MEDI12008 *Fundamentals of Radiographic Imaging*
Term 3 - 2017

Profile information current as at 05/05/2024 08:53 am

General Information

Overview
The unit will provide you with the foundation knowledge needed for interpretation of radiographic image appearances and safe and effective use of digital radiographic imaging systems. You will learn the theoretical concepts of radiation production and control, radiation interactions in matter, image acquisition and digital image processing. You will learn how and why to limit radiation exposure through the study of radiation bioeffects and best practice in radiation protection.

Details
Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Prerequisite: MEDI11002 Physics for Health Sciences Antirequisite: MEDI12002 Science & Instrumentation 1
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

Offerings For Term 3 - 2017

- Brisbane
- Mackay
- Sydney

Attendance Requirements
All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website
This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **In-class Test(s)**
Weighting: 40%
2. **In-class Test(s)**
Weighting: 60%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Student feedback

Feedback
The Moodle site was well organised and provided a useful learning resources beyond the recorded lectures and text readings.

Recommendation
Maintain the Moodle site design and content.

Feedback from Student feedback, instructional team reflection

Feedback
The weekly tutorials provided effective consolidation of the previous week's concepts. The practice questions and response critiques in tutorials were helpful.

Recommendation
Maintain the weekly tutorial design and keep a focus on developing students' ability to articulate reasoned responses to theory questions.

Feedback from Student feedback, instructional team observations.

Feedback
The unit content covers fundamental theory of radiographic technique but currently is delivered with no hands-on learning activities. Students struggle to understand cause-and-effect relationships between technique and resultant images without the opportunity to put theory to practice.

Recommendation
Investigate the feasibility of adding a lab component to the first half of the unit, either in multiple weekly labs or as intensives, so that students can test theory concepts in producing their own images.

Feedback from Student feedback

Feedback
Some students have difficulty expressing a logical argument in a test situation and would prefer an additional assessment method for demonstrating their learning.

Recommendation
If a lab component can be added to the unit, consider adding a lab-based assessment item such as a portfolio in which students create a set of images to demonstrate core concepts of radiographic technique.

Feedback from Instructor observation

Feedback
Many students relied on the powerpoint slides from lectures rather than watching the actual recordings, and had an incomplete understanding of key terms and concepts as a result.

Recommendation
Reinforce to students that the powerpoint slides are meant to accompany, not replace, recorded lectures.

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Outline the construction, operation and clinical use of digital radiographic image acquisition and processing systems.
2. Discuss the underlying physical principles and the controls involved in x-ray beam production, emission and detection.
3. Apply the concepts of image geometry to discuss the controlled production of a projection radiograph from a point source of radiation.
4. Discuss parameters of image quality of digital radiographs.
5. Outline deterministic and stochastic effects of ionising radiation and current theories of dose-response their relationships.
6. Discuss safe practices and radiation protection standards in the clinical use of ionising radiation.

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level | • Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - In-class Test(s) - 40%	•	•	•	•		
2 - In-class Test(s) - 60%	•	•	•	•	•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
1 - Communication	•	•	•	•		
2 - Problem Solving			•	•		•
3 - Critical Thinking						
4 - Information Literacy	•	•	•	•	•	•
5 - Team Work						
6 - Information Technology Competence				•	•	•
7 - Cross Cultural Competence						
8 - Ethical practice						•
9 - Social Innovation						

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
10 - Aboriginal and Torres Strait Islander Cultures						

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - In-class Test(s) - 40%	•	•		•						
2 - In-class Test(s) - 60%	•	•		•		•		•		

Textbooks and Resources

Textbooks

MEDI12008

Prescribed

Radiographic Imaging and Exposure
Edition: 5th (2017)
Authors: Fauber, Terri L
Elsevier
St. Louis , Missouri , USA
ISBN: 9789323356244
Binding: Other

Additional Textbook Information
All students enrolled in this unit this term should already have a copy of this textbook from prior study.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Caroline Falconi Unit Coordinator
c.falconi@cqu.edu.au

Schedule

Week 1 - 06 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to radiography • The radiograph as an attenuation map • introduction to radiographic terminology • overview of the imaging process • introduction to attributes of a radiographic image • viewing radiographic images		online tutorial on using learning goals and writing definitions

Week 2 - 13 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
X-ray beam production and control • x-ray tube basic construction and operation • controls of the emitted beam's quantity and quality • introduction to technical factor settings	Fauber Chapter 2	online tutorial on Week 1 content

Week 3 - 20 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
X-ray interactions in matter • attenuation • attenuation processes • factors affecting quantity of attenuation • fractional attenuation and transmission • differential attenuation	Fauber Chapter 3 Additional readings as posted on unit Moodle site	online tutorial on Week 2 content

Week 4 - 27 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
Control of spatial information • image geometry and projections through ray paths • distortions of spatial information (magnification, shape distortion, position distortion) • spatial resolution • unsharpness • control of geometric unsharpness	Fauber Chapter 3 Additional readings as posted on unit Moodle site	online tutorial on Week 3 content

Vacation Week - 04 Dec 2017

Module/Topic	Chapter	Events and Submissions/Topic

Week 5 - 11 Dec 2017

Module/Topic	Chapter	Events and Submissions/Topic
Control of contrast information • subject contrast • use of beam energy to control subject contrast • quantum mottle • use of beam quantity to control mottle • scatter behaviour • impact of scatter on contrast resolution	Fauber Chapters 3, 6 & 7 Additional readings as posted on unit Moodle site	online tutorial on Week 4 content **In-Class Test 1** Due: Week 5 Thursday (14 Dec 2017) 2:00 pm AEST

Week 6 - 18 Dec 2017

Module/Topic	Chapter	Events and Submissions/Topic

Control of scatter • factors affecting the magnitude of scatter produced • collimation • grids • air gap technique	Fauber Chapter 7 Additional readings as posted on unit Moodle site	online tutorial on Week 5 content

Week 7 - 01 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Principles of clinical radiographic imaging • standardisation of projections and positioning • technical factors and technique charts • equipment limitations • image evaluation	Fauber Chapters 6, 8 & 9	online tutorial on Week 6 content

Week 8 - 08 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Digital image fundamentals • digital image and image file properties • overview of the imaging process • image processing • control of spatial and contrast resolution of digital images	Fauber Chapter 4 Additional readings as posted on unit Moodle site	online tutorial on Week 7 content

Week 9 - 15 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Digital imaging technology • image receptor systems • image display and viewing • display adjustments (windowing, zoom, annotation) • image optimisation using processing • dose optimisation using digital radiograph • exposure index	Fauber Chapter 4 Additional readings as posted on unit Moodle site	online tutorial on Week 8 content

Week 10 - 22 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Radiation biology • dose metrics (exposure, absorbed dose and effective dose) • Bioeffects of ionising radiation (deterministic and stochastic effects) • Dose response theories	Additional readings as posted on unit Moodle site	online tutorial on Week 9 content

Week 11 - 29 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Radiation protection • ALARA principle • legislation and professional responsibilities • justification, limitation and optimisation • best practices in dose management • considerations for paediatric and pregnant patients • radiation occupational health and safety	Fauber Chapter 1 & Appendix C Additional readings as posted on unit Moodle site	online tutorial on Week 10 content

Week 12 - 05 Feb 2018

Module/Topic	Chapter	Events and Submissions/Topic

• Revision and consolidation		online tutorial on Week 11 content

Exam Week - 12 Feb 2018

Module/Topic	Chapter	Events and Submissions/Topic
		In-class Test 2 Due: Review/Exam Week Tuesday (13 Feb 2018) 1:00 pm AEST

Review/Exam Week - 12 Feb 2018

Module/Topic	Chapter	Events and Submissions/Topic
		In-class Test 2 Due: Review/Exam Week Tuesday (13 Feb 2018) 1:00 pm AEST

Term Specific Information

This unit is offered this term only to students who have attempted the unit previously. All lectures are provided as recorded videos. An online tutorial will be held weekly to consolidate the previous week's learning. There are no on-campus instructional sessions. However, you are required to attend on campus for the two in-class tests held during the term in Weeks 5 and 13.
You are expected to spend on average 10 - 12 hours of time each week in your study activities for this unit. A suggested time budget for weekly study is:

- 2 - 3 hours for watching recorded lectures and taking notes
- 1/2 - 1 hours for completing assigned reading
- 1 hour for completion of other posted learning activities
- 2 - 3 hours for creating study notes to meet weekly learning goals using lectures and readings
- 1/2 hour to prepare for tutorial using posted questions
- 1 hour of participation in online tutorial
- 1 - 2 hours for revision in preparation for assessments

Tutorials are interactive sessions where your participation enables you to check your understanding of and your ability to apply the week's concepts and for you to build your skills in responding to test questions. Your regular participation strongly supports your success in the unit. While online tutorials will be recorded, these recordings are not intended to replace your active participation in live sessions.

Assessment Tasks

1 In-Class Test 1

Assessment Type
In-class Test(s)

Task Description
You will write an in-class test to demonstrate your ability to apply the concepts and use the terminology from Weeks **1 - 4** of the unit. All questions will be based on the posted weekly learning goals for those weeks. Question tasks will be of the same types that you will practice in tutorials. These question tasks will include analysis of projected diagrams, photographs and radiographs, creation of line diagrams to illustrate concepts, explanations, definitions and discussions. Any projected visuals (diagrams, photographs and/or radiographs) will also be printed onto the test paper in low resolution. You will need to ensure that you can see the projected visuals during the test.
This test is a closed-book assessment of **60** minutes (1 hour) duration. You will have a 5 minute perusal time prior to the allotted writing time. You will write the test under examinations conditions as detailed in the Assessment Procedures. You will hand in your test paper and rough paper at the end of the test period.
This test must be written by the stated due date. As per the University's Assessment Procedures, there is no provision for a late submission and no late penalty can be applied. In the absence of an approved extension, you cannot complete this assessment at a later time, and you will receive a mark of zero for the assessment if you have not completed it by the scheduled date and time.

Assessment Due Date
Week 5 Thursday (14 Dec 2017) 2:00 pm AEST

Return Date to Students
Week 7 Friday (5 Jan 2018)

Weighting
40%

Assessment Criteria
Question responses will be scored on the following criteria:

- correct use and defining of terminology
- correct selection and application of core concepts to the specific question situation
- clarity, correctness, relevance and completeness of the response in addressing the question that was asked

Marks for each question are allocated based on the number of key points expected in the response to sufficiently address the question, and will be indicated on the test paper.

Referencing Style

- Harvard (author-date)

Submission
Offline

Learning Outcomes Assessed

- Outline the construction, operation and clinical use of digital radiographic image acquisition and processing systems.
- Discuss the underlying physical principles and the controls involved in x-ray beam production, emission and detection.
- Apply the concepts of image geometry to discuss the controlled production of a projection radiograph from a point source of radiation.
- Discuss parameters of image quality of digital radiographs.

Graduate Attributes

- Communication
- Problem Solving
- Information Literacy

2 In-class Test 2

Assessment Type
In-class Test(s)

Task Description
You will write an in-class test to demonstrate your ability to apply the concepts and use the terminology from all weeks of study, with emphasis on Weeks **5 - 11** of the unit. All questions will be based on the posted weekly learning goals. Question tasks will be of the same types that you will practice in tutorials. These tasks will include analysis of projected diagrams, photographs and radiographs and creation of line diagrams to illustrate concepts, as well as explanations, definitions and discussions. Any visuals that are provided for specific questions will be projected in the testing room and will also be printed in low resolution on the test paper. You will need to ensure that you can see the projected visuals during the test.
This test is a closed-book assessment of **105** minutes (1 3/4 hours) duration. You will have a five minute settling in period and 10 minute perusal time prior to the allotted writing time. You will write the test under examinations conditions as detailed in the Assessment of Coursework procedures. You will hand in your test paper and rough paper at the end of the test period.
This test must be written by the stated date and time. As per the Assessment of Coursework Procedures, this task is to be completed during a defined period. There is no opportunity to apply a late penalty. In the absence of an approved extension, you cannot complete this assessment at a later time, and you will receive a mark of zero for the assessment if you have not completed by the scheduled date and time.

Assessment Due Date
Review/Exam Week Tuesday (13 Feb 2018) 1:00 pm AEST

Return Date to Students
Exam Week Friday (16 Feb 2018)

Weighting
60%

Assessment Criteria
Question responses will be scored on the following criteria:

- correct use and defining of terminology
- correct selection and application of core concepts to the specific question situation
- clarity, correctness and completeness of the response in addressing the question that was asked

Marks for each question are allocated based on the number of key points expected in the response to sufficiently address the question, and will be indicated on the test paper.

Referencing Style

- Harvard (author-date)

Submission
Offline

Learning Outcomes Assessed

- Outline the construction, operation and clinical use of digital radiographic image acquisition and processing systems.
- Discuss the underlying physical principles and the controls involved in x-ray beam production, emission and detection.
- Apply the concepts of image geometry to discuss the controlled production of a projection radiograph from a point source of radiation.
- Discuss parameters of image quality of digital radiographs.
- Outline deterministic and stochastic effects of ionising radiation and current theories of dose-response their relationships.
- Discuss safe practices and radiation protection standards in the clinical use of ionising radiation.

Graduate Attributes

- Communication
- Problem Solving
- Information Literacy
- Information Technology Competence
- Ethical practice

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem