



# HLTH3140

## Radiographic Physics, Practice and Protection

Session 1, Weekday attendance, North Ryde 2021

*Department of Chiropractic*

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#### **Disclaimer**

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#### **Notice**

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

## General Information

Unit convenor and teaching staff

Unit convenor

Simon French

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Lecturer

Hazel Jenkins

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Lecturer

Rich Mildren

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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. Breaches of this policy may result in disciplinary procedures for the involved student.

### ONLINE QUIZZES

Online quizzes will be held during the lecture time (Tuesday 2PM-4PM). If you miss an online quiz a supplementary exam 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](http://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.

### DATA ANALYSIS AND INTERPRETATION OF X-RAY INTERACTIONS

For this assessment, there will be 3 online activities during weeks 2 to week 4 where you will undertake online simulation. These will be held during the Practical times you have enrolled in. Assessment will be via iLearn online quizzes.

### THEORY EXAMINATION

The final examination will be held in the University Examination period for Semester 1. You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of the examinations.

You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. You are expected to ensure that you are available until the end of the teaching semester that is the final day of the official examination period. 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](http://www.ask.mq.edu.au).

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. **Please ensure you are familiar with the Special Consideration policy prior to submitting an application.** 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](#).

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Online quiz 1</a>	20%	No	Will be advised
<a href="#">Online quiz 2</a>	20%	No	Will be advised
<a href="#">Data analysis and interpretation of X-ray interactions</a>	10%	No	Will be advised
<a href="#">Final theory exam</a>	50%	No	University Exam period

### Online quiz 1

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 3 hours

Due: **Will be advised**

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 <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 3 hours

Due: **Will be advised**

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

## Data analysis and interpretation of X-ray interactions

Assessment Type <sup>1</sup>: Problem set

Indicative Time on Task <sup>2</sup>: 9 hours

Due: **Will be advised**

Weighting: **10%**

An assignment to explore data analysis and interpretation of X-ray interactions

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 <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 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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<sup>1</sup> 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 [Learning Skills Unit](#) for academic skills support.

<sup>2</sup> 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 comprises three distinct modules:

**Module 1** is the study of the principles of radiation physics and the current technology of radiographic equipment, and will run from Week 1 to Week 3.

**Module 2** is the study of the principles and practice of image production and image processing techniques, and will run from Week 4 to Week 8, and Week 12.

**Module 3** describes the biological effects of radiation as well as current radiation protection techniques, and will run from Week 9 to Week 11.

### ONLINE LECTURES

2-hour online lectures each week will be available before Tuesdays 2-4pm.

### ONLINE PRACTICAL SESSIONS

3 x 3-hour online practical sessions per student as scheduled, starting week 2. You will be divided into separate groups and will attend the appropriate weeks as indicated on the schedule, available on the unit iLearn page.

### TUTORIAL SESSIONS

5 x 1-hour tutorial sessions per student as scheduled. You will be divided into separate groups

and attend alternate weeks. Schedule will be available in Week 1.

## **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.

## **REQUIRED TEXTS**

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. Fosbinder, 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

## **Unit Schedule**

Unit schedule available on iLearn page

## **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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/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 \(https://policies.mq.edu.au\)](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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Student Support

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

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [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 Enquiry Service

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Equity Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.