



CHIR6410

Radiographic Science

Session 1, Weekday attendance, North Ryde 2020

Department of Chiropractic

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Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff

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Lecturer

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Physics lab manager

Adam Joyce

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Lecturer

Craig Moore

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Tutor

Annie Young

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Credit points

10

Prerequisites

Admission to MChiroprac

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 four 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. - Module 4 describes the normal appearance of the spine and extremities on radiographic images and common normal variations to this appearance.

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:** Contrast the generation and use of advanced imaging modalities
- ULO3:** Critically appraise the principles of radiographic image production and processing
- ULO4:** Summarise the working principles of x-ray tubes and how these influence their operation and performance
- ULO5:** Explain the biological effects of radiation
- ULO6:** Summarise radiation protection in relation to radiography
- ULO7:** Recognise, identify, and assess normal radiographic anatomy of the musculoskeletal system and be able to explain variations in appearance due to radiographic technique.

Assessment Tasks

Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult [iLearn](#) for revised unit information.

[Find out more about the Coronavirus \(COVID-19\) and potential impacts on staff and students](#)

General Assessment Information

LABORATORIES

You will be scheduled to attend three laboratory sessions throughout the semester. Missed session must be made up prior to week 13. A timetable will be released early in the semester to inform you which laboratory sessions you should attend. Please email the lab manager, Adam Joyce adam.joyce@mq.edu.au if you have concerns regarding your laboratory session time or to arrange making-up missed sessions.

IN-CLASS EXAMS

If an in-class exam is missed a supplementary exam will only be considered under the Special Consideration policy (<https://students.mq.edu.au/study/my-study-program/special-consideration>),

applied for through www.ask.mq.edu.au within 5 days of the assessment.

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.

QUIZ

The quiz will be available through iLearn.

It is expected that the academic honesty policy (http://mq.edu.au/policy/docs/academic_honesty/policy.html) be followed at all times. Breaches of the academic honesty policy may result in disciplinary procedures for the involved student.

All quizzes should be attempted. The quiz will open from 10am Monday 1st June 2020 and close at 5pm Sunday 7th June 2020. The quiz will not be reopened after it is closed for any reason. If submission is affected by technical difficulties, you can send your answers to the unit convener (simon.french@mq.edu.au) **PRIOR** to the closing time of the quiz for manual grading.

THEORY EXAMINATIONS

The University Examination period for Semester 1, 2020 is from June 9th to June 26th 2020.

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.

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 within 5 days of the disruption.

If you receive [special consideration](#) for the final exam, a supplementary exam will be scheduled in the interval between July 13th to July 24th, 2020. 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 [policy](#) prior to submitting an application. You can check the supplementary exam information page on FSE101 in iLearn (bit.ly/FSESupp) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination. If you are approved for Special Consideration and granted a supplementary exam, only your supplementary exam result will be counted towards your final grade.

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.

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](#).

Delivery and Resources

Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

LECTURES

2-hour lectures each week on Tuesday 2-4pm in 23 Wallys Walk - T2 Theatre. These lectures are also available on iLearn.

LABORATORY SESSIONS

3 x 3-hour practical laboratory's per student as scheduled, starting week 3. You will be divided into separate groups and will attend the appropriate weeks as indicated on the laboratory 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 starting week 3.

ONLINE WORKBOOKS

Module 4 will be presented as a series of weekly online workbooks containing videos and formative activities. It is expected that you complete these workbooks on a weekly basis. You will access the online workbooks accessed through the CHIR6410 iLearn page

iLEARN PAGE

The ilearn pages 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 information and assessments for modules 1-3.

For module 4, all information and assessments will be presented on the individual CHIR6410 ilearn page.

Please ensure that you stay up to date with both ilearn pages

REQUIRED TEXTS/MANUALS

Radiological Science For Technologists - Physics, Biology and Protection. - Stewart C Bushong
10th Edition, Elsevier, 2013.

HLTH3140/CHIR6410 Laboratory Notebook 2020.

REFERENCES

Essentials of Radiologic Science. - Robert A. Fosbinder & Denise Orth; Philadelphia : Wolters Kluwer Health/Lippincott Williams & Wilkins. 2010

Principles of Radiological Physics. - Robin Wilks, (2nd Edition), Churchill Livingstone Edinburgh. 1987

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

Unit Schedule

Coronavirus (COVID-19) Update

The unit schedule/topics and any references to on-campus delivery below may no longer be relevant due to COVID-19. Please consult [iLearn](#) for latest details, and check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

WEEK 1 Rich Mildren and Simon French

Introduction to Unit; Electricity and magnetism/Explanation of syllabus.

WEEK 2 Rich Mildren

Electric currents. Electromagnetic radiation. X-ray circuits. X-ray tubes.

WEEK 3 Rich Mildren

What are X-rays and how are they produced. X-ray interactions.

WEEK 4 Hazel Jenkins

Historical background and the current use of radiography. Image formation. Optical Density and Contrast as related to exposure parameters: milliamperes (mA), time (s), milliamperere seconds (mAs), Kilovoltage (kVp), distance (SID or FFD).

WEEK 5 Hazel Jenkins

Scatter radiation. Grids. Image sharpness. Assessing the image.

WEEK 6 - Craig Moore

Radiographic film. Film processing. Sensitometry & densitometry. Characteristic curve. Intensifying screens – Construction; Spectral matching; Screen speed; Quantum mottle Film/screen cassettes;

WEEK 7 - Craig Moore

Direct Radiography, Computed Radiography, Radiological Information Systems (RIS) and Picture Archival and Communication Systems (PACS). Digital Image manipulation – Window and Level (Density and Contrast). Exposure Indices.

WEEK 8 - Craig Moore

Variable kVp techniques. Automatic Exposure Control (AEC). Image artifacts.

WEEK 9 - Craig Moore

Biological effects of radiation. The Law of Bergonne & Tribondeau. Linear energy transfer. Types of cell damage.

WEEK 10 - Craig Moore

Direct & indirect effects. High-dose radiation effects. Radiation & pregnancy. Genetic effects.

WEEK 11 - Craig Moore

Radiation protection. Reduction of radiation dose to the patient. Reduction of radiation exposure to the staff. Effective dose. Regulations. Radiation detectors. Natural background radiation.

WEEK 12 - Craig Moore

Special radiographic equipment (Fluoroscopy, CT, MRI).

WEEK 13 No lecture for HLTH3140 (CHIR6410 lecture will occur)

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Students seeking more policy resources can visit the [Student Policy Gateway \(https://students.mq.edu.au/support/study/student-policy-gateway\)](https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/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

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) 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 Services and 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.

Student Enquiries

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

If you are a Global MBA student contact globalmba.support@mq.edu.au

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 |
|------------|----------------------------------|
| 21/02/2020 | Staff added and schedule updated |