

Postgraduate Certificate in Health Sciences in Medical Imaging (CT Pathway)

Introduction

The Computed Tomography (CT) pathway of the Postgraduate Certificate in Health Sciences (Medical Imaging) provides an opportunity for Medical Imaging Technologists (MIT)/radiographers to explore this imaging modality in more depth and advance their professional knowledge.

Other appropriate students including (but not limited to) Nuclear Medicine Technologists, Radiation Therapists and MITs returning to work, may complete a variation of this programme enabling them to provide evidence of clinical competency in CT. Graduates will have a sound knowledge and skills base to practise CT safely and competently by meeting the criteria for competence as set out in the New Zealand Medical Radiation Technologists Board's (MRTB) competency documents.

Programme Overview

The specialisations in the Postgraduate Certificate in Health Sciences consist of 60 points of taught coursework (four 15-point courses) and can be completed part-time within a period of up to two years. Students will be expected to spend approximately 150 hours of study for each 15-point course.

In specialisations with a clinical requirement (such as the CT clinical competency pathway) students will be required to complete a minimum of 500 hours of clinical practice by programme completion.

All courses will be delivered fully online, with the possible exception of the elective course being dependent on the student's choice. Each student is required to complete four compulsory 15-point courses (60 points); 30 points (two courses) being common to all Medical Imaging specialisations and 30 points (two courses) specific to the CT specialisation.

Schedule of courses:

Postgraduate Certificate in Health Sciences in Medical Imaging (CT pathway)

| Course Code | Course Name | Semester 1 | Semester 2 |
|--------------|----------------------------------------|------------|------------|
| MEDIMAGE 701 | Imaging Anatomy and Pathology | ✓ | ✓ |
| MEDIMAGE 702 | Professional Issues in Medical Imaging | ✓ | ✓ |
| MEDIMAGE 710 | CT Imaging Technology | ✓ | |
| CLINIMAG 717 | CT Clinical Applications | | ✓ |
| CLINIMAG 707 | CT Clinical Practice* | | ✓ |

*This course includes assessment of clinical competency in CT

Course Outlines

MEDIMAGE 701: Imaging Anatomy and Pathology

15 Points

Students will develop an integrated understanding of anatomy and pathology as it applies to Medical Imaging in the clinical context. The course introduces the principles of medical science at whole body, organ, tissue, cellular and sub cellular levels and includes the fundamentals of anatomy, physiology and pathophysiology of the major systems of the human body in relation to specific regions and pathologies.

Objectives of the course

This course aims to enhance the student's clinical reasoning skills and to enable them to evaluate the use of a variety of imaging modalities in patient diagnosis and management. It will extend students' overall professional competence through an academically applied level of understanding of clinical science. Anatomical knowledge of various systems and associated pathological processes will be developed, linked to their functional and clinical relevance.

Learning outcomes

1. Demonstrate a comprehensive understanding of normal anatomy and selected pathological processes by explaining the clinical course of a disease/injury using supporting images from a range of imaging modalities.
2. Evaluate the advantages and limitations of a range of imaging modalities when applied to the investigation of specific pathologies.
3. Critically examine strategies for the selection of appropriate imaging modalities as part of the diagnostic, management and/or treatment pathway.

MEDIMAGE 702: Professional Issues in Medical Imaging

15 Points

Students will investigate the concept of professional practice leading to an exploration of current professional issues relevant to Medical Imaging including role development and advanced practice. The course will provide students with the knowledge to interact with individuals from a variety of backgrounds both ethically and with respect for their beliefs and values. The course also addresses medico-legal issues, decision-making and effective communication within the clinical setting.

Objectives of the course

This course aims to provide students with the ability to respond to the wide variety of professional, ethical, medico-legal and clinical workplace issues generated in a rapidly changing environment. Students will develop an awareness of personal, professional and interpersonal expertise thereby enabling them to reflect on their own clinical practice related to these issues in the context of fitness to practise.

Learning outcomes

1. Critically evaluate the development and evolution of Medical Imaging as a profession and its place within the healthcare system.
2. Examine how communication, interpersonal and inter-professional dynamics impact on your role as a Medical Imaging practitioner.
3. Reflect on the role of critical thinking and reflective practice in the context of your clinical practice.
4. Critically examine a broad range of ethical and medico-legal issues relevant to professional and cultural competence within Medical Imaging practice.
5. Analyse the processes of clinical decision making and professional judgement, including the concept of autonomous practice.
6. Compare and contrast Medical Imaging role development in New Zealand and the progression of advanced practice within Medical Imaging and other healthcare professions.
7. Define fitness to practise in Medical Imaging by critically reflecting on each of the above topics within your clinical practice.

MEDIMAGE 710: CT Imaging Technology

15 Points

Provides students with an in-depth understanding of CT technology and its application. The course addresses the scientific principles of the modality including image formation and reconstruction, technical parameters, radiation safety and dose reduction, image quality, artefacts, quality assurance and contrast agents. Equipment developments and new and evolving techniques will be examined.

Objectives of the course

This course aims to provide students with specialised theoretical knowledge and an understanding of the underlying scientific principles of CT technology. Students will develop the ability to apply this knowledge in the safe use of CT equipment for clinical and/or research purposes. This course will critically examine the selection of technical parameters and their relationship to image quality and to the use of sophisticated techniques in the acquisition of CT images.

Learning outcomes

1. Demonstrate an understanding of theoretical concepts relating to CT technology.
2. Critically discuss specific issues relating to bio-effects, radiation safety and dose reduction within the CT environment.
3. Analyse and integrate the principles and technology of CT to enable image optimisation.
4. Critically evaluate the technical and diagnostic quality of a range of CT images.
5. Evaluate the importance of quality assurance and explain the associated impact on safety and image quality.
6. Critically discuss current developments in CT technology and explore recent literature in relation to emerging initiatives.

CLINIMAG 717: CT Clinical Applications

15 Points

Addresses normal and abnormal Computed Tomography (CT) imaging appearances, protocol selection and modification, and application to clinical practice.

Prerequisite: MEDIMAGE 710 (recommended but not required)

Restriction: CLINIMAG 707

Objectives of the course

This course aims to cultivate a critically questioning approach to CT imaging practice. An emphasis will be placed on integrating theory and clinical practice elements in order to facilitate clinical competence. The course will expect students to assimilate the underlying physical principles of CT with relevant biological processes and imaging appearances.

Learning outcomes

1. Differentiate and explain normal and abnormal CT imaging appearances of the head, thorax, abdomen and pelvis.
2. Make informed clinical judgements with regard to the selection of imaging protocols and technical parameters in relation to the head, thorax, abdomen and pelvis.
3. Assess current clinical protocols for specific pathologies of the head, thorax, abdomen and pelvis, suggesting and justifying possible modifications.
4. Critically evaluate a range of both standard and specialised CT techniques to investigate specific regions and pathologies.
5. Apply an evidence-based approach to clinical decision-making and problem solving.

CLINIMAG 707: CT Clinical Practice

15 Points

Addresses normal and abnormal computed tomography (CT) imaging appearances, technique evaluation and adaptation, and includes reflection on clinical practice relating to CT. The course will ensure students develop the knowledge, competencies, skills and attitudes needed to demonstrate mastery in academic and professional CT practice.

Prerequisite: MEDIMAGE 710

Restriction: CLINIMAG 717

Objectives of the course

This course aims to cultivate a critically questioning approach to CT imaging practice and enables the student to provide evidence of their clinical competence while emphasising the importance

of synthesising theory and clinical practice elements. The course will expect students to assimilate the underlying physical principles of CT with relevant biological processes and imaging. Students will evaluate their own clinical practice specifically relating to technique, patient management and image optimisation to ensure diagnostic accuracy. In particular, this course will promote higher level professional and reflective skills in the student.

Learning outcomes

1. Differentiate and explain normal and abnormal CT imaging appearances of the head, thorax, abdomen and pelvis.
2. Make informed clinical judgements with regard to the selection of imaging protocols and technical parameters in relation to the head, thorax, abdomen and pelvis.
3. Assess current clinical protocols for specific pathologies of the head, thorax, abdomen and pelvis, suggesting and justifying possible modifications.
4. Critically evaluate a range of both standard and specialised CT techniques to investigate specific regions and pathologies.
5. Apply an evidence-based approach to clinical decision-making and problem solving.
6. Demonstrate clinical competence in performing a wide range of CT examinations.

Clinical Learning and Assessment

For those students who choose to complete the clinical competency pathway, development of the practitioner's clinical practice is a vital part of the University's programmes. For this to be possible, it is necessary for students to carry out a sufficient number and range of examinations in a clinical setting. This will assist students to progress their clinical decision-making skills in practice and subsequently to achieve the minimum clinical competency standards as prescribed by the Medical Radiation Technologists Board (MRTB).

In order to facilitate integration of academic knowledge with applied clinical practice, it is essential that a supportive learning environment is encouraged within the workplace and the University will work with clinical partners to achieve this. The University will require that students are supervised by an appropriately qualified CT Technologist. This person will contribute to the assessment of students to ensure their performance and knowledge is at the required level.

Within the Medical Imaging courses, students will complete a range of assessments designed to develop and assess academic development as well as assessment to attest to clinical competence. In the CT Clinical Practice course, students will be required to demonstrate clinical competence before a passing grade may be awarded. Students will not be able to compensate an inadequate clinical assessment with excellent academic work.

Workplace-Based Clinical Competency Assessment

Assessment of clinical competency will occur in the workplace throughout the student's enrolment within this programme, until successful completion of the CT Clinical Practice course. Failure to demonstrate a minimum level of competency at specific time points may indicate a fitness to practise issue consequently resulting in the student being unable to proceed in the programme until a remediation plan is implemented and successfully completed.

To facilitate learning within a clinical setting, students will receive access to an ePortfolio in which they will record and accumulate both formative and summative evidence of clinical learning. They will also be expected to record reflections on incidents and events that occur within their clinical practice.

The ePortfolio will contain an electronic log of examinations that are observed or performed along with a record of workplace-based assessments. As the students proceed through their programme of study they will be given feedback on their ePortfolio.

1. Electronic Logbook (eLogbook)

The student is required to complete an electronic record of a specified number and range of examinations that they observe, perform with assistance, or perform independently, with verification by the Clinical Supervisor. If it is not possible for a single workplace to provide the required minimum number and range of examinations, it will be the responsibility of the student's manager to ensure the student is able to meet these requirements elsewhere. For example, it may be necessary to arrange for the student to visit another department to perform or observe examinations.

2. Quarterly Progress Reports (QPR)

Quarterly progress meetings between the Clinical Supervisor and student will take place with a report being submitted. The most important function of these meetings is to provide constructive, effective feedback to the student on their progress to date and to identify any issues or concerns.

3. Longitudinal Evaluation of Performance (LEP)

This assessment involves a student performing a range of clinical examinations within their own workplace. A prescribed minimum number of LEP assessments will be completed by the Clinical Supervisor. In addition, other appropriately qualified assessors within the workplace are encouraged to perform these assessments. Online training for Clinical Supervisors and Clinical Assessors is provided by the University of Auckland.

4. Multi-source feedback (MSF)

Questionnaires will be distributed to several groups; peers, patients, radiologists, clerical staff and inter-professional colleagues where appropriate. This form of assessment is used to evaluate attributes such as communication skills, team-working, professionalism, patient care and personal insight. The Clinical Supervisor will be responsible for distribution and collection of these.

Conclusion

Learning and teaching at the University of Auckland is informed by education theories and research-led. Students are encouraged to learn collaboratively, learning with and from their peers and the academic teaching team. The focus is not just on acquiring new knowledge. While the acquisition of new knowledge is seen as an essential part of postgraduate education, equally important is the development of clinical competence, critical thinking and reflective learning; essential attributes for modern healthcare practitioners.

Disclaimer: Although every reasonable effort is made to ensure accuracy, the information in this document is provided as a general guide only and is subject to alteration.