MEDI13001 *Science and Instrumentation 3*
Term 1 - 2017

All details in this unit profile for MEDI13001 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

Overview

This unit will expand on your prior study of x-ray equipment and imaging processes with particular focus on specialised imaging modalities. The primary focus of the unit is on the technical fundamentals (both theoretical and practical) of Computed Tomography to enable safe and effective scan technique. You will be introduced to the physical and operational principles of advanced medical imaging modalities including angiography, magnetic resonance imaging, ultrasound imaging, bone mineral densitometry and nuclear medicine imaging.

Details

Career Level: *Undergraduate*
Unit Level: *Level 3*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites

Pre-requisites MEDI12001 Radiation Science; and MEDI12002 Science & Instrumentation 1, and MEDI12005 Science and Instrumentation 2, and MEDI12007 Radiation Dose, Safety & Quality Assurance
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 1 - 2017

- Mackay

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. **Practical and Written Assessment**
Weighting: 50%
2. **In-class Test(s)**
Weighting: 50%

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.

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 Coordinator self-reflection Have your say evaluation

Feedback

Use of study guides for tutorials.

Recommendation

Provide study guides as a self-study tool for students to test their understanding of the course content. Include more interactive activities for tutorial sessions.

Action

The tutorials were highly interactive, with students expected to discuss concepts and draw images to explain some concepts. For some tutorials students were given the questions and scenarios beforehand in order to prepare their response.

Feedback from Coordinator self-reflection Have your say evaluation

Feedback

Portfolio Assessment.

Recommendation

Since students work in small groups to acquire the data for the portfolio assessment, it is recommended to have the final work submitted as a group work instead of individual submission. This will reduce the time spent marking the assessments and enable a more timely feedback to be provided.

Action

The portfolio was kept as an individual assessment in order to assess the understanding of individual students. Grades for this task ranged from 43% to 94%. If group assessments were introduced some form of self and peer assessment would be required to ensure equitable work between students

Feedback from Coordinator self-reflection

Feedback

Emphasis on definition of key terminologies to promote consistent usage within the course and in other core courses in the program.

Recommendation

Key terms were discussed during lectures, labs and tutorials but some of the terms were either confused or used interchangeably by students resulting in deviation from the context. Including a glossary list in the course Moodle site will help deal with this issue.

Action

An interactive glossary was provided for students to fill in as terms were explored and explained. A list of key terms was given to students with the instruction to add these terms to the glossary as they were covered.

Unit Learning Outcomes

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

1. Detail the processes of data acquisition, processing and image reconstruction in computed tomography.
2. Operate computed tomography equipment safely and effectively, with consideration to patient dose, image quality and equipment conservation.
3. Manipulate 3D data sets in computed tomography.
4. Outline the issues of image transmission, storage and viewing in DICOM and PACS-integrated digital radiology environments.
5. Discuss the design, operational features and clinical safety considerations of specialised applications such as angiography, bone mineral densitometry, ultrasonography and nuclear medicine imaging.

The learning outcomes are mapped to the following domains of the MRPB's 'Professional capabilities for medical radiation practice':
· Domain 4.1, 4.3 & 4.4
· Domain 5.2, 5.3, 5.6 & 5.7
· Domain 5A 3 -6

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
1 - Practical and Written Assessment - 50%	●	●	●		
2 - In-class Test(s) - 50%	●	●		●	●

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
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		●			

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
9 - Social Innovation					
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 - Practical and Written Assessment - 50%	•	•		•		•		•		
2 - In-class Test(s) - 50%	•	•		•		•				

Textbooks and Resources

Textbooks
MEDI13001

Prescribed

Computed Tomography for Technologists: A Comprehensive Text
(2010)
Authors: Romans, L.
Lippincott Williams and Wilkins
Philadelphia , USA
Binding: Hardcover
MEDI13001

Prescribed

The Essential Physics of Medical Imaging
Edition: 3rd (2011)
Authors: Jerrold T. Bushberg Et Al
Lippincott Williams and Wilkins
Philadelphia , PA , USA
ISBN: 9780781780575
Binding: Hardcover

Additional Textbook Information
Students taking this unit should have already purchased The Essential Physics of Medical Imaging for MEDI12001: Radiation Science and MEDI12002: Science & Instrumentation 1 and Computed Tomography for Technologist by Romans for MEDI13002: Imaging Procedures 3. Both of these texts will be used in this unit.

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

Karen Finlay Unit Coordinator
k.finlay@cqu.edu.au

Schedule

Week 1 - 06 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Not on campus		

Week 2 - 13 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to CT and Terminology	Recommended readings available on the unit Moodle site	

Week 3 - 20 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Components of a CT System	Recommended readings available on the unit Moodle site	

Week 4 - 27 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Data Acquisition in CT	Recommended readings available on the unit Moodle site	

Week 5 - 03 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic
Data Display in CT	Recommended readings available on the unit Moodle site	

Vacation Week - 10 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic
Break		

Week 6 - 17 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic
Data Management in CT	Recommended readings available on the unit Moodle site	

Week 7 - 24 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic
Image Quality and Patient Dose in CT	Recommended readings available on the unit Moodle site	In-class test

Week 8 - 01 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
CT Quality Assurance	Recommended readings available on the unit Moodle site	

Week 9 - 08 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
CT Artefacts	[Recommended readings available on the unit Moodle site](#)	

Week 10 - 15 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Imaging equipment for specialised applications: DSA, DEXA, MRI	Recommended readings available on the unit Moodle site	

Week 11 - 22 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Imaging equipment for specialised applications: Ultrasound and Nuclear Medicine	Recommended readings available on the unit Moodle site	

Week 12 - 29 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Consolidation		In-Class test

Review/Exam Week - 05 Jun 2017

Module/Topic	Chapter	Events and Submissions/Topic
		Practical Portfolio Due: Review/Exam Week Friday (9 June 2017) 4:00 pm AEST

Exam Week - 12 Jun 2017

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

The coordinator for this unit is: Karen Finlay
I can be contacted on 07 4940 7818 or k.finlay@cqu.edu.au.
During the term I may be teaching other units or be off-campus. For this reason it is advisable to contact me by email initially.
All lectures for this unit of study are recorded and must be viewed before attending the scheduled lab activities. Quizzes in each module will assess your understanding of the content. These quizzes should be completed before attending the scheduled laboratory session.

Assessment Tasks

1 Practical Portfolio

Assessment Type
Practical and Written Assessment

Task Description
This assessment task is based on the scheduled Computed Tomography laboratory activities. During these weekly lab activities you will use imaging phantoms and test tools to acquire a variety of CT images. You will use these CT images to compile a portfolio and submit it electronically on the unit Moodle site. To complete the portfolio, you will respond to a set of questions regarding key concepts in CT imaging. These task questions will be made available on the unit Moodle site.

- As a guideline, your portfolio should be approximately 3000 words, excluding references. However, no marks will be deducted for being over or under the word limit. Stick to the question asked and avoid irrelevant content in your responses. A response that is complete, correct, clearly stated and contains only relevant content will get full marks.
- When explaining each key concept, define the core technical terms and support your discussions with relevant CT images acquired during the CT lab activities. In addition to the use of the CT images that you have produced, you can also use diagrams to illustrate the concept.

- Ensure that the diagrams and images are properly labelled and linked to the content. All externally sourced images and/or diagrams are to be acknowledged using the Harvard system. Avoid images and diagrams with very large file sizes as they will cause submission issues when you are uploading your portfolio on the course Moodle site.
- If the task questions ask for the clinical significance of a key concept to the control of image appearances, patient dose and equipment conservation, make sure you include that in your discussions. You must support your discussions with literature from the field - take note that any information that you draw from another source (whether you paraphrase or quote verbatim) must be cited using the Harvard system.
- Your submission must be a word-processed document. Acceptable file types are WORD document (either .doc or .docx format) or a PDF file that is a conversion of a word processed document (NOT an image file such as a scanned document). All submissions must be processed through TURNITIN.
- Ensure that your document includes a header with your name and student number and a footer with the unit code and term/year.

Assessment Due Date
Review/Exam Week Friday (9 June 2017) 4:00 pm AEST

Return Date to Students

Within 2 weeks of the due date or submission date if extension granted

Weighting
50%

Assessment Criteria
The portfolio will be assessed on the following criteria:

- introduction and conclusion
- familiarity with content including clarity and correctness of concept explanations
- quality, appropriate labeling and relevance of images and diagrams selected to illustrate the concept
- correct use, spelling and definition of technical terms
- extent and correctness of clinical considerations of the concept
- appropriate use and citing of references (Harvard Style)
- analysis of relevant theory and literature from the field

A detailed marking rubric will be posted on the unit Moodle site.

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Detail the processes of data acquisition, processing and image reconstruction in computed tomography.
- Operate computed tomography equipment safely and effectively, with consideration to patient dose, image quality and equipment conservation.
- Manipulate 3D data sets in computed tomography.

Graduate Attributes

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

2 In-class Test(s)

Assessment Type
In-class Test(s)

Task Description
There are two in-class tests worth a total of 50%. These tests will have a range of question formats such including very short-answer

- **In-class Test 1 is worth 15% of the total grade for this unit**

This test will be held during the scheduled class week in 7 and assess content related to Weeks 2 to 5.

- **In-class Test 2** is worth **35% of the total grade for this unit**

This test will be held during the scheduled class in week 12 and assess content related to Weeks 2 to 11.
As per the Assessment Procedures all In-class tests must be written at the scheduled time. There is no ability to apply a late penalty. In the absence of an approved assessment extension, if you do not write a test at the scheduled time, your mark on that test will be zero.

Assessment Due Date

Week 7 & week 12

Return Date to Students

Week 9 for Test 1 results. The second test mark will be released when the final unit grade is certified.

Weighting
50%

Minimum mark or grade
50% overall, based on the weighted average of both tests.

Assessment Criteria
There will be a mixture of recall, problem solving and application of concepts to imaging situations type questions. The short answer questions will test your demonstration of theory concepts using explanations which may include drawing diagrams to illustrate the points made. Marks for each question will be indicated on the in-class test. More details will be posted on the Moodle site for the unit.

Referencing Style

- Harvard (author-date)

Submission
Offline

Learning Outcomes Assessed

- Detail the processes of data acquisition, processing and image reconstruction in computed tomography.
- Operate computed tomography equipment safely and effectively, with consideration to patient dose, image quality and equipment conservation.
- Outline the issues of image transmission, storage and viewing in DICOM and PACS-integrated digital radiology environments.
- Discuss the design, operational features and clinical safety considerations of specialised applications such as angiography, bone mineral densitometry, ultrasonography and nuclear medicine imaging.

Graduate Attributes

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

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