HLTH3140
Radiographic Physics, Practice and Protection
Session 1, In person-scheduled-weekday, North Ryde 2023

Department of Chiropractic

Contents

General Information ........................................ 2
Learning Outcomes ........................................ 3
General Assessment Information ......................... 3
Assessment Tasks .......................................... 4
Delivery and Resources .................................... 6
Policies and Procedures .................................... 7
Inclusion and Diversity ..................................... 9
Professionalism ............................................. 9

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# General Information

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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 your knowledge in the underlying physical principles of medical radiation science and radiographic image production to prepare you for further study in diagnostic radiology. The unit includes key components of radiation physics, image production, and image processing to provide you with an understanding of the use and application of medical diagnostic radiography. You will be introduced to the biological effects of radiation and related safety concerns and 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, influence image quality, and inform patient safety standards
ULO2: Explain the working principles of diagnostic imaging modalities and how they influence image production
ULO3: Critically appraise the principles of radiographic image production and processing
ULO4: Summarise the biological effects of radiation and explain the importance of radiographic protection in relation to radiography

General Assessment Information
Grade descriptors and other information concerning grading are contained in the Macquarie University Assessment Policy.

All final grades are determined by a grading committee, in accordance with the Macquarie University Assessment Policy, and are not the sole responsibility of the Unit Convenor.

Students will be awarded a final grade and a mark which must correspond to the grade descriptors specified in the Assessment Procedure (clause 128).

To pass this unit, you must demonstrate sufficient evidence of achievement of the learning outcomes, meet any ungraded requirements, and achieve a final mark of 50 or better.

Further details for each assessment task will be available on iLearn.

For any late submissions of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration. 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
Application of Radiation Physics and the Biological Effects of Radiation

Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online quiz 1</td>
<td>25%</td>
<td>No</td>
<td>Week 8 - 27/04/23 5pm</td>
</tr>
<tr>
<td>Online quiz 2</td>
<td>15%</td>
<td>No</td>
<td>Week 11 - 18/05/23 5pm</td>
</tr>
<tr>
<td>Physics lab book</td>
<td>10%</td>
<td>No</td>
<td>Week 13</td>
</tr>
<tr>
<td>Final theory exam</td>
<td>50%</td>
<td>No</td>
<td>University Exam Period</td>
</tr>
</tbody>
</table>

Online quiz 1
Assessment Type: Quiz/Test
Indicative Time on Task: 18 hours
Due: Week 8 - 27/04/23 5pm
Weighting: 25%

Online quiz on material covered in lectures and tutorial sessions on radiographic physics and the biological effects of radiation

On successful completion you will be able to:
- Identify the properties of x-rays and explain how they interact with matter, influence image quality, and inform patient safety standards
- Explain the working principles of diagnostic imaging modalities and how they influence image production
- Summarise the biological effects of radiation and explain the importance of radiographic protection in relation to radiography

Online quiz 2
Assessment Type: Quiz/Test
Indicative Time on Task: 10 hours

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 quiz on material covered in image formation lectures and tutorial sessions

On successful completion you will be able to:

• Explain the working principles of diagnostic imaging modalities and how they influence image production
• Critically appraise the principles of radiographic image production and processing

Physics lab book
Assessment Type 1: Lab book
Indicative Time on Task 2: 9 hours
Due: Week 13
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, influence image quality, and inform patient safety standards
• Explain the working principles of diagnostic imaging modalities and how they influence image production

Final theory exam
Assessment Type 1: Examination
Indicative Time on Task 2: 25 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, influence
image quality, and inform patient safety standards

- Explain the working principles of diagnostic imaging modalities and how they influence image production
- Critically appraise the principles of radiographic image production and processing
- Summarise the biological effects of radiation and explain the importance of radiographic protection in relation to radiography

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**

As a student enrolled in this unit, you will engage in a range of in-person and online learning activities described below:

**LECTURES**

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

**TUTORIAL SESSIONS**

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

**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 early in the session.

**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.

RECOMMENDED READINGS


ADDITIONAL READINGS

- Introduction to Radiologic Technology. LaVerne Tolley Gurley & William J. Callaway (7th Edition); Mosby St Louis 2011

TECHNOLOGY USED

Active participation in the learning activities throughout the unit will require students to have access to a tablet, laptop or similar device. Students who do not own their own laptop computer may borrow one from the university library.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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/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.e
Student Support Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
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.

Inclusion and Diversity
Social inclusion at Macquarie University is about giving everyone who has the potential to benefit from higher education the opportunity to study at university, participate in campus life and flourish in their chosen field. The University has made significant moves to promote an equitable, diverse and exciting campus community for the benefit of staff and students. It is your responsibility to contribute towards the development of an inclusive culture and practice in the areas of learning and teaching, research, and service orientation and delivery. As a member of the Macquarie University community, you must not discriminate against or harass others based on their sex, gender, race, marital status, carers' responsibilities, disability, sexual orientation, age, political conviction or religious belief. All staff and students are expected to display appropriate behaviour that is conducive to a healthy learning environment for everyone.

Professionalism
In the Faculty of Medicine, Health and Human Sciences, professionalism is a key capability embedded in all our courses.

As part of developing professionalism, students are expected to attend all small group interactive sessions including clinical, practical, laboratory, work-integrated learning (e.g., PACE placements), and team-based learning activities. Some learning activities are recorded (e.g., face-to-face lectures), however you are encouraged to avoid relying upon such material as they do not recreate the whole learning experience and technical issues can and do occur. As an adult learner, we respect your decision to choose how you engage with your learning, but we would remind you that the learning opportunities we create for you have been done so to enable your success, and that by not engaging you may impact your ability to successfully complete this unit. We equally expect that you show respect for the academic staff who have worked hard to
develop meaningful activities and prioritise your learning by communicating with them in advance if you are unable to attend a small group interactive session.

Another dimension of professionalism is having respect for your peers. It is the right of every student to learn in an environment that is free of disruption and distraction. Please arrive to all learning activities on time, and if you are unavoidably detained, please join activity as quietly as possible to minimise disruption. Phones and other electronic devices that produce noise and other distractions must be turned off prior to entering class. Where your own device (e.g., laptop) is being used for class-related activities, you are asked to close down all other applications to avoid distraction to you and others. Please treat your fellow students with the utmost respect. If you are uncomfortable participating in any specific activity, please let the relevant academic know.