absorption and planar conventional tomography and how they apply in clinical situations for the gastrointestinal, urinary and hepatobiliary systems
3. Implement appropriate radiation safety strategies and radiation protection measures in the context of mobile and fixed digital fluoroscopic examinations
4. Evaluate the effectiveness of exposure protocols for all general and contrast radiographic imaging in terms of image quality and radiation protection for patients
5. Describe the efficacy of traditional radiographic methods to image the gastrointestinal, genito-urinary and hepato-biliary systems and skull and teeth

Recommended Textbooks and Readings:

- Nick Watson, Hefin Jones, A guide to radiological procedures, 7th Ed. Saunders Elsevier 2018
- Hardy, Maryann and Boynes S., 2003. Paediatric radiography. London Blackwell Science,
- Raby, Nigel et al., 2015. Accident & emergency radiology: a survival guide. 3rd Ed. Elsevier
- Bontrager, Kenneth L. and Lampignano, John P., 2014. Textbook of radiographic positioning and related anatomy, St. Louis, Mo: Elsevier/Mosby.
- Bushong, Stewart C., 2017. Radiologic science for technologists: physics, biology, and protection, St. Louis, Mo: Elsevier Mosby.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Quizzes (2x) (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	30%	Week 4,11
2.Case study Presentation (oral power point presentation of 15 min)	10%	Week 13
3.Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 8
4.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
100%		

Course Outline:

WEEK	Lecture	Topic and Content
1	Radiography 1 Review 1 Radiography 2 Radiography 3	Spine, Shoulder & Pelvic Girdle
2	Imaging Introduction Review Imaging 1 Imaging 2	Mobile x ray Systems Fluoroscopic Imaging Systems
3	Imaging 3 Imaging 4	Image. Intensifiers 1 Image. Intensifiers 2
4	Imaging 5 Imaging 6	Photo-stimulable Phosphors Direct Conversion imaging Sensors
5	Imaging 7 Imaging 8	Digital Fluoroscopy Digital Subtraction Imaging
6	Imaging 9 Imaging10	Planar Conventional Tomography Dual Energy X-ray Absorption (BMD)
7	Contrast Imaging 1 Contrast Imaging 2	Upper GI Lower GI
8	Mid term	

9	Contrast Imaging 3 Contrast Imaging 4	Sialography, Dacrocystography, Arthroscopy Genito Urinary System
10	Contrast Imaging 5 Radiography 1 Radiography 2	Hepato Biliary Imaging Mobile 1 Mobile 2
11	Radiography 3 Radiography 4	Operating Theatre Trauma
12	Radiography 5 Radiography 6	Pediatric 1 Pediatric 2
13	Radiography7 Radiography 8 Radiography 9 Case study Presentation	Skull Facial Bones Dental Imaging 1 & 2
14	Radiography 10 Imaging 11	Radiography Exposures in the digital age Factors affecting Quality
15	Revision Week	
16	Final exam	

RMI 227 Radiography and contrast imaging Lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course co-Requisite: RMI 226 Radiography and contrast imaging

Instructor: Sahana Kotian

Contact: Sahana.Kotian@fchs.ac.ae

Course Description:

This is a practical lab course utilizing lab equipment such as DEXA scan and mobile X-ray to improve the imaging skills of students. It will focus on mobile imaging, and radiography of the skull and facial bones and contrast imaging methodologies.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Differentiate between fixed x ray systems and mobile x-ray systems and how they apply in clinical situations to produce and evaluate images taken in the hospital wards and operating theatres
2. Implement appropriate radiation safety strategies and radiation protection measures in the context of mobile x ray systems
3. Practice common radiographic projections of extremities, chest, abdomen and pelvis using mobile x ray equipment

Recommended Textbooks and Readings:

- Nick Watson, Hefin Jones, A guide to radiological procedures, 7th Ed. Saunders Elsevier 2018
- Hardy, Maryann and Boynes S., 2003. Paediatric radiography. London Blackwell Science,
- Raby, Nigel et al., 2015. Accident & emergency radiology: a survival guide. 3rd Ed. Elsevier
- Bontrager, Kenneth L. and Lampignano, John P., 2014. Textbook of radiographic positioning and related anatomy, St. Louis, Mo: Elsevier/Mosby.
- Bushong, Stewart C., 2017. Radiologic science for technologists: physics, biology, and protection, St. Louis, Mo: Elsevier Mosby.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Lab Reports (Students carry out a practical experiment and are then assessed based on the written report)	40%	continuous
2.Presentation (oral power point presentation of 15 min)	20%	Week 12
3.Practical assessment 1(positioning and patient preparation)	20%	Week 7-8
4.Practical assessment 2 (positioning and patient preparation)	20%	Week 14
Total	100%	

Course Outline:

Week	Topics
1	Physical principle of Mobile x ray equipment
2	Radiography of adult chest using mobile x ray equipment
3	Radiography of adult abdomen using mobile x ray equipment
4, 5, 6	Radiography of extremities using mobile x ray equipment Presentation
7-8	Practical Assessment 1
9.	Pediatric chest and abdomen radiography using fixed x ray equipment
10.	Radiography of skull and facial bones using fixed x ray equipment
11.	Physical principle and methods of DEXA
12.	Presentation
13.	Contrast imaging interactive learning online videos
14.	Practical assessment 2

RMI 331 Angiographic & Interventional procedures

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: RMI 226 Radiography and contrast imaging

Course Co-Requisite: RMI 332 Angiographic and interventional procedures Lab

Instructor: Qays Alhourani

Contact: Qays.AlHorani@fchs.ac.ae

Course Description:

This course allows students to learn how to assess and manage a range of patients who are referred to radiology for a range of angiographic imaging procedures. Angiographic, Vascular and interventional studies will be taught. Basic nursing concepts including surgical asepsis, venepuncture, infection control, medications and their administration will be addressed.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Evaluate the professional challenges posed by patients with special needs to provide effective and safe care to them and those patients undergoing contrast imaging examinations of the gastrointestinal, urinary, hepato-biliary and cardiovascular systems;
2. Discuss the use of radiological and other medications and their administration, the control of infection, the administration of oxygen and barium, the maintenance of surgical asepsis and recognition of vital signs
3. Discuss the relevant protocols, positioning and methods employed in digital vascular procedures of the human body and those used in interventional therapeutic procedures
4. Evaluate radiographs/images of the gastrointestinal, urinary and hepatobiliary systems in terms of the condition of the patient, the clinical question, anatomy and image quality factors.

Recommended Textbooks and Readings:

- Morris, P (2013). Practical neuroangiography. Philadelphia: Lippincott Williams and Wilkins
- Bontrager KL., & Lampignano, JP (2014). Textbook of radiographic positioning and related anatomy. St Louis Elsevier
- Snopek, A M (2006). Fundamentals of special radiographic procedures. Saunders Elsevier
- Uflacker, R (2007). Atlas of vascular anatomy an angiographic approach. Philadelphia: Lippincott Williams and Wilkins.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assessment 1 written (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week4
2.Assessment 2 written (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 8
3.Assessment 3 presentation (oral power point presentation of 15 min)	20%	Week 12
4.Assessment 4 Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
Total	100%	

Course Outline:

WEEK	Lecture	Topic and Content	Reference
W1	Introduction to Course	Introduction to Course	Course syllabus

	General Angiographic Principles	principle of DSA	L1
	General Angiographic Principles	tools and equipment	L1
W2	General Angiographic Principles	Image quality and artifacts	L1
	General Angiographic Principles	seldinger technique	L1
	General Angiographic Principles	rad.protection,3D DSA	L1
W3	Thoracic Angiography (DSA) methods	Angiographic protocols	L2 part1
		Acquisition parameters	
		Catheter selection	
	Thoracic Angiography (DSA) methods	Contrast injection parameters	
	Thoracic Angiography (DSA) methods	vascular anatomy	
W4	Abdominal Angiography (DSA) methods	Angiographic protocols	l2 part2
		Acquisition parameters	
		Catheter selection	
	Abdominal Angiography (DSA) methods	Contrast injection parameters	
	Abdominal Angiography (DSA) methods Assessment 1 Exam 1	vascular anatomy	
W5	Peripheral Angiography	Angiographic protocols	L3
		Acquisition parameters	
		Catheter selection	
	Peripheral Angiography	Contrast injection parameters	
	Peripheral Angiography	vascular anatomy	
W6	Cerebral DSA methods	Angiographic protocols	L4
		Acquisition parameters	
		Catheter selection	
	Cerebral DSA methods	Contrast injection parameters	
	Cerebral DSA methods	vascular anatomy	
W7	Cardiac Angiography	Cardiac Anatomy – Revision	L5
		Cardiac Catheterization (LHC)	
	Cardiac Angiography	Percutaneous Coronary Intervention (PCI)	
	Cardiac Angiography	Advanced Interventional Techniques	
W8	Assessment 2 Exam 2		

W9	Interventionnel Techniques in DSA	vascular interventional procedures 1	L6
	Interventionnel Techniques in DSA	vascular interventional procedures 2	
	Interventionnel Techniques in DSA	non-vascular interventional procedures	
W10	Interventionnel Techniques in DSA	How are interventional techniques applied to various pathological conditions 1	
	Interventionnel Techniques in DSA	How are interventional techniques applied to various pathological conditions 2	
	Interventionnel Techniques in DSA	How are interventional techniques applied to various pathological conditions 3	
W11	-Sterile Fields/Surgical Asepsis.	Hand Hygiene, infection control	L7
	-Sterile Fields/Surgical Asepsis.	Aseptic Technique	
W12	- Measuring vital signs, Medications, Infection Control.	basic vital signs, indications for measurement	L8
		anatomical position for measurement and	
	- Measuring vital signs, Medications, Infection Control.	Distinguish between normal and abnormal ranges of vital signs.	
	- Measuring vital signs, Medications, Infection Control.	Process of infection, micro-organisms that may cause infection, the concept of Standard Precautions. Assessment 3 presentation	L8
W13	-Principles of IV venipuncture	Principles of IV cannulation, Site Selection, Equipment required for cannulation, prevent infection and potential complications	L9
W14	patient care	-The neonatal intensive care unit	L10
	patient care	- Radiography of the elderly Pt.	L11
	patient care and infection control	-The intensive Care unit	L12
W15	Revision		
W16	FINAL EXAMS		

RMI 332 Angiographic & Interventional procedures lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 331 Angiographic & Interventional procedures

Instructor: Qays Alhourani

Contact: Qays.AlHorani@fchs.ac.ae

Course Description:

This is a practical lab course to demonstrate positioning and methods of angiographic procedures using different types of catheters, wires and angioplasty tools. Basic nursing concepts including surgical asepsis, venepuncture, infection control, medications and their administration will be addressed.

Course Learning Outcomes

Upon completion of this course, students will be able to:

1. Demonstrate the relevant protocols, positioning and methods employed in digital vascular procedures of the human body and those used in interventional therapeutic procedures

2. Discuss the use of radiological and other medications and their administration, the control of infection, the administration of oxygen and barium, the maintenance of surgical asepsis and recognition of vital signs

Recommended Textbooks and Readings:

- Morris, P (2013). Practical neuroangiography. Philadelphia: Lippincott Williams and Wilkins
- Bontrager KL., & Lampignano, JP (2014). Textbook of radiographic positioning and related anatomy. St Louis Elsevier
- Snopek, A M (2006). Fundamentals of special radiographic procedures. Saunders Elsevier

- Uflacker, R (2007). Atlas of vascular anatomy an angiographic approach. Philadelphia: Lippincott Williams and Wilkins.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assessment 1 LAB reports (Students carry out a practical experiment and are then assessed based on the written report)	60%	continuous
2.Assessment 2 TEST 1 (DSA) (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	20%	Week6
3.Assessment 3 TEST 2 (nursing procedures) (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	20%	Week10
Total	100%	

Course Outline:

WEEK	Lab
W1	Introduction
W2	General Angiographic Principles using educational interactive online videos
W3	Thoracic Angiography positioning and X-ray images utilizing viewing box, and general imaging system to demonstrate the position of the patient
W4	Abdominal Angiography positioning and X-ray images utilizing viewing box, and general imaging system to demonstrate the position of the patient
W5	Peripheral Angiography positioning and X-ray images utilizing viewing box, and general imaging system to demonstrate the position of the patient
W6	Cerebral DSA positioning and X-ray images utilizing viewing box, and general imaging system to demonstrate the position of the patient
W7	Cardiac Angiography positioning and X-ray images utilizing viewing box, and general imaging system to demonstrate the position of the patient
W8	Interventionnel Techniques in DSA using different types of catheters, positioning and X-ray images utilizing viewing box, and general imaging system to demonstrate the position of the patient
W9	Hand hygiene and asepsis techniques demonstration

W10	Measuring vital signs in collaboration with nursing department
W11	IV cannulation, Site Selection, Equipment required for cannulation in collaboration with nursing department
W12	Infection control procedure

RMI 333 Ultrasound imaging

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: RMI 223 Radiographic anatomy & positioning 2

Course Co-Requisite: RMI 334 Ultrasound imaging lab

Instructor: Fatima AlAli

Contact: Fatima.AlAli@fchs.ac.ae

Course Description:

This course delivers theoretical knowledge in abdominal ultrasound that also forms a foundation for subsequent ultrasound studies. It introduces the student to the requisite knowledge required to perform an ultrasound examination of abdominal organs, including the physics of ultrasound and instrumentation, sonographic anatomy and pathophysiology, scanning principles and practice.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain the function, application and potential pitfalls of ultrasound instrumentation used in abdominal ultrasound scanning, including B- mode, spectral Doppler and imaging artefacts.
2. Discuss the likely bio-effects and bio-hazards of diagnostic ultrasound.
3. Recognize and describe normal structures, function and common pathological appearances of abdominal structures in ultrasound images.

Recommended Textbooks and Readings:

- Bates, J.A., (2011) Abdominal Ultrasound: How, Why and When, Churchill Livingstone.
- Gill R. (2016) the physics and technology of diagnostic ultrasound. High Frequency Publishing, Melbourne.
- Kremkau, F.W. (2016), Sonography Principles and Instruments, 9th Ed, Saunders Elsevier, Missouri, USA.

- Rumack, C.M., Wilson S.R., Charboneau, J.W., (2011), Diagnostic Ultrasound Vol 1 & 2. 4th Edition, Mosby.
- Curry R, Tempkin BB, 2016 Sonography: an introduction to normal structure and functional anatomy, 4th Ed. Elsevier Saunders St Louis Mo.
- Tempkin BB, 2014 Ultrasound Scanning Principles and Protocols, 4thEd. Elsevier Saunders, St Louis Mo.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Ultrasound cases	20%	Week4
2.Ultrasound Essay (written assignment of 1000 words)	20%	Week8
3.Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week12
4.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16
Total	100%	

Course Outline:

Week No.	Topic	Content
1	Imaging 1 Introduction to waves and sound	Creation of Ultrasound Waves and their

		interaction with matter
2	Imaging 2 Interaction of sound and matter	Creation of Ultrasound Waves and their interaction with matter
3	Methods 3A Great Vessels .	Structure & Anatomy of the Great Vessels & their US appearance
4	Methods 3B Great Vessels Ultrasound Essay introduction.	Structure & Anatomy of the Great Vessels & their US appearance
5	Methods 2A Lesion Descriptors +Artefacts	Basic US Lesions of the abdomen.
6	Methods 2B Lesion Descriptors +Artefacts	Basic US Lesions of the abdomen.
7	Methods 3A Great Vessels	Structure & Anatomy of the Great Vessels & their US appearance
8	Methods 3B Great Vessels Ultrasound Essay	Structure & Anatomy of the Great Vessels & their US appearance
9	Imaging 3 Piezo electric transducers	Mechanism of US Transducers
10	Methods 4A Kidneys Normal and Variants	US appearance of Kidneys & its related structures including outline.

	Methods 4B Kidneys Normal and Variants Methods 5A Renal Pathology Methods 5B Renal Pathology	US for Renal Pathology & its appearance.
11	Imaging 4 Transducers and Ultrasound Beam	US Transducer Beam formation.
12	Imaging 5 Basic Modes of Ultrasound Imaging 6 Focusing and Steering the Ultrasound beam Methods 6A Adrenal glands, lower abdomen and pelvis Midterm	Different US Modes. US Beam focusing, steering. US Appearance of Adrenal glands & Pelvis including their pathologies.
13	Imaging 7 B-Mode Acquisition image display and ultrasound Imaging 8 Doppler Ultrasound Principles Methods 6B Adrenal glands, lower abdomen and pelvis	US image acquisition and Principle of US Doppler. US Appearance of Adrenal glands & Pelvis including their pathologies.
14	Methods 7A The Spleen and Gastro intestinal tract Methods 7B The Spleen and Gastro intestinal tract Methods 8A The Pancreas Methods 8B The Pancreas	US appearance of the normal variants of the Spleen, Gastro-intestinal tract & the Pancreas. Pathologies of the Spleen, Pancreas & the Gastro-intestinal tract.
15	Revision	Revision of all course material.
16	Final Exam.	

RMI 334 Ultrasound imaging Lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact hours:2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 333 Ultrasound imaging

Instructor: Fatima AlAli

Contact: Fatima.AlAli@fchs.ac.ae

Course Description:

This lab course will introduce students to physical principles of ultrasound machine and ultrasound simulation machine, and apply the acquired knowledge in terms of instrumentation, sonographic anatomy, scanning principles and practice.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe patient preparation and sonographic imaging methods employed in ultrasound examinations of the upper abdomen.
2. Recognize and describe normal structures, function and common pathological appearances of abdominal structures in ultrasound images.
3. Demonstrate the integration of theoretical knowledge of anatomy, physiology and ultrasound instrumentation in abdominal ultrasound scanning to a beginner sonographer level

Recommended Textbooks and Readings:

- Bates, J.A., (2011) Abdominal Ultrasound: How, Why and When, Churchill Livingstone.
- Gill R. (2016) the physics and technology of diagnostic ultrasound. High Frequency Publishing, Melbourne.
- Kremkau, F.W. (2016), Sonography Principles and Instruments, 9th Ed, Saunders Elsevier, Missouri, USA.

- Rumack, C.M., Wilson S.R., Charboneau, J.W., (2011), Diagnostic Ultrasound Vol 1 & 2. 4th Edition, Mosby.
- Curry R, Tempkin BB, 2016 Sonography: an introduction to normal structure and functional anatomy, 4th Ed. Elsevier Saunders St Louis Mo.
- Tempkin BB, 2014 Ultrasound Scanning Principles and Protocols, 4thEd. Elsevier Saunders, St Louis Mo.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Ultrasound Practical Laboratory (practice the US procedures on simulation and US machine)	10%	W4
2.Ultrasound Image Recognition 1 (Identify the US image appearance)	30%	W8
3.Ultrasound Imaging Recognition 2 (Identify the US image appearance)	30%	W9
4.Ultrasound Simulator Assessment (US procedure using the US simulator)	30%	W11
Total	100%	

Course Outline:

Week No.	Topic
1	Practical Lab 1: Introduction to Ultrasound Machine and simulator
2	Practical Lab 2: Great Vessels anatomy demonstration using US phantom

3	Practical 3: Simulator “Great Vessels” using US phantom
4	Practical 4: Peer Scanning + Simulator
5	Practical Lab 5: Peer Scanning + Simulator
6	Practical 6: Renal / Kidney imaging using Ultrasound Machine and simulator
7	Practical 7: Simulator “Renal / Kidney” imaging using Ultrasound Machine and simulator
8	Practical 8: Adrenal gland, Lower Abdomen – Pelvis imaging using Ultrasound Machine and simulator Ultrasound Image Recognition 1
9	Practical 9: Spleen, Gastrointestinal Tract, and Pancreas imaging using Ultrasound Machine and simulator Ultrasound Imaging Recognition 2
10	Ultrasound Practical Laboratory Observation
11	Ultrasound Simulator Assessment
12	Revision

RMI 362 CP2

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 9

Course Pre-Requisite: RMI 261 Pre-clinical placement 1

Course co-Requisite: NA

Instructor: Sahana Kotian

Contact: Sahana.Kotian@fchs.ac.ae

Course Description:

CP 2 develops the scientific, professional and clinical radiographic knowledge that will be foundational in subsequent radiographic science and practice units as the student progresses along the Novice to Expert continuum of development. CP 2 will build on the earlier philosophies of professional practice and introduce the professional, legal, ethical and psychosocial components of radiography and health care practice. This placement will concentrate on the radiographic positioning and radiographic image analysis of the respiratory system, shoulder and pelvic girdles, the vertebral column, the bony thorax and plain abdomen.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe and apply within a professional standards and ethics context theories of the psychosocial impact on human behavior
2. Record and obtain information from individuals to provide quality levels of patient care;
3. Recognize and adapt, in a professional manner, to the variety of social, cultural and ethical perspectives
4. Conduct radiographic examinations of the respiratory system, pelvis, shoulder girdle, vertebral column, the bony thorax and plain abdomen of an adult patient under supervision.

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

Course Outline:

Week	Days	Area
2 to 13	Sunday 8am – 3pm	Clinical Placement CP2
	Monday 8am- 3pm	
14	OSCE & Clinical Learning Portfolio submission	

RMI 335 Magnetic Resonance Imaging

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: RMI 215Digital image processing and analysis

Course Co-Requisite: RMI 336 Magnetic Resonance Imaging lab

Instructor: Christopher Hayre

Contact: Christopher.Hayre@fchs.ac.ae

Course Description:

The physics of MRI is presented, with particular application to clinical diagnostic imaging. The unit covers the basic physics of magnetic dipoles and magnetic spin resonance, through to a detailed presentation of the basic gradient and spin echo sequences that are used in medical MRI scanners. The factors that determine the contrast and spatial resolution achievable in MRI are discussed. The FID signal sampling and image reconstruction methods are reviewed, as are the SNR and image artefacts that typically occur in MRI. Patient and MRI staff safety issues are presented. An overview of MRI imaging applications, such as spectroscopic and dynamic imaging is presented.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Present a comprehensive and critical description of the complementary nature of MRI relative to other imaging modalities

2. Describe the physical design and operational requirements for a typical clinical MRI system

3. Demonstrate an understanding of the imaging parameters that define the contrast sensitivity in MRI

4. Demonstrate an understanding of the imaging parameters that define the SNR and spatial resolution of MRI

5. Evaluate the advantages and disadvantages of gradient and spin echo recovery techniques

6. List the reasons for precautions that are taken in MRI to assure staff and patient safety

8. Use problem solving skills to define appropriate strategies to meet the needs of clinical imaging through MRI techniques

Recommended Textbooks and Readings:

- C Westbrook, C Kaut-Roth, J Talbot (2018), MRI In Practice (5th Edition), Wiley-Blackwell Publishing, UK

- S C Bushong (2015), Magnetic Resonance Imaging Physical and Biological Principles, Mosby, USA

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Assessment 1 Presentation (oral power point presentation of 15 min)	20%	Week4
2. Written Exam 1 mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week8
3. Written Exam 2 mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week12
4. Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16

Course Outline:

Week	Topic	Content
W1	MRI Basic principles 1	Introduction Atomic structure Motion in the atom
	MRI Basic principles 1	

		MR active nuclei The hydrogen nucleus Alignment Precession The Larmor equation
W2	MRI Basic principles 2	Resonance The MR signal The free induction decay signal (FID) Relaxation T1 recovery T2 decay Pulse timing parameters
	MRI Basic principles 2	
W3	Image weighting and contrast 1	Introduction Image contrast Contrast mechanisms Relaxation in different tissues
	Image weighting and contrast 1	
W4	Image weighting and contrast 2	T1 contrast T2 contrast Proton density contrast Weighting T2 * decay Introduction to pulse sequences
	Image weighting and contrast 2 Assessment 1 Presentation	
W5	Encoding and image formation 1	Encoding Introduction Gradients Slice selection Frequency encoding Phase encoding Sampling
	Encoding and image formation 1	
W6	Encoding and image formation 2	Data collection and image formation Introduction K space description K space filling Fast Fourier transform (FFT) Important facts about K space K space traversal and gradients Options that fill K space Types of acquisition
	Encoding and image formation 2	
W7	Parameters and trade-offs 1	Introduction Signal to noise ratio (SNR)

	Parameters and trade-offs 2	Contrast to noise ratio (CNR) Spatial resolution Scan time Trade-offs Decision making Volume imaging
W8	Pulse sequences 1 Pulse sequences 1 Exam 1	Introduction Spin echo pulse sequences Conventional spin echo Fast or turbo spin echo Inversion recovery Fast inversion recovery
W9	Pulse sequences 2 Pulse sequences 2	STIR (short tau inversion recovery) FLAIR (fl uid attenuated inversion recovery) IR prep sequences Gradient echo pulse sequences
W10	Pulse sequences 3 Pulse sequences 3	Conventional gradient echo The steady state and echo formation Coherent gradient echo Incoherent gradient echo (spoiled) Steady state free precession (SSFP) Balanced gradient echo Fast gradient echo Single shot imaging techniques Parallel imaging techniques
W11	Artefacts and their compensation 1	Introduction Phase mismapping Aliasing or wrap around Chemical shift artefact Out of phase artefact (chemical misregistration) Truncation artefact
	Artefacts and their compensation 2	Magnetic susceptibility artefact Cross-excitation and cross-talk Zipper artefact Shading artefact Moiré artefact Magic angle
W12	Instrumentation and equipment 1	Introduction Magnetism Permanent magnets Electromagnets Superconducting electromagnets Fringe fields

	Instrumentation and equipment 2 Exam 2	Shim coils Gradient coils Radio frequency (RF) Patient transportation system MR computer systems and the user interface
W13&W14	MRI safety and application of MRI	Assignment Presentation
W15	Revision	
W16	Final Exams	

RMI 336 Magnetic Resonance Imaging Lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 335 Magnetic Resonance Imaging

Instructor: Christopher Hayre

Contact: Christopher.Hayre@fchs.ac.ae

Course Description:

The physics of MRI is explored with a lab environment, with particular application to clinical diagnostic imaging utilizing MRI simulator. The factors that determine the contrast and spatial resolution will be discussed in order for the students to apply theoretical concepts.

Course Learning Outcomes:

Upon completion of this course, students will be able to:
1. Describe the physical design and operational requirements for a typical clinical MRI system.

2. Demonstrate an understanding of the imaging parameters that define the image quality in MRI.

3. Use problem solving skills to define appropriate strategies to meet the needs of clinical imaging through MRI techniques.

4. Recognize deficiencies in images, such as reconstruction artifacts and the cause of such problems.

Recommended Textbooks and Readings:

- C Westbrook, C Kaut-Roth, J Talbot (2018), MRI In Practice (5th Edition), Wiley-Blackwell Publishing, UK

- S C Bushong (2015), Magnetic Resonance Imaging Physical and Biological

Principles, Mosby, USA

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Lab report (Students carry out a practical experiment and are then assessed based on the written report)	50%	continuous
2.Presentation oral power point presentation of 15 min)	30%	Week4
3.Written exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week10
Total	100	

Course Outline:

WEEK	Topic
W1	Introduction to MRI simulator
W2	MRI sequence using MRI simulator
W3	Demonstration of T1&T2 using MRI simulator
W4	Comparison of different MRI images using MRI simulator

W5	Impact of MRI parameters variation on image using MRI simulator
W6	Fast Fourier transform (FFT) demonstration
W7	SNR and CNR effect on scanning time using MRI simulator
W8	Conventional spin echo vs Fast or turbo spin echo using MRI simulator
W9	STIR Vs FLAIR using MRI simulator
W10	Gradient echo demonstration using MRI simulator

W11	MRI images of different artefacts
W12	MRI coils applications
W13	MRI safety

RMI 337 Computed tomography imaging

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: RMI 215 Digital image processing and analysis

Course Co-Requisite: RMI 338 Computed tomography imaging lab

Instructor: Qays Alhourani

Contact: Qays.AlHorani@fchs.ac.ae

Course Description:

This course provides the scientific fundamentals that underpin computed tomography. It includes scientific principles and operational modes; system components and image characteristics; Image reconstruction techniques; summation convolution back-projection; Fourier reconstruction and algebraic and iterative reconstruction methods. Helical/spiral and multislice CT systems are discussed. CT artefacts and the principles of CT dosimetry and radiation protection are also covered. The professional skills element of this course aims to introduce students to a range of topics relevant to the practice of CT. Students will be introduced to protocols and clinical application of physical principles to the CT imaging of the major regions of the body.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain the scientific principles underpinning computed tomography
2. Describe the physical configuration of axial, helical and multislice CT systems
3. Distinguish between the various data acquisition and image reconstruction processes used in CT and their characteristics
4. Identify common CT artefacts
5. Apply radiation protection and dosimetry principles to the practice of CT
6. Explain the clinical rationale for the selection of CT scanning protocols, image display and reconstruction methods for CT examinations of the head, chest, abdomen and spine
7. Evaluate positioning methods, scanning protocols, image display and reconstruction routines for CT examinations of the head, chest, abdomen and spine;
8. Identify the CT appearances of the anatomical structures

Recommended Textbooks and Readings:

- Seeram, E., (2015), Computed tomography Physical principles, clinical applications and quality control, 4th edition, W.B. Saunders Company, Philadelphia.
- Webb, W.R., Brant, W.E. & Major, N.M. (2014), Fundamentals of Body CT, Saunders Elsevier, Philadelphia, PA, USA.
- Romans, L. (2018). Computed Tomography for Technologists: A Comprehensive Text. Lippincott Williams & Wilkins.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assessment 1 CT Physics Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week4
2.Assessment 2 CT sectional Imaging Exam (mixed cross sectional images labeling, 60 min)	20%	Week8
3.Assessment 3 presentation (oral power point presentation of 15 min)	20%	Week12
4.Assessment 4 Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16
Total	100%	

Course Outline:

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Weeks	Lecture	topic	Content
Week 1	L1	principles of CT	principles of CT
	L2	Data acquisition	Data acquisition
Week 2	L3	Image Reconstruction	Image Reconstruction
	L4	Image Display	Image Display

Week 3	L5	Methods of Data Acquisition	Methods of Data Acquisition
	L6	Methods of Data Acquisition	Methods of Data Acquisition
Week 4	L7	Methods of Data Acquisition	Methods of Data Acquisition
	L8	Assessment 1 CT Physics Exam	
Week 5	L9	Post-Processing	Post-Processing
	L10	Data Management	Data Management
Week 6	L11	Radiation Dosimetry	Radiation Dosimetry in CT 1
	L12	Radiation Dosimetry	Radiation Dosimetry in CT 2
Week 7	L13	CT protocols	introduction to CT protocols
	L14	Patient Preparation	Patient Preparation for CT
Week 8	L15	Cross-Sectional Anatomy	Neuroanatomy
	L16	Cross-Sectional Anatomy Assessment 2 CT sectional Imaging Exam	Thoracic Anatomy
Week 9	L17	Cross-Sectional Anatomy	Abdominopelvic Anatomy
	L18	Cross-Sectional Anatomy	Musculoskeletal Anatomy
Week 10	L19	Procedures and Protocols	Contrast Agents
	L20	Procedures and Protocols	Neurologic Imaging Procedures 1
Week 11	L21	Procedures and Protocols	Neurologic Imaging Procedures 2
	L22	Procedures and Protocols	Neurologic Imaging Procedures 3
Week 12	L23	Procedures and Protocols	Neurologic Imaging Procedures (spine)
	L24	Procedures and Protocols Assessment 3 presentation	Thoracic Imaging Procedures 1
Week 13	L25	Procedures and Protocols	Thoracic Imaging Procedures 2
	L26	Procedures and Protocols	Abdomen Imaging Procedures 1

	L27	Procedures and Protocols	Abdomen Imaging Procedures 2
Week 14-W15	L28	Procedures and Protocols	Pelvis Imaging Procedures
	L29	Procedures and Protocols	Musculoskeletal Imaging Procedures 1
	L30	Procedures and Protocols	Musculoskeletal Imaging Procedures 2
Week 16	Final Exam Week		

RMI 338 Computed tomography imaging Lab

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 337 Computed tomography imaging

Instructor: Qays Alhourani

Contact: Qays.AlHorani@fchs.ac.ae

Course Description:

This course provides a clinical hands-on training to students within RMI lab by using the CT simulator and CT scan, and practicing different scenarios for a normal and abnormal CT studies.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain the clinical rationale for the selection of CT scanning protocols, image display and reconstruction methods for CT examinations of the head, chest, abdomen and spine;
2. Implement positioning methods, scanning protocols, image display and reconstruction routines for CT examinations of the head, chest, abdomen and spine
3. Distinguish between normal and abnormal structures as shown on CT.

Recommended Textbooks and Readings:

- Seeram, E., (2015), Computed tomography Physical principles, clinical applications and quality control, 4th edition, W.B. Saunders Company, Philadelphia.
- Webb, W.R., Brant, W.E. & Major, N.M. (2014), Fundamentals of Body CT, Saunders Elsevier, Philadelphia, PA, USA.
- Romans, L. (2018). Computed Tomography for Technologists: A Comprehensive Text. Lippincott Williams & Wilkins.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assessment 1 written test(mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week4
2.Assessment 2 Practical Exam on the CT scanner	20%	Week10
3.Assessment 3 lab reports (Students carry out a practical experiment and are then assessed based on the written report)	60%	continuous
Total	100%	

Course Outline:

Weeks	lab	Topics
Week 1	Lab1	Patient positioning and preparation using CT scan
Week 2	Lab2	introduction to CT simulator
Week 3	Lab3	CT Head w & w/o contrast using CT scan and CT simulator Assessment 1 written test
Week 4	Lab4	CT Head w/o CM using CT scan and CT simulator
Week 5	Lab5	CT Head w CM using CT scan and CT simulator
Week 6	Lab6	CT Sinuses using CT scan and CT simulator
Week 7	Lab7	CT Neck w CM using CT scan and CT simulator
Week 8	Lab8	CT C-spine using CT scan and CT simulator
Week 9	Lab9	CT chest w & w/o CM using CT scan and CT simulator Assessment 2 Practical Exam
Week 10	Lab10	CT chest w CM1 using CT scan and CT simulator
Week 11	Lab11	CT chest w CM2 using CT scan and CT simulator
Week 12	Lab12	CT abd.pelvis w & w/o CM using CT scan and CT simulator
Week 13	Lab13	CT AP w CM using CT scan and CT simulator
Week 14	Lab14	CT L.spine, CT wrist using CT scan and CT simulator

RMI 339 Nuclear Medicine Imaging

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 3

Course Pre-Requisite: RMI 215 Digital image processing and analysis

Course Co-Requisite: NA

Instructor: Christopher Hayre

Contact: Christopher.Hayre@fchs.ac.ae

Course Description:

This course extends the knowledge base of the student into nuclear medicine and hybrid imaging in medicine. Students will be introduced to the three themes of Nuclear medicine, radiopharmacy, Nuclear Medicine technology and Nuclear Medicine Procedures. The students will also gain an appreciation of the applications and benefits of hybrid imaging and the physical principles behind the operation of the key imaging modalities commonly used in multimodal imaging including computed tomography (CT), positron emission tomography (PET), and single photon emission computed tomography (SPECT). Topics regarding radiation activity and monitoring in the UAE by the federal authority for nuclear regulation (FANR) will be covered.

The course has been divided into three themes each with their own learning objectives.

Course Learning Outcomes:

Theme one learning outcomes:

Upon completion of this course, students will be able to:

1. Describe basic principles of radiation protection with regard to the use of unsealed sources
2. Justify the need for a regulatory framework governing the use of radioactive materials and chemicals in the health care setting
3. Explain the characteristics of a radiopharmaceutical for diagnostic imaging purposes
4. Perform half-life calculations for a range of radionuclides and radiopharmaceuticals
5. Describe the construction and function of the 99mo/99mtc radionuclide generator
6. Distinguish between radiopharmaceutical administration techniques
7. Identify patient contrindications
8. Explain normal and altered radiopharmaceutical biodistribution

Theme two learning outcomes:

Upon completion of this course, students will be able to:

1. Discuss the basic components used in electronic radiation detection systems
2. Compare and contrast the design advantages and disadvantages of different types of detecting systems used within nuclear medicine practice
3. Describe the principles of image acquisition parameters including equipment checks, peaking, collimator selection, counting statistics associated with the use of the gamma camera
4. Discuss the performance characteristics of the gamma camera;
5. Explain the physical principles of single photon emission computed tomography (SPECT)
6. Describe the common clinical applications of SPECT

Theme three learning outcomes:

Upon completion of this course, students will be able to:

1. Describe patient preparation, positioning and care, in relation to lung ventilation and perfusion; bone imaging; cardiac imaging renal imaging and the biliary tree
2. Evaluate lung ventilation and perfusion images; bone images; cardiac images; renal images and biliary tree images
3. Interpret nuclear medicine referrals
4. Justify the selection of image acquisition parameters for planar studies, including radiopharmaceutical and collimator selection and counting statistics
5. Implement appropriate image display parameters
6. Demonstrate and understanding of the role of gated and SPECT imaging

Recommended Textbooks and Readings:

- Christian, P.E. & Waterstram-Rich, K.M., (2012), Nuclear Medicine and PET/CT Technology and Techniques, 7th edition, Mosby, Philadelphia

- Shackett P, (2009), Nuclear Medicine Technology: Procedures and Quick Reference, 2nd edition, Wolters Kluwer. Philadelphia

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Quiz 1 (mixed exam of MCQ and essay questions	10%	Week 5

about covered topics, 20-30 min)		
2.Midterm (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 8
3.Quiz 2 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 10
4.Quiz 3 (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week 13
5.Group Presentation (oral power point presentation of 15 min)	10%	Week 14
6.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16
Total	100%	

Course Outline:

Week No.	Topic	Content
1	Radiation Protection Radiation Dose and Regulations	ALARA principle. Sealed and unsealed source. Types of shielding material. Radiation monitoring devices. Dose & Units Regulations.
2	Radio Pharmaceuticals	Radioactivity in medicine Radionuclide Radiopharmaceutical

	Radioactive Emissions and Decay	Ideal characteristics of a diagnostic radiopharmaceutical. Alpha, beta and gamma decay.
3	Radionuclide half-life Technetium and the Generator	Half-life, calculations. 99m-Tc the ideal radionuclide 99m-Tc generator
4	Pharmaceutical QC Administration of Pharmaceuticals	QC on radiopharmaceuticals Cold kit reconstitution Administering radiopharmaceuticals. Different routes of administering radiopharmaceuticals
5	Patient Contraindications and Bio-distribution Electronic Radiation Detectors Quiz 1	Contraindications. Normal, altered and abnormal radiopharmaceutical bio distribution for a number of tracers. Various types of radiation detectors.
6	Detector systems in NM Image Acquisition Image Acquisition	Construction and uses of scintillation and gas filled detectors. Advantages and disadvantages of the different types of detection systems used in Nuclear Medicine practice. Image acquisition in Nuclear Medicine. Types of Collimator
7	Gamma Camera	Gamma camera working and its characteristics. SPECT definition Functional imaging Planar imaging and scintigraphy SPECT reconstruction and performance Multimodal & Hybrid Imaging Modality Principles Hybrid Imaging - Configurations
8	Midterm Week	
	SPECT Clinical Apps SPECT	SPECT system

		variety of situations in which SPECT is clinically used
9	Intro. To Nuclear Medicine Practice Bone imaging	Different types of Nuclear Medicine images Time activity curve Patient preparation, positioning and care, in relation to bone imaging
10	Lung Imaging Cardiac Imaging Quiz 2	Patient preparation, positioning and care, in relation to lung ventilation and perfusion (V/Q) imaging. Image acquisition parameters for V/Q scans Patient preparation, positioning and care, in relation to myocardial perfusion imaging (MPI) and Gated Blood Pool Scans (GBPS).
11	Renal Imaging Biliary Imaging	Patient preparation, positioning and care, in relation to both functional and morphological renal scans. Describe patient preparation, positioning and care, in relation to hepatobiliary imaging
12	Workplace Safety Multimodal and Hybrid Imaging Intro	principles of radiation safety and protection safe work environment in Nuclear Medicine (NM) principles of infection control Multimodal, hybrid and molecular imaging. main advantages that multimodal imaging has over individual modalities

13	Modality Principles Multi-Modal Systems Quiz 3	basic principles of CT, PET and MRI imaging arrangements and configurations of common multimodal imaging system combinations
14	Multi-Modal Systems Multi modal performance and QC Group Presentation	Key performance parameters for PET, MRI, PET/CT, SPECT/CT and PET/MRI. Key performance standards for the modalities and QA
15	Radiological Environmental Monitoring in the UAE	
16	Final Exam Week	

RMI 363 CP3

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours: 9

Course Pre-Requisite: RMI 362 CP2

Course Co-Requisite: NA

Instructor: Wijdan Alomaim

Contact: Wijdan.Alomaim@fchs.ac.ae

Course Description:

Clinical Practice 3 is a second semester course. It builds upon the scientific knowledge and clinical experiences developed through engagement with the previous semesters. Thus, the clinical component will continue to provide experience in mobile imaging, accident and emergency imaging, paediatrics, geriatrics and radiography of the skull including dental imaging and geriatric imaging. The development of clinical skills in relation to the evaluation of general radiographic images in terms of the clinical question and patient management will occur as will a progression in relation to general radiographic skills along the novice to expert model of clinical skill development. students will learn how to assess and manage a range of patients who are referred to radiology for a range of contrast imaging procedures. Angiographic, Vascular and interventional studies, and US imaging will be taught. Basic nursing concepts including surgical asepsis, venepuncture, infection control, medications and their administration will be addressed.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Demonstrate an understanding of the multidisciplinary approach to the clinical management of paediatrics, the elderly and patients in accident and emergency situations
2. Participate in digital subtraction angiographic examinations
3. Evaluate appropriate general radiographic examinations for the musculoskeletal and respiratory systems and the abdomen on adult patients with minimal supervision using mobile x-ray
4. Manage fluoroscopy sessions in terms of the radiographer's role, so that an appreciation of the nature of the professional inter-relationship between all

members of the multi-disciplinary team is revealed and the team's duty of care obligation to the patient during diagnostic imaging procedures is evident.

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

Course Outline:

Week	Days	Area
2 to 13	Wednesday 8am – 3pm	Clinical Placement CP3
	Thursday 8am- 3pm	
14	OSCE & Clinical Learning Portfolio submission	

RMI 342 Radiographic pathology Interpretation

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: RMI 223 Radiographic anatomy & positioning 2

Course Co-Requisite: RMI 343 Radiographic pathology Interpretation lab

Instructor: Fatima AlAli

Contact: Fatima.AlAli@fchs.ac.ae

Course Description:

This course provides the students with the skills, knowledge and judgment to interpret images and to provide a written comment through the employment of radiographic image interpretation principles and pattern recognition.

Course Learning Outcomes;

Upon completion of this course, students will be able to:

1. Distinguish between sensitivity, specificity and accuracy in relation to the interpretation of general radiographic images
2. Differentiate between search error, detection error and interpretation error in relation to the interpretation of radiographic images
3. Apply the knowledge of the psychophysics of vision to patterns seen in radiographic images of the skeleton, chest and abdomen
4. Apply a logical method to the radiographic evaluation of bones, soft tissues and joints of the skeletal system, chest and abdomen
5. Recognize the characteristics of the radiographic representation of common pathologies affecting the skeletal system, chest and abdomen
6. Create a series of evidence based radiographic comments related to the interpretation of general radiographic images

Recommended Textbooks and Readings:

- Chan, O (2013) ABC of Emergency Radiology, 3rd Ed, BMJ Blackwell Publishing, London: eBook
- McConnell, J. Eyres, R., Nightingale, J. (2008). Interpreting Trauma Radiographs. BMJ Blackwell Publishing, London.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assignment (written assignment of 1000 words)	20%	Week4
2.Written Exam 1 (MSK Pattern Recognition exam)	20%	Week8
3.Written Exam 2 (MSK Pattern Recognition exam)	20%	Week12
4.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16
Total	100%	

Course Outline:

Week No.	Topic	Content
1	Introductory lecture Writing a Lit review Choosing an assay Topic for lit review	
2	Psycho Physics theory in RMI	Psycho Physics Measuring performance in Radiography Reporting

		Psycho Physics Measuring performance in Radiography Reporting CONT Moodle book self-study 1
3	Psycho Physics theory in RMI (cont.)	Decision making in medical Imaging Moodle book Self-study 2 Mechanisms of Injury
4	Introduction to Radiography Opinion Forms Assignment	Pattern Recognition ABC Search Strategy Terminology and Commenting Part A Terminology and Commenting Part B Moodle Book Self Study 3
5	Image Interpretation Upper limb	Pattern Recognition Appendicular Upper Limb Pattern Recognition Appendicular Upper Limb CONT Moodle Book Self-study 4
6	Image Interpretation lower limb and pelvis	Pattern Recognition the Appendicular Lower Limb Pattern Recognition the Appendicular Pelvis Pattern Recognition Appendicular Common Pathologies
7	Recognition of Rheumatology	Pattern Recognition Rheumatology
8	MSK Pattern Recognition exam Exam 1	MSK image review
9	MSK Pattern Recognition revision	Computer Based Test
10	Recognition of Emergency Spine	Pattern Recognition Emergency Spine
11	Recognition of Abdomen	Pattern Recognition the Adult Abdomen Pattern recognition Pediatric Abdomen

12	Recognition of the Adult Chest Exam 2	Pattern Recognition the Adult Chest Pattern Recognition Pediatric Chest
13	Recognition of Facial Bones and Skull	Pattern Recognition Facial Bones and Skull Moodle Book Self Study
14	Spine , Chest, Abdomen Mock Pattern Recognition	Spine, chest, and abdomen image review
15	Spine , Chest, Abdomen, Pattern Recognition	Computer Based image
16	Final	

RMI 343 Radiographic pathology Interpretation lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 342 Radiographic pathology Interpretation

Instructor: Fatima AlAli

Contact: Fatima.AlAli@fchs.ac.ae

Course Description:

This is a practical lab course provide the students with the skills, knowledge and judgment to comment on radiological images and develop a range of skills to detect acute and chronic pathology utilizing X-ray images.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Distinguish between sensitivity, specificity and accuracy in relation to the interpretation of general radiographic images
2. Differentiate between search error, detection error and interpretation error in relation to the interpretation of radiographic images
3. Apply the knowledge of the psychophysics of vision to patterns seen in radiographic images of the skeleton, chest and abdomen
4. Apply a logical method to the radiographic evaluation of bones, soft tissues and joints of the skeletal system, chest and abdomen
5. Recognize the characteristics of the radiographic representation of common pathologies affecting the skeletal system, chest and abdomen
6. Create a series of evidence based radiographic comments related to the interpretation of general radiographic images

Recommended Textbooks and Readings:

- Chan, O (2013) ABC of Emergency Radiology, 3rd Ed, BMJ Blackwell Publishing, London: eBook
- McConnell, J. Eyres, R., Nightingale, J. (2008). Interpreting Trauma Radiographs. BMJ Blackwell Publishing, London.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Exam 1 (MSK Pattern Recognition exam)	20%	Week4
2.Lab Report (Students carry out a practical session and are then assessed on written report)	40%	continuous
3.Final Presentation (oral power point presentation of 15 min)	40%	Week12
Total	100%	

Course Outline:

Week No.	Topic
1	Revision of Anatomy on X ray images
2	Image Interpretation of Upper limb using X-ray images (Anatomy & pathology)
3	Image Interpretation of Upper limb using X-ray images (Anatomy & pathology) (cont.)
4	Image Interpretation of lower limb using X-ray images (Anatomy & pathology)
5	Image Interpretation of lower limb using X-ray images (Anatomy & pathology) (cont.)
6	Image Interpretation of pelvis (Anatomy & pathology)
7	Recognition of Rheumatology on images (Anatomy & pathology)
8	Recognition of Emergency Spine X-ray images (Anatomy & pathology)

9	Recognition of Abdomen using X-ray images (Anatomy & pathology)
10	Recognition of the Adult Chest using X-ray images (Anatomy & pathology)
11	Recognition of Facial Bones and Skull using X-ray images (Anatomy & pathology)
12	Revision
13	Student feedback

RMI 444 Sectional Imaging Anatomy

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: RMI 223 Radiographic anatomy & positioning 2

Course Co-Requisite: RMI 445 Sectional imaging anatomy lab

Instructor: Qays Alhourani

Contact: Qays.AlHorani@fchs.ac.ae

Course Description:

This course specifically addresses sectional anatomy of the human body. Students will learn about the anatomical representation and relationships of the bones, organs, blood vessels, nerves and muscles comprising the chest, abdomen, male and female pelvis, spine, limbs and girdles in multiple planes as demonstrated on CT and MRI.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Distinguish between normal and abnormal sectional anatomy as they appear on computed tomography, magnetic resonance and digital subtraction angiographic images.
2. Compare and contrast the computed tomography, magnetic resonance and digital subtraction angiographic appearances of different organs and regions in human body.
3. Discriminate between the osseous and soft tissue components, important muscles and blood vessels of the chest, abdomen, male and female pelvis, spine, limbs and girdles as displayed on sectional CT and MRI images

Recommended Textbooks and Readings:

- Lazo D,(2015), Fundamentals of Sectional Anatomy: An Imaging Approach 2nd edition Cengage CT, USA

- Lazo D,(2015), Fundamentals of Sectional Anatomy: Workbook 2nd edition Cengage CT, USA
- Madden, M (2013), Introduction to Sectional Anatomy 3rd Ed. Lippincott Williams and Wilkins, Philadelphia
- Madden, M ,(2013),Introduction to Sectional Anatomy: Workbook and Board review 3rd Ed. Lippincott Williams and Wilkins, Philadelphia
- Haines EH 2012 Neuroanatomy, An Atlas of structures, sections and systems, 8th edition Wolters, Klumer, Lippincott Williams& Wilkins

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assignment (written assignment of 1000 words)	30%	Week4
2.Computer based image analysis and recognition exam	30%	Week10
3.Final written examination (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16

Course Outline:

Week	Lecture
W1	Imaging Anatomy 1 Skull and Facial bones radiography
W2	Imaging Anatomy 2.CT Sectional imaging anatomy The brain

W3	Imaging Anatomy 3. MRI Sectional imaging anatomy the brain
W4	Imaging Anatomy 4 CT Sectional Anatomy Spine and MSK Assignment
W5	Imaging Anatomy 5.MRI MSK and Spine
W6	Imaging Anatomy 6. Vascular Imaging Anatomy of head and neck
W7	Imaging Anatomy 7. Cerebrovascular Disease
W8	Imaging Anatomy 8. CT Sectional Anatomy Abdomen and pelvis
W9	Imaging Anatomy 9. MRI Sectional anatomy Abdomen and pelvis
W10	Imaging Anatomy 10. MRI Sectional Anatomy Abdomen and pelvis Computer based image analysis and recognition exam
W11	Imaging Anatomy 11 CT Sectional Anatomy, neck
W12	Imaging Anatomy 12 CT Sectional Anatomy, thorax
W13	Imaging Anatomy 13 MRI Sectional Anatomy neck
W14	Imaging Anatomy 14 MRI Sectional Anatomy thorax
W15	Imaging Revision Session
16	Final Examination

RMI 445 Sectional Imaging Anatomy lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 444 Sectional imaging anatomy

Instructor: Qays Alhourani

Contact: Qays.AlHorani@fchs.ac.ae

Course Description:

This lab course will allow students to identify anatomical parts on CT and MRI images using CT scanner, CT simulator and MRI simulator. In addition, viewing boxes will be used to visualized printed images of different organs such as chest, abdomen, male and female pelvis, spine, limbs and girdles in multiple planes as demonstrated on CT and MRI.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Distinguish between normal and abnormal sectional anatomy as they appear on computed tomography, magnetic resonance and digital subtraction angiographic images.
2. Compare and contrast the computed tomography, magnetic resonance and digital subtraction angiographic appearances of different organs and regions in human body.
3. Discriminate between the osseous and soft tissue components, important muscles and blood vessels of the chest, abdomen, male and female pelvis, spine, limbs and girdles as displayed on sectional CT and MRI images.

Recommended Textbooks and Readings:

- Lazo D,(2015), Fundamentals of Sectional Anatomy: Workbook 2nd edition Cengage CT, USA

- Madden, M ,(2013),Introduction to Sectional Anatomy: Workbook and Board review 3rd Ed. Lippincott Williams and Wilkins, Philadelphia

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Lab reports (Students carry out a practical session and are then assessed on written report)	50%	continuous
2.Image anatomy labelling exam	30%	Week4
3.Presentation (oral power point presentation of 15 min)	20%	Week 9

Course Outline:

Week.	Topics
W1	Lab 1 Skull and Facial bones radiography using CT scan images of phantom
W2	Lab 2.CT Sectional images for the brain using CT scan images of phantom
W3	Lab 3. MRI Sectional images for the brain using MRI simulator images
W4	Lab 4 CT spine using CT scan images of phantom image anatomy labelling exam
W5	Lab 5.MRI Spine using MRI simulator images
W6	Lab 6. Vascular CT images head and neck using CT scan

W7	Lab 7. CT Sectional Anatomy Abdomen and pelvis using CT scan images of phantom
W8	Lab 8. MRI Sectional anatomy Abdomen and pelvis using MRI simulator images
W9	Lab 9. CT Sectional Anatomy of thorax using CT scan images of phantom Presentation
W10	Lab 10 MRI Sectional Anatomy of thorax using MRI simulator images
Wk11	Lab 11.Imaging Revision

RMI 417 Quality Management for Medical Imaging

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 2

Contact Hours: 2

Course Pre-Requisite: RMI 213 Principles of Medical Imaging

Course Co-Requisite: RMI 418 Quality Management for Medical Imaging lab

Instructor: Christopher Hayre

Contact: Christopher.Hayre@fchs.ac.ae

Course Description:

This course will cover procedures and guidelines to monitor and calibrate imaging equipment in order to optimize patient dose and image quality. This course will guide student through laboratory and experimental sessions to understand the techniques used to maintain the imaging equipment at optimal level. At the end of this course, student will be able to diagnose the image quality in terms of artefacts and make necessary corrections for optimization.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe the significance of quality assurance and quality control in medical imaging
2. Define the components and processes of quality assurance program
3. List tools for quality control procedures
4. Evaluate image quality
5. Demonstrate skills in using quality control tools for image optimizations

Recommended Textbooks and Readings:

- Jeffrey Papp, Quality Management in the Imaging Sciences, 6th edition, 2018

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Quiz1(mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 4
2. Quiz2 (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week 8
3. Assignment (written assignment of 1000 words)	20%	Week 12
4. Final exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week 16

Course Outline:

Week No.	Topic
1	Quality Management Tools and Procedures
2	Film Processing
3	Processor Quality Control
4	Quzi1
5	Quality Control of Radiographic Equipment
6	Quality Control of Fluoroscopic Equipment
7	Digital Image Receptors and Advanced Imaging Equipment

8	Quiz2
9	Mammographic Quality Standards
10	Quality Control in Computed Tomography
11	Quality Control for Magnetic Resonance Imaging Equipment
12	Assignment
13	Ultrasound Equipment Quality assurance
14	Nuclear Medicine Quality assurance
15	Revision
16	Final

RMI 418 Quality Management for Medical Imaging lab

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 1

Contact Hours: 2

Course Pre-Requisite: NA

Course Co-Requisite: RMI 417Quality Management for Medical Imaging

Instructor: Christopher Hayre

Contact: Christopher.Hayre@fchs.ac.ae

Course Description:

This lab course will cover procedures and guidelines to monitor and calibrate imaging equipment in order to optimize patient dose and image quality utilizing lab tools for calibration and image quality phantoms. This course will be conducted through laboratory experimental sessions.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe the significance of quality assurance and quality control in medical imaging
2. Define the components and processes of quality assurance program
3. List tools for quality control procedures
4. Evaluate image quality
5. Demonstrate skills in using quality control tools for image optimizations

Recommended Textbooks and Readings:

- Jeffrey Papp, Quality Management in the Imaging Sciences, 6th edition, 2018

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Lab reports (Students carry out a practical session and are then assessed on written report)	50%	continuous
2. Written exam (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	10%	Week4
3. Presentation (oral power point presentation of 15 min)	20%	Week8
4. Assignment (written assignment of 1000 words)	20 %	Week10
Total	100%	

Course Outline:

Week No.	Topic
1	Lab 1: Introduction to calibration tools and Procedures using calibration phantoms
2	Lab 2: Conventional Film Processing Vs digital printing devises
3	Lab 3: Maintenance of image processor steps
4	Lab 4: Collimation calibration experiment Written exam
5	Lab 5: Effect of filtration experiment

6	Lab 6: Exposure factors measurements experiment
7	Lab 7: Computed Tomography calibration
8	Lab8: Measurement of radiation levels and leakage experiment
9	Lab9: Radiation dose in correlation with exposure factors chart
10	Lab 10: US equipment calibration with US phantoms
11	Lab11: Revision
12	Student feedback

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

RMI 464 CP4A

Credit Hours: 3

Contact Hours:9

Course Pre-Requisite: RMI 363 CP3

Course Co-Requisite: RMI 465CP4B

Instructor: Fatima AlAli

Contact: Fatima.AlAli@fchs.ac.ae

Course Description:

This is a first semester course. it builds upon the scientific knowledge and clinical experiences developed through engagement with the previous semesters. Thus, the clinical component will continue to provide experience in mobile imaging, accident and emergency imaging, paediatrics, geriatrics and radiography of the skull including dental imaging and geriatric imaging, CT and MRI. The development of clinical skills in relation to the evaluation of general radiographic images in terms of the clinical question and patient management will occur as will a progression in relation to general radiographic skills along the novice to expert model of clinical skill development.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Identify personal learning goals in respect to the development of professional expertise
2. Participate in digital subtraction angiographic examinations
3. Implement and evaluate appropriate general radiographic examinations for the musculoskeletal and respiratory
4. Perform MRI and CT examinations

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

Course Outline:

Week	Days	Area
2 to 13	Wednesday 8am – 3pm	Clinical Placement CP4A
	Thursday 8am- 3pm	
14	OSCE & Clinical Learning Portfolio submission	

RMI 465 CP4B

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours:3

Contact Hours: 9

Course Pre-Requisite: RMI 363 CP3

Course Co-Requisite: RMI 464CP4A

Instructor: Fatima AlAli

Contact: Fatima.AlAli@fchs.ac.ae

Course Description:

This course focuses on CT, MRI and US imaging. It is an ongoing development of clinical expertise in parallel with CP4A.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain the clinical rationale for the selection of CT and MRI scanning protocols, image display and reconstruction methods for CT and MRI examinations of the head, chest, abdomen and spine
2. Implement positioning methods for CT and MRI examinations of the head, chest, abdomen and spine
3. Identify the CT and MRI appearances of the anatomical structures comprising the head, chest, abdomen
4. Apply evidence based inquiry principles developed in second year to an advanced radiographic practice clinical issue.

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.

- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

1. **Course Outline:**

Week	Days	Area
2 to 13	Wednesday 8am – 3pm	Clinical Placement CP4A
	Thursday 8am- 3pm	
14	OSCE & Clinical Learning Portfolio submission	

RMI 466 CP5A

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours:3

Contact Hours: 9

Course Pre-Requisite: RMI 465 CP4B

Course Co-Requisite: RMI 467 CP5B, RMI 468 CP5 C, RMI 469 CP5 D

Instructor: Nisha Thankappan Kayaplackal

Contact: Nisha.Kayaplackal@fchs.ac.ae

Course Description:

This course is a final year clinical placement. The training will emphasize on CT and Ultrasound in this placement but will be required to work in general procedures at the level of a competent student.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Modify and adapt general and advanced radiographic techniques, radiation protection strategies, professional communication skills to the level of a competent student radiographer.
2. Identify ongoing personal learning goals in respect to the continued development of professional expertise in general radiography and ultrasound.
3. Apply the knowledge of radiation dose to the delivery of radiation during CT imaging

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.

- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

Course Outline:

Week	Days	Area
2 to 13	Monday 8am – 3pm	Clinical Placement CP5A
	Tuesday 8am- 3pm	
14	OSCE & Clinical Learning Portfolio submission	

RMI 467 CP5B

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours:3

Contact Hours: 9

Course Pre-Requisite: RMI 465 CP4B

Course Co-Requisite: RMI 466 CP5 A, RMI 468 CP5 C, RMI 469 CP5 D

Instructor: Nisha Thankappan Kayaplackal

Contact: Nisha.Kayaplackal@fchs.ac.ae

Course Description:

In this clinical course, students will also continue to develop and refine their CT and MRI imaging skills.

Course Learning Outcomes

Upon completion of this course, students will be able to:

1. Prepare the co-operative patient for the implementation of multislice CT scanning protocols
2. Conduct pre-scanning screening of MRI patients and provide clear instructions of the procedure prior to performing MRI
3. Describe the selection of clinical CT and MRI imaging protocols
4. Demonstrate familiarity with use of CT and MRI workstation software to provide a range of image options in these modalities
5. Explain the use of quality control measures relevant to medical multislice CT and MRI
6. Synergize image appearances and health assessments in the clinical environment using appropriate terminology

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.

- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

Course Outline:

Week	Days	Area
1 to 13	Sunday	Clinical Placement CP5B
14	OSCE	

RMI 468 CP5 C

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours:3

Contact Hours: 9

Course Pre-Requisite: RMI 465 CP4B

Course Co-Requisite: RMI 466 CP5 A, RMI 467 CP5B, RMI 469 CP5 D

Instructor: Jerald Paul Immanuel

Contact: Jerald.Immanuel@fchs.ac.ae

Course Description:

It is the final period of continuous supervised practice. It is intended to enable final year students enrolled in the Bachelor of Medical Imaging to demonstrate they have reached the expected level of clinical competency in general radiography and computed tomography in order that they can assume independent practice as a radiographer upon graduation from the course. Additionally, this final period provides opportunities for final year students to reflect upon their professional development as health care practitioners.

Course Learning Outcomes:

Upon completion of this course, students will be able to:
1. Demonstrate an understanding of professional responsibility for the delivery of general radiographic examinations (including fluoroscopy) of the musculo-skeletal system, respiratory system, the gastro-intestinal tract, the genito-urinary system, and hepato-biliary system under appropriate levels of supervision
2. Adapt the standard general and advanced radiographic methods, techniques (including fluoroscopy) and radiation protection approaches used to image the body systems
3. Provide all patients irrespective of their socio-economic, cultural, ethnic or religious background with a duty of care commensurate with the expectations of the relevant professional registration board and professional body
4. Identify the anatomical structures displayed in the images created during general radiographic examinations of the body systems

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

Course Outline:

Week	Days	Area
2 to 13	Tuesday 8am – 3pm	Clinical Placement CP5 C
	Wednesday 8am- 3pm	
	Thursday 8am – 3pm	
14	OSCE & Clinical Learning Portfolio submission	

RMI 469 CP5 D

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours:3

Contact Hours: 9

Course Pre-Requisite: RMI 465 CP4B

Course Co-Requisite: RMI 466 CP5 A, RMI 467 CP5B, RMI 468 CP5 C

Instructor: Jerald Paul Immanuel

Contact: Jerald.Immanuel@fchs.ac.ae

Course Description:

This course will provide students with a comprehensive and final clinical placement before graduation.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Operate different imaging modalities including X-ray, MRI, CT and US in a professional way
2. Determine the quality of the produced images
3. Perform quality control of different modalities

Recommended Textbooks and Readings:

- Bontrager, K.L. and Lampignano, J.P., (2014), Textbook of Radiographic Positioning and Related Anatomy, 8th edition, Mosby: St Louis, Missouri.
- McQuillen Martensen K. (2018), Radiographic Image Analysis 5th Edition, Saunders: St Louis, Missouri.
- McQuillen Martensen K. (2014), Radiographic Image Analysis Workbook 4th Edition, Saunders: St Louis, Missouri.
- Bushong, S. (2017) Radiologic science for technologists: physics, biology, and protection, 11th edition, Elsevier Mosby, St. Louis, Mo; London.

Course Assessment and Grading Policy:

Assessment 1: Objective Structured Clinical examination (OSCE) (Clinical assessment) (Comprehensive oral and written exam to measure the overall clinical imaging skills of students)
Assessment 2: Workbook (student need to complete a clinical workbook composed of the cases that performed in the hospital under supervision of the preceptor)
Assessment 3: Attendance (should not exceed 15% of the total assigned clinical days)
Assessment 4: Professionalism (Dress code, TLD badge, and student attendance and professional/ethical attitude are assessed continuously)

Course Outline:

Week	Days	Area
2 to 13	Tuesday 8am – 3pm	Clinical Placement CP5 D
	Wednesday 8am- 3pm	
	Thursday 8am – 3pm	
14	OSCE & Clinical Learning Portfolio submission	

RMI 451 Advanced topics in Ultrasound (Elective course)

Credit Hours:2

Contact Hours: 2

Course Pre-Requisite: RMI 333 Ultrasound imaging

Course Co-Requisite: NA

Instructor: Fatima AlAli

Contact: Fatima.AlAli@fchs.ac.ae

Course Description:

This course comprises the sonographic anatomy of the abdominal organs and related structures, sonographic representation of common abdominal pathologies. It includes selection of appropriate ultrasound equipment, and optimization of technical factors. Scanning techniques for the liver, gallbladder, biliary system, anterior abdominal wall & hernias, peritoneum & retro peritoneum and Doppler ultrasound of the upper abdomen are covered and students will participate in the scanning of models under supervision to enable them to apply these principles and develop basic practical skills in a simulated clinical environment.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Describe sonographic imaging methods
2. Describe normal structures, function and common pathological appearances of structures in ultrasound images.
3. Explain the function, application and potential pitfalls of ultrasound instrumentation used in abdominal ultrasound scanning, including B- mode, spectral Doppler and imaging artefacts.
4. Discuss hazards and safety of diagnostic ultrasound.
5. Perform ultrasound examinations

Recommended Textbooks and Readings:

- Bates, J.A., (2011) Abdominal Ultrasound: How, Why and When, Churchill Livingstone.

- Gill R. (2016) the physics and technology of diagnostic ultrasound. High Frequency Publishing, Melbourne.
- Kremkau, F.W. (2016), Sonography Principles and Instruments, 9th Ed, Saunders Elsevier, Missouri, USA.
- Rumack, C.M., Wilson S.R., Charboneau, J.W., (2011), Diagnostic Ultrasound Vol 1 & 2. 4th Edition, Mosby.
- Curry R, Tempkin BB, 2016 Sonography: an introduction to normal structure and functional anatomy, 4th Ed. Elsevier Saunders St Louis Mo.
- Tempkin BB, 2014 Ultrasound Scanning Principles and Protocols, 4thEd. Elsevier Saunders, St Louis Mo.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1. Presentation (oral power point presentation of 15 min)	20%	Week4
2. Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week8
3. Quiz (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	20%	Week11
4. Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16
Total	100%	

Course Outline:

Week No.	Topic
Week1-2	Liver Anatomy and Diffuse Pathology
Week3	Liver Focal Pathology
Week4	Gallbladder Presentation
Week5	Biliary tree
Week6	Abdominal Wall and Hernias
Week7	Pleura, Peritoneum and Retroperitoneum
Week8	Midterm Exam
Week9	Doppler and Haemodynamics
Week10	Abdominal Doppler Applications and Optimization
Week11	Doppler Quiz
Week12	Biological effect
Week13	Image quality
Week14-15	Revision
Week16	Final Exams

RMI 452 Advanced topics in CT (Elective course)

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours:2

Contact Hours: 2

Course Pre-Requisite: RMI 337 Computed tomography imaging

Course Co-Requisite: NA

Instructor: Qays Alhourani

Contact: Qays.AlHorani@fchs.ac.ae

Course Description:

This course will provide the students with the skills and knowledge in advanced multi slice computed tomography.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain the physical principle of image processing techniques such as multi-planar reformats, maximum intensity projection (MIP), slab-MIP, surface rendering and volume rendering and their significance to MSCT imaging.
2. Differentiate between axial, SSH and MSH scanning modes/systems
3. Describe how oversampling techniques are used in the collection, processing and visualization of 3-D images.
4. Describe the methods used to enable MSCT to be used to image the heart including the concept of dose modulation in cardiac CT.
5. Outline the principles of specialist techniques of CT scan.

Recommended Textbooks and Readings:

- Seeram, E., (2015), Computed tomography Physical principles, clinical applications and quality control, 4th edition, W.B. Saunders Company, Philadelphia.
- Webb, W.R., Brant, W.E. & Major, N.M. (2014), Fundamentals of Body CT, Saunders Elsevier, Philadelphia, PA, USA.
- Romans, L. (2018). Computed Tomography for Technologists: A Comprehensive Text. Lippincott Williams & Wilkins.

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Assessment 1 written assignment (written assignment of 1000 words)	20%	Week4
2.Assessment 2 midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week8
3.Assessment 2 quiz (mixed exam of MCQ and essay questions about covered topics, 20-30 min)	20%	Week11
4.Assessment 4 Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min	40%	Week16
Total	100%	

Course Outline:

WEEK	LECTURES	Topic and Content
W1	Introduction to Course	
W2	Principles of MSCT	the essential procedural steps in performing a CT scan for different body parts
W3	Image processing and Visualization	Post processing techniques and DICOM system
W4	Special imaging techniques	CT Biopsy
W5	Special imaging techniques	Interventional techniques
W6	Special imaging techniques	Virtual Colonography/Endoscopy
W7	Cardiac CT	MSCT protocols for performing a CCTA
W8	MT exam	

W9	CT Angiography	impact of MSCT upon angiography and the role of the radiographer, appropriate usage and administration of iodinated contrast media
W10	CT in the Emergency Setting	• distinguish abnormal appearances from normal CT Pulmonary Angiogram (CTPA) • identify a pulmonary embolus on a CTPA • distinguish abnormal appearances from normal CT Brain • identify common acute intracranial pathology in a CT brain
W11	Protocols and Dose Optimization	
W12	Dose reduction in MSCT	
W13	DRL ,CTDI ,DLP	
W14	factors affecting dose in CT	
W15	revision	
W16	FINAL EXAMS	

RMI 453 Advanced topics in MRI (Elective course)

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours:2

Contact Hours: 2

Course Pre-Requisite: RMI 335 Magnetic resonance imaging

Course Co-Requisite: NA

Instructor: Wijdan Alomaim

Contact: Wijdan.Alomaim@fchs.ac.ae

Course Description:

This course will provide the students with the skills and knowledge in advanced MRI techniques.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Explain the role played by the radiographer in the application of safety principles within the MRI suite.
2. Describe a range of clinical indications, patient presentations, patient preparation and positioning methods for MRI studies of the brain, spine and joints of the upper and lower limbs
3. Recognize the characteristics of the MRI representation of common pathologies affecting the brain, spine and joints of the upper and lower limbs.
4. Outline the principles of specialist techniques.

Recommended Textbooks and Readings:

- C Westbrook, C Kaut-Roth, J Talbot (2018), MRI In Practice (5th Edition), Wiley-Blackwell Publishing, UK

- S C Bushong (2015), Magnetic Resonance Imaging Physical and Biological Principles, Mosby, USA

Course Assessment and Grading Policy:

Assessment	Weighting	Date
1.Written Assignment (written assignment of 1000 words)	20%	Week4
2. Power point Presentation of 15 min	20%	Week8
3.Midterm Exam (mixed exam of MCQ and essay questions about covered topics, 60 min)	20%	Week11
4.Final Exam (Comprehensive mixed exam of MCQ and essay questions about covered topics, 120 min)	40%	Week16
Total	100%	

Course Outline:

Week No.	Topic
1	Introduction to the Course
2	Practical Aspects of Clinical MRI
3	MRI of the Brain 1

4	MRI of the Brain 2 Written Assignment
5	MRI of the Spine 1
6	MRI of the Spine 2
7	MRI of the Appendicular Upper Limb and joints 1
8	MRI of the Appendicular Upper Limb and joints 2 Power point Presentations
9	MRI of the Appendicular Lower Limb and Joints 1
10	MRI of the Appendicular Lower Limb and Joints 2
11	MRI of Chest, Abdomen, Breast 1 Midterm Exam
12	MRI of Chest, Abdomen, Breast 2
13	MRI Technical Parameters 1
14	MRI Technical Parameters 2
15	The principles of specialist techniques

16	Final exam

RMI 471 Research project

كلية فاطمة للعلوم الصحية
FATIMA COLLEGE OF HEALTH SCIENCES

Credit Hours: 3

Contact Hours:3

Course Pre-Requisite: GRD 361 Research Methodology

Course Co-Requisite: NA

Instructor: Mustafa Alhasan

Contact: Mustafa.alhasan@fchs.ac.ae

Course Description:

This course builds upon the foundation established in earlier years of the course and examines in greater depth the scientific method and the various research designs available to clinicians seeking answers to health related questions.

This element will equip students with the capacity to differentiate between quantitative and qualitative research methods, evaluate the veracity of research claims, understand current trends in research in medical imaging and their implications for evidence based health care.

The second element of the course provides students with the opportunity to apply the knowledge developed previously and complete a literature review of a chosen topic agreed by a supervisor. Students will learn how to communicate effectively using written and oral communication through the creation of a written report and a formal oral presentation.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

1. Review the scientific research process in light of an understanding of the moral, ethical and legal responsibilities
2. Differentiate between a qualitative and quantitative research design within clinical medical imaging
3. Demonstrate the capacity to search the scientific literature to obtain related information
4. Wright a research proposal to apply earned knowledge
5. Prepare a scientific research paper
6. present the scientific paper in power point format

Recommended Textbooks and Readings:

- Polgar S and Thomas S A (2013), Introduction to Research in the Health Sciences, 6th edition, Churchill Livingstone, Sydney.

- Hoffmann T, Bennett S, Del Mar C (2013). Evidence-Based Practice across the health professions. Churchill Livingstone, Sydney.

Course Assessment and Grading Policy:

1. Continues meetings with student mentor during the semester
2. Submission of final research project to the student research mentor (word and power point) by the end of semester
3. Oral presentation by the end of semester

Course Outline:

Week	Contents
1	Syllabus
2	Introduction to research
3	Topics and student mentor selection
4-11	Meeting with mentor
12	Revision of research progress
13	Final submission of research project
14-15	Final oral presentations