



HLTH3140

Radiographic Physics, Practice and Protection

Session 1, In person-scheduled-weekday, North Ryde 2022

Department of Chiropractic

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General Information

Unit convenor and teaching staff

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Lecturer

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Credit points

10

Prerequisites

130cp at 1000 level or above including 40cp at 2000 level

Corequisites

Co-badged status

Unit description

This unit is conducted to develop students' knowledge in the underlying physical principles of medical radiation science. The unit is presented in three distinct modules: - Module 1 is the study of Radiation Physics, its principles and current technology of imaging equipment. - Module 2 is the study of the principles and practice of image production and image processing techniques. - Module 3 describes the biological effects of radiation as well as current radiation protection techniques.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

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

ULO1: Identify the properties of x-rays and explain how they interact with matter, and influence image quality and patient safety

ULO2: Summarise the working principles of x-ray tubes and how these influence their operation and performance

ULO3: Contrast the generation and use of advanced imaging modalities

ULO4: Critically appraise the principles of radiographic image production and processing

ULO5: Explain the biological effects of radiation

ULO6: Summarise radiation protection in relation to radiography

General Assessment Information

It is expected that students will follow the **Academic Integrity Policy** at all times (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/academic-integrity>). Breaches of this policy may result in disciplinary procedures for the involved student.

ONLINE QUIZZES

Quizzes will be available online through iLearn unless otherwise indicated. The timing of the online quizzes will be available on the iLearn page. If you miss an online quiz at the scheduled time, a supplementary quiz will only be considered under the Special Consideration policy (<http://students.mq.edu.au/study/my-study-program/special-consideration>), applied for through www.ask.mq.edu.au. If you complete an online quiz you are declaring that you are **fit to sit** that assessment and Special Consideration will not normally be granted.

PHYSICS LAB BOOKS

You will complete a Lab Book for the three physics laboratory sessions held throughout the Session. Missed laboratory sessions must be made up prior to Week 13. A timetable will be released early in the Session to inform you which laboratory sessions you should attend.

THEORY EXAMINATION

The final examination will be held in the University Examination period for Session 1. You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. You are expected to ensure that you are available until the end of the teaching Session, that is, the final day of the official examination period. You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students.

If you attend and complete an examination you are declaring that you are **fit to sit** that assessment and Special Consideration will not normally be granted. The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration.

Information about unavoidable disruption and the Special Consideration process is available at <https://students.mq.edu.au/study/my-study-program/special-consideration>, applied for through www.ask.mq.edu.au.

Please ensure you are familiar with the Special Consideration policy prior to submitting an application.

If you receive Special Consideration approval for the final exam, a supplementary exam will be scheduled. By making a Special Consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. If you are approved for Special Consideration and granted a supplementary exam, only your supplementary exam result will be counted towards your final grade.

Students with a pre-existing disability/health condition or prolonged adverse circumstances may be eligible for ongoing assistance and support. Such support is governed by other policies and may be sought and coordinated through Student Wellbeing and Support Services (<https://students.mq.edu.au/support/wellbeing>).

Assessment Tasks

Name	Weighting	Hurdle	Due
Online quiz 1	20%	No	To be advised - see iLearn
Online quiz 2	20%	No	To be advised - see iLearn
Physics lab book	10%	No	To be advised - see iLearn
Final theory exam	50%	No	University Exam period

Online quiz 1

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 3 hours

Due: **To be advised - see iLearn**

Weighting: **20%**

An online quiz on material covered in lecture and tutorial sessions on module 1 - physics

On successful completion you will be able to:

- Identify the properties of x-rays and explain how they interact with matter, and influence image quality and patient safety
- Summarise the working principles of x-ray tubes and how these influence their operation

and performance

Online quiz 2

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 3 hours

Due: **To be advised - see iLearn**

Weighting: **20%**

An online quiz on material covered in lectures and tutorial sessions on module 2 - image formation

On successful completion you will be able to:

- Contrast the generation and use of advanced imaging modalities

Physics lab book

Assessment Type ¹: Lab book

Indicative Time on Task ²: 9 hours

Due: **To be advised - see iLearn**

Weighting: **10%**

Lab books associated with 3 in-person lab sessions performed across the Session

On successful completion you will be able to:

- Identify the properties of x-rays and explain how they interact with matter, and influence image quality and patient safety
- Summarise the working principles of x-ray tubes and how these influence their operation and performance

Final theory exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 12 hours

Due: **University Exam period**

Weighting: **50%**

The exam will assess material from the whole semester

On successful completion you will be able to:

- Identify the properties of x-rays and explain how they interact with matter, and influence image quality and patient safety
 - Summarise the working principles of x-ray tubes and how these influence their operation and performance
 - Contrast the generation and use of advanced imaging modalities
 - Critically appraise the principles of radiographic image production and processing
 - Explain the biological effects of radiation
 - Summarise radiation protection in relation to radiography
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¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

HLTH3140 is a mix of in-person and online learning activities that covers the following material:

- The principles of radiation physics and the current technology of radiographic equipment
- The principles and practice of image production and image processing techniques
- The biological effects of radiation
- Radiation protection techniques

LECTURES

2-hour weekly lectures that will be a mix of online and in-person lectures, held Thursdays 1-3pm.

TUTORIAL SESSIONS

5 x 1-hour tutorial sessions per student as scheduled. You will be divided into separate groups and attend alternate weeks. The schedule will be available on the iLearn page.

PHYSICS LABORATORY SESSIONS

3 x 3-hour physics laboratory sessions per student as scheduled. You will be divided into separate groups and will attend the appropriate weeks as indicated on the schedule, available on the unit iLearn page.

iLEARN PAGE

The web page for this unit can be found at: <https://ilearn.mq.edu.au> and following the links for either Postgraduate or Undergraduate students. There is a combined iLearn page for HLTH3140 and CHIR6410 students. This will contain all Unit information and assessments.

REQUIRED TEXT

Radiologic science for technologists: physics, biology, and protection. Bushong, Stewart C. (Stewart Carlyle), author. Eleventh edition. St. Louis, Missouri: Elsevier 2017

REFERENCES

- Essentials of radiologic science. Fossbinder, Robert.; Orth, Denise. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins 2012
- Principles of radiological physics. Graham, Donald T.; Cloke, Paul J. 4th ed. Edinburgh: Churchill Livingstone 2003
- Introduction to Radiologic Technology. LaVerne Tolley Gurley & William J. Callaway (7th Edition); Mosby St Louis 2011

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/su\)](https://students.mq.edu.au/su)

[upport/study/policies](#)). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](#) (<https://policies.mq.edu.au>) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Changes since First Published

Date	Description
09/02/2022	Unit convenor updated