MEDI13001 *Science and Instrumentation 3*
Term 1 - 2019

Profile information current as at 14/12/2025 03:41 pm

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 - 2019

- 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 survey

Feedback
Several students felt that content and concepts were clearly explained and linked to learning objectives, although some disagreed with this.

Recommendation
Review lecture material to ensure concepts are clearly explained.

Feedback from Student survey

Feedback
Lab activities were felt to enhance learning and understanding of concepts.

Recommendation
Maintain lab activities and ensure continual appraisal for relevance.

Feedback from Student survey

Feedback
Some students felt that the in-class tests had too much weighting on modalities other than CT.

Recommendation
Assessed content covered all modalities taught within the unit.

Feedback from Coordinator reflection/ Discussion with Head of Course

Feedback
Including content from other modalities in this mainly CT instrumentation unit may not be the most effective method of delivering required content.

Recommendation
The Medical Imaging teaching team will review how required content is delivered within the course curriculum for best effect.

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		•			
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
2nd Edition (2018)
Authors: Romans, L
Wolters-Kluwer
Sydney , NSW , Australia
ISBN: 9781496375858
Binding: Paperback

Additional Textbook Information
This is the same textbook required for MEDI13002 - Imaging Procedures 3.
This textbook is available as a soft-cover physical text, with the ISBN for the physical copy given in the book details.
Copies can be purchased from the CQUni Bookshop here: http://bookshop.cqu.edu.au (search on the Unit code)
It is also available as an e-book. The ISBN for the ebook is: 9781496375872

View textbooks at the CQUniversity Bookshop

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 - 11 Mar 2019

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

Week 2 - 18 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to CT and CT Terminology	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L Recommended readings available on the unit Moodle site	

Week 3 - 25 Mar 2019

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 Recommended readings available on the unit Moodle site	

Week 4 - 01 Apr 2019

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

Week 5 - 08 Apr 2019

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

Vacation Week - 15 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Break		

Week 6 - 22 Apr 2019

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

Week 7 - 29 Apr 2019

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 Recommended readings available on the unit Moodle site	In-class test 1. This test assesses content from weeks 2 to 5 inclusive.

Week 8 - 06 May 2019

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 methods) Recommended readings available on the unit Moodle site	

Week 9 - 13 May 2019

Module/Topic	Chapter	Events and Submissions/Topic

CT Artefacts	Computed Tomography for Technologists (2nd ed.): A Comprehensive Text, Romans, L chapter 7 (Image Artifacts) Recommended readings available on the unit Moodle site	

Week 10 - 20 May 2019

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 - 27 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Imaging equipment for specialised applications: Ultrasound and Nuclear Medicine	Recommended readings available on the unit Moodle site	**Practical Portfolio** Due: Week 11 Friday (31 May 2019) 5:00 pm AEST

Week 12 - 03 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
Consolidation		

Review/Exam Week - 10 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
		In-Class test 2. This final test assesses content from all weeks.

Exam Week - 17 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

The coordinator for this unit is: **Karen Finlay**
I can be contected on 07 4923 2647 or k.finlay@cqu.edu.au
During the term I may be teaching other units or be on a different campus. For this reason, it is advisable to contact me by email initially.
All lectures for this unit are recorded and must be viewed before attending any scheduled class or lab activity. On-line quizzes are formative, designed to help you to assess your understanding of the weekly content. Quizzes should be completed before attending any scheduled class or lab activity.
It is vital to maintain engagement with the unit content and to budget your time effectively. Completing the pre-reading, watching lecture presentations, taking notes and completing the formative quizzes should take approximately five (5) hours per week. Expect to spend approximately three (3) hours per week on face to face class and lab activities. Further time will be required to undertake unsupervised lab activities for completion of the portfolio assessment. Revision and completion of the portfolio and in-class tests must be factored into your time management plan. On average, expect to spend approximately 12.5 hours per week studying this unit.

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 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 be no more than 3500 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 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 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 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 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 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 Harvard system.
- The final page(s) must be a list of references used in your portfolio. Referencing should be in consistent 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 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.
- 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 11 Friday (31 May 2019) 5:00 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:

- 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)
- quality, completeness and relevance of information offered, including adherence to word limit

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 including very short-answer and short answer questions. Question tasks will be similar to the type that you will practice in weekly tutorials and formative quizzes. Diagrams may be required to explain concepts. Some answers will require diagrams to be labelled or to be drawn and labelled. Calculations will be required.
This is a closed-book assessment and no notes, texts or electronic devices are allowed into the class during this assessment task. You will have a five minute perusal time prior to the allotted writing time. You will submit your test paper and rough paper at the end of the test period.
This test must be written at the timetabled date and time. As per the Assessment Procedures, this task is to be completed during a defined period. There is no opportunity to apply a late penalty. If you arrive late, you may enter the test room up to 30 minutes after the start of the test, however, you will still be required to submit your test at the standard test end time. You will not be allowed entry more than 30 minutes after the test starts. In the absence of an approved extension, there will be no opportunity for you to complete this assessment at a later time, and you will receive a mark of zero for the assessment.

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

This test will be held during scheduled class week in 7 and assess content related to Weeks 2 to 5. The maximum time allowed for in-class test 1 is one and a half hours (90 minutes).

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

This test will be held during scheduled class in week 13 and assess content related to Weeks 2 to 11.The maximum time allowed for in-class test 2 is two hours (120 minutes).

Assessment Due Date

Week 7 & week 13 during designated timetabled class

Return Date to Students

Results for both tests will be released within two weeks of each scheduled test.

Weighting
50%

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

Assessment Criteria
Your responses will be scored on the basis of completeness, correctness and relevance to the question being asked.

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