MEDI13001 *Science and Instrumentation 3*
Term 1 - 2021

Profile information current as at 14/12/2025 04:11 pm

General Information

Overview
This unit will expand on your prior study of x-ray equipment and imaging processes of specialised imaging technologies. 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 examine in detail the equipment operation of computed tomography and its processes of data acquisition, processing, reconstruction and display. You will explore dose and image optimisation strategies and quality assurance testing. You will be introduced to the physical and operational principles of advanced medical imaging modalities including angiography, magnetic resonance imaging, ultrasound imaging 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 Quality Processes for Dose and Image Optimisation
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 - 2021

- 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.

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 - Unit Evaluation

Feedback

Well-organised content of recorded lectures, tutorials and quizzes, were presented in a way that made the information easy to understand and further explore the content.

Recommendation

Continue with the use of the pre-recorded lectures, weekly formative quizzes and engaging tutorials to assess the students' understanding of the weekly material.

Feedback from Unit Coordinator reflection

Feedback

The creation of the recorded practical CT exercises equipped students with practical CT application whilst studying via distance.

Recommendation

Investigate the use of the recorded CT lab exercises as preparation for scheduled CT lab activities when on-campus teaching resumes.

Unit Learning Outcomes

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

1. Discuss the processes of data acquisition and processing, image reconstruction, reformatting and display and of quality assurance testing in computed tomography
2. Operate computed tomography equipment safely and effectively, with consideration to patient dose, image quality and equipment conservation
3. Manipulate three dimensional (3D) data sets in computed tomography
4. Discuss the design, operational features and clinical safety considerations of computed tomography equipment and of specialised imaging modalities such as angiography, ultrasonography and nuclear medicine imaging.

This unit maps to the following components of the Medical Radiation Practice Board of Australia's Professional Capabilities for Medical Radiation Practice (2020 version):
· Domain 1A 3
· Domain 4.1
· Domain 5.1, 5.3

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
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
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				
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
2nd Edition (2018)
Authors: Romans, Lois E.
Lippincott Williams & Wilkins
Sydney , NSW , Australia
ISBN: 9781496375858
Binding: Paperback

Additional Textbook Information
This textbook will also be used for MEDI13002.

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 styles below:

- Harvard (author-date)
- American Psychological Association 7th Edition (APA 7th edition)

For further information, see the Assessment Tasks.

Teaching Contacts

Natalie Sciascia Unit Coordinator
n.sciascia@cqu.edu.au

Schedule

Week 1 - 08 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to CT and CT Terminology	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 1 - Basic Principles of CT Recommended readings available on the unit Moodle site	No on-campus class this week

Week 2 - 15 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic

Components of a CT System	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 2 - Data Acquisition Recommended readings available on the unit Moodle site	CT Practical Lab, on-campus tutorial

Week 3 - 22 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Data Acquisition in CT	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 5 - Methods of Data Acquisition Recommended readings available on the unit Moodle site	CT Practical Lab, on-campus tutorial

Week 4 - 29 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Data Display in CT	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 4 - Image Display Recommended readings available on the unit Moodle site	CT Practical Lab, on-campus tutorial

Week 5 - 05 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Data Management in CT	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 3 - Image Reconstruction, Chapter 8 - Post-processing & Chapter 9 - Data Management Recommended readings available on the unit Moodle site	CT Practical Lab, on-campus tutorial

Vacation Week - 12 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Break Week		

Week 6 - 19 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Image Quality and Patient Dose in CT	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 6 - Image Quality Recommended readings available on the unit Moodle site	CT Practical Lab, on-campus tutorial

Week 7 - 26 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
CT Quality Assurance	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 7 - Quality Assurance Recommended readings available on the unit Moodle site	CT Practical Lab, on-campus tutorial

Week 8 - 03 May 2021

Module/Topic	Chapter	Events and Submissions/Topic

CT Artefacts	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Chapter 7 - Quality Assurance (Image Artifacts) Recommended readings available on the unit Moodle site	CT Practical Lab, on-campus tutorial

Week 9 - 10 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
		CT Practical Lab, on-campus tutorial
Imaging equipment for specialised applications: DSA & MRI	Recommended readings available on the unit Moodle site	**Practical and Written Assessment** Due: Week 9 Friday (14 May 2021) 4:00 pm AEST

Week 10 - 17 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Imaging equipment for specialised applications: Ultrasound	Recommended readings available on the unit Moodle site	No on-campus class this week

Week 11 - 24 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Imaging equipment for specialised applications: EOS and Nuclear Medicine		On-campus tutorial

Week 12 - 31 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Consolidation		On-campus tutorial

Review/Exam Week - 07 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic
		Final Test - specific date/time to be advised through Moodle page

Exam Week - 14 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

This unit is delivered in on-campus mode at Mackay Ooralea campus. You will need to be on campus for tutorials and labs from Week 2 onwards. Tutorials will not be recorded.

Each week's tutorial and lab activity builds on the content of the pre-recorded lectures for the weeks, so you need to ensure you have watched the lectures prior to attending labs and tutorials. The on-line quizzes are formative, designed to help you assess your understanding of the weekly content. Quizzes should be completed before attending any scheduled class or lab activity.

Note that 150 hours of student engagement is required for this unit. You should plan to complete pre-reading (1 hr/wk), view all lectures (2 hrs/wk), supervised labs (1 hr/wk) and tutorials (1 hr/wk), as this will be integral to the development of knowledge required for the assessments of the unit. Further time will be required to undertake unsupervised lab activities for completion of the portfolio assessment. Revision, completion of the portfolio and preparation for the in-class test must be factored into your time management plan. In total, you should expect to spend approximately 12.5 hours per week studying for this unit.

The unit coordinator for this unit is: Natalie Sciascia
Preferred contact is by email at n.sciascia@cqu.edu.au. Alternatively, I can be contacted by phone on (07) 4940 7482 or Ext. 57482.

Assessment Tasks

1 Practical and Written Assessment

Assessment Type
Practical and Written Assessment

Task Description
This assessment task is based on the scheduled computed tomography (CT) laboratory activities and independent study. During the weekly lab activities you will use imaging phantoms and test tools to acquire a variety of CT images and to understand critical concepts. You must use this learning and CT images to compile a portfolio and submit it electronically on the unit Moodle site. To complete the portfolio, you must respond to a set of questions regarding key concepts in CT imaging. These task questions will be made available on the unit Moodle site.

- Your portfolio must not exceed 3000 words, excluding references. 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 achieve 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 produced during labs, you may 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 must be acknowledged using the APA or Harvard systems. Avoid images and diagrams with very large file sizes as they will cause submission issues when you are uploading your portfolio on the unit Moodle site.
- If the task questions ask for the clinical significance of a key concept to the control of image appearances, patient dose and/or equipment conservation, make sure you include that in your discussions. You must support your discussions with literature from the field, including your text book. Please note that any information that you draw from another source (whether you paraphrase or quote verbatim) must be cited using the APA or Harvard systems.
- The final page(s) must be a list of references used in your portfolio. This reference list must follow the APA or Harvard style.
- 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 of a scanned document). Any images/photographs/diagrams may be contained within the document or provided collectively as a separate PDF file. Each image must be clearly titled to communicate which part of the portfolio content it illustrates. 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.
- Note that although you will work with classmates to acquire CT images used in your portfolio, the written component is an individual task and must be your own work.

Assessment Due Date
Week 9 Friday (14 May 2021) 4:00 pm AEST

Return Date to Students

Written feedback provided within 2 weeks of the due date

Weighting
50%

Minimum mark or grade
50%

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

- 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 (APA or Harvard Style)
- quality, completeness and relevance of information offered, including adherence to word limit

A detailed marking rubric will be posted on the unit Moodle site to specify the requirements for each criterion listed

above.

Referencing Style

- Harvard (author-date)
- American Psychological Association 7th Edition (APA 7th edition)

Submission
Online

Learning Outcomes Assessed

- Discuss the processes of data acquisition and processing, image reconstruction, reformatting and display and of quality assurance testing in computed tomography
- Operate computed tomography equipment safely and effectively, with consideration to patient dose, image quality and equipment conservation
- Manipulate three dimensional (3D) data sets in computed tomography

Graduate Attributes

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

2 Final Test

Assessment Type
In-class Test(s)

Task Description
This test paper is a Word document that you will download at the start of the test time, use to enter your question responses into the allocated spaces and upload by the due time.

The test will have a range of question formats including multiple choice and short to medium-length answered questions. Question tasks will be similar to the type that you will practice in weekly tutorials and formative quizzes. Some questions will require a calculator to complete.

A representative sampling of material from all weeks of the unit will be tested.

This is an open book test. It means that during the test you may access your study notes, textbook, the unit Moodle site and/or any website. **The standards of academic integrity still apply.** Just as for written assignments, you must acknowledge intellectual content in your answers that is not your own work. Basic statements of facts are considered 'common knowledge' in the context of this unit so they do not need to be cited. However, *if you copy any explanation content word-for-word from ANY source, you must put that content in quotation marks and formally cite your source.*

You must undertake this quiz as individuals and not with classmates or others. As with all other University assessments, colluding with other students on a non-group work task is considered academic misconduct and will be dealt with in accordance with the Student Academic Integrity Policy.

This test must be written at the specified date and time. There is no provision for a late submission and no late penalty can be applied. If you commence the test late, you will still be required to submit your test at the standard test end time. 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 an approved extension, you will be assigned a new test date and time as soon as possible after the original test date. It is your responsibility to ensure that you can attend at that new assigned date/time. Please see Section 5 of the the University's Assessment Policy and Procedure for details regarding Assessment Management, specifically around assessment extension.

Assessment Due Date

The final online test will be administered during the University's Exam period at a date/time set by the School of Health, Medical and Applied Science. All students will be required to sit the test during the same 120 minute period.

Return Date to Students

Scores provided within 2 weeks of the due date

Weighting
50%

Minimum mark or grade
50%

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

- Correct use of scientific terminology
- Correct selection and application of core concepts to the specific content of the question
- Clarity, correctness, relevance and completeness of the response in addressing the question that was asked.

The number of marks for each question are allocated based on the depth and breadth of the required response, and will be indicated on the test paper.

Referencing Style

- Harvard (author-date)
- American Psychological Association 7th Edition (APA 7th edition)

Submission
Online

Learning Outcomes Assessed

- Discuss the processes of data acquisition and processing, image reconstruction, reformatting and display and of quality assurance testing in computed tomography
- Operate computed tomography equipment safely and effectively, with consideration to patient dose, image quality and equipment conservation
- Discuss the design, operational features and clinical safety considerations of computed tomography equipment and of specialised imaging modalities such as angiography, ultrasonography and nuclear medicine imaging.

Graduate Attributes

- Communication
- Problem Solving
- 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