



UNIVERSITI TEKNOLOGI MARA

MIT163: RADIOGRAPHIC INSTRUMENTATIONS II

Course Name (English)	RADIOGRAPHIC INSTRUMENTATIONS II APPROVED
Course Code	MIT163
MQF Credit	3
Course Description	This course covers the key physical and technical principles of digital imaging equipment including computed radiography (CR), digital radiography (DR), digital subtraction angiography technique, and fluoroscopy. It is designed to complement the Radiographic Instrumentations I in Semester 1 by providing the student the opportunity to enhance knowledge, numeracy and leadership skills.
Transferable Skills	Demonstrate ability to identify and articulate self skills, knowledge and understanding confidently and in a variety of context
Teaching Methodologies	Lectures, Lab Work, Tutorial, Small Group Sessions
CLO	CLO1 Discuss the fundamentals of Computed Radiography (CR), Digital radiography (DR), fluoroscopy, and image quality parameters. CLO2 Analyse numerical data in mathematical processes relevant to image quality in general radiography. CLO3 Demonstrate leadership skills through a group work pertaining to CR, DR, fluoroscopy, and image quality parameters.
Pre-Requisite Courses	No course recommendations
Topics	
1. 1.Basic principles of conventional/analog x-ray image capture devices. 1.1) 1.1. Recording material 1.2) 1.2. Film, intensifying screen, cassette	
2. 2.Computed Radiography (CR) 2.1) 2.1. Introduction to CR 2.2) 2.2. Basic principles of operation of CR 2.3) 2.3. Major components of CR 2.4) 2.4. CR image acquisition	
3. 3. Digital Radiography (DR) 3.1) 3.1. Introduction to DR 3.2) 3.2. Basic principles of operation DR 3.3) 3.3. Major components of DR 3.4) 3.4. DR image acquisition	
4. 4. Radiographic Image Processing and Manipulation (Analog & Digital) 4.1) 4.1. Overview of analog image processing 4.2) 4.2. Image manipulation & display monitors 4.3) 4.3. Conventional screen-film images and dynamic image recording	
5. 5. Analysing Image Quality (conventional screen-film & digital) 5.1) 5.1. Factors affecting Image Quality related to conventional screen-film, CR, and DR	
6. 6. Recording Material 6.1) 6.1. X-ray film 6.2) 6.1.1. Construction 6.3) 6.1.2. Purpose 6.4) 6.1.3. Composition 6.5) 6.1.4. Physical properties 6.6) 6.1.5. Characteristics 6.7) 6.1.6. Storage 6.8) 6.2. Intensifying Screens 6.9) 6.2.1. Construction	

- 6.10) 6.2.2. Purpose
- 6.11) 6.2.3. Composition
- 6.12) 6.2.4. Physical properties
- 6.13) 6.2.5. Characteristics
- 6.14) 6.2.6. Storage
- 6.15) 6.3. Cassettes
- 6.16) 6.3.1. Construction
- 6.17) 6.3.2. Types

7. 7. Introduction to Radiographic Film processing

- 7.1) 7.1. Developing
- 7.2) 7.2. Fixing
- 7.3) 7.3. Washing
- 7.4) 7.4. Drying
- 7.5) 7.5. Archiving

8. 8. Processing

- 8.1) 8.1. Darkrooms
- 8.2) 8.1.1. Design & Area

9. 9. Digital Fluoroscopy Imaging Systems

- 9.1) 9.1. Image intensifiers
- 9.2) 9.1.1. Purposes
- 9.3) 9.1.2. Constructions, design and operational principle
- 9.4) 9.1.3. Imaging modes and characteristics
- 9.5) 9.1.4. Viewing Systems
- 9.6) 9.1.5. Recording Systems
- 9.7) 9.1.6. Radiation protection and safety considerations
- 9.8) 9.2. Digital subtraction technique
- 9.9) 9.2.1. Basic principle.
- 9.10) 9.2.2. Subtraction methods.
- 9.11) 9.2.3. Digital subtraction angiography (DSA).

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Generate simple image quality calculations relevant to defined areas of practice	30%	CLO2
	Group Project	Discuss in a group about CR, DR, fluoroscopy, and image quality parameters.	20%	CLO3
	Test	Test on CR, DR, fluoroscopy, and image quality parameters.	25%	CLO1
	Test	Test on CR, DR, fluoroscopy, and image quality parameters.	25%	CLO1

Reading List	Recommended Text	• Hayre, C. M. & Cox. W. A.S. 2020, <i>General Radiography: Principles and Practices.</i> , CRC Press.
	Reference Book Resources	<ul style="list-style-type: none"> • Bushong, S.C. 2020, <i>Radiologic Science for Technologists: Physics, Biology and Protection</i>, Elsevier Health Sciences. • Seeram, E. 2019, <i>Digital Radiography: Physical Principles and Quality Control</i>, Springer • Carlton, R. R., Adler, A. M. , Balac, V. 2012, <i>Principles of radiographic Imaging; an art and a science.</i>, 6th Ed., Cengage Learning, Inc • Terri L. F. 2016, <i>Radiographic Imaging and Exposure - E-Book</i>, 5th Ed., Elseiver Mosby USA
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	