

Unit Descriptions for the Master of Medical Radiations (Nuclear Medicine)

MMR4000 PHYSICS AND INSTRUMENTATION 1

Leader:	Dr Ray Budd
Credit points:	6
Prerequisites:	Admission to the course
Co-requisites:	RTS4010 and NMS4021

Synopsis:

This unit will instruct students in the areas of: introductory radiation protection, fundamentals of radiation physics and applied mathematics, radioactivity, radiation detection and spectroscopy, interaction of radiation with matter, radionuclide production, basic operation principles of the Gamma Camera and nuclear counting statistics.

Objectives:

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

1. Discuss the principles of radiation protection applicable to the medical use of ionising radiation;
2. Explain the scientific concepts of atomic structure and radioactivity;
3. Describe the various types and sources of ionising radiation;
4. Recognise and explain the design features and operation principles of different types of radiation detectors;
5. Explain the physical processes involved in the interaction of radiation with matter; and
6. Comprehend and explain the principles of image formation with the Gamma Camera.

Assessment:

Two 1500 word assignments (30%) + one three hour written examination (70%).

MMR4010 PROFESSIONAL PRACTICE 1

Leader:	Ms Carolyn Wright
Credit points:	6
Prerequisites:	Admission to the course
Co-requisites:	RTS4000, NMS4021

Synopsis:

Common pathophysiology of the respiratory, urinary, digestive and musculoskeletal systems. Principles of human bioethics and medico-legal issues and their application in the nuclear medicine context. Health psychology, health behaviour and stress and their relationship to the illness and injury.

Objectives:

On successful completion of this unit students will be able to:

1. Understand and describe common functional and structural changes related to disease processes and injury pertinent to nuclear medicine.
2. Apply fundamental principles of pathophysiology to other disorders encountered in clinical practice.
3. Demonstrate and communicate a broad and critical conceptual understanding of human bioethics and medico-legal issues and its application to the medical setting and the nuclear medicine context; and
4. Demonstrate and communicate a broad and critical conceptual understanding of theories of health psychology and health behaviour and their application in the delivery of nuclear medicine services and patient care.

Assessment:

Two 1500 word clinical action plans and accompanying comparative reports (40%) + one two hour written examination (60%).

NMS4021 NUCLEAR MEDICINE & RADIOPHARMACY 1

Leader:	Ms Liz Parkinson
Credit points:	6
Prerequisites:	Admission to the course
Co-requisites:	RTS4000, RTS4010

Synopsis:

Nuclear Medicine and Radiopharmacy 1, is the first of three units in the Master of Nuclear Medicine to deal specifically with the clinical practice of nuclear medicine. The unit is designed to introduce the student to the fundamental concepts that underpin imaging the human body using radiopharmaceuticals. The unit is modularised to enhance learning outcomes for students and utilises a combination of both clinical application (organ or structure to be imaged) and the radiopharmaceutical requirements to provide the context for learning. Each module will also cover the relevant safety and quality issues and documentation standards and practices.

Module 1 : Introduction to radiopharmacy

This module introduces the student to fundamental concepts of radiopharmacy, in particular chemical reactivity, biochemical molecules and functions; sealed and unsealed sources; radiation protection, chemical hazards; standards, legislation and safety; radionuclides, emissions, half-life, purity, chromatography; ^{99m}Tc Technetium – the 'model' radiopharmaceutical - including basic chemistry, generators, biodistribution; reconstitution, chromatography, aseptic technique, activity calculations; routes of administration & contraindications.

Module 2 : Considerations in imaging

The module introduces students to the concept of imaging radiopharmaceutical emissions using the gamma camera, and provides examples of the considerations that need to be made in order to ensure an image of high quality in particular, radionuclide emissions suitable for imaging; collimation; counting statistics; equipment checks' introduction to SPECT imaging.

Module 3 : Diagnostic imaging procedures

In this module students examine common nuclear medicine applications over a broad range of body systems. This module includes patient preparation, positioning and care, in relation to lung ventilation and perfusion; bone imaging; renal imaging – divided function and cortical imaging; gastro-intestinal imaging – biliary

Module 4 : Introduction to image processing and display

The module introduces students to concepts of image quality, interpretation, display and storage / archive.

Objectives:

On successful completion of this unit, students will be able to demonstrate and communicate a broad and critical conceptual understanding of:

1. The basic principles of radiation protection with regard to the use of unsealed sources

2. The regulatory framework governing the use of radioactive materials and chemicals in the health care setting
3. The characteristics of a radiopharmaceutical for diagnostic imaging purposes
4. Simple activity and half-life calculations for a range of radionuclides and radiopharmaceuticals
5. The construction and function of the $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$ radionuclide generator
6. Radiopharmaceutical quality control techniques
7. Radiopharmaceutical administration techniques, and patient contraindications
8. Normal and altered radiopharmaceutical biodistribution
9. Imaging studies of the lungs, skeletal system, renal system and biliary system
10. Patient preparation, positioning and care, including identification processes, acquiring a patient history, checking for contraindications.
11. Image acquisition parameters including equipment checks, peaking, collimator selection, counting statistics, patient care.
12. Image quality and image storage.

Assessment:

Two clinical action plans of approximately 1500 words, and accompanying comparative reports of approximately 1500 words (40%) + One 180 minute end of semester written examination (60%).

MMR4012 CLINICAL STUDIES 1

Leader:	Ms Liz Parkinson
Credit points:	3
Prerequisites:	RTS4000, RTS4010, NMS4021
Co-requisites:	RTS4020, RTS4022

Synopsis:

This is the first clinical practice unit and it provides a systematic introduction to the clinical nuclear medicine setting in particular (1) department layout and design; (2) personal and patient safety; (3) imaging and laboratory equipment; (4) participation in routine imaging studies on adult patients exhibiting a range of clinical conditions and presentations; (5) patient care and communication strategies with patients, carers and team members; (6) introduction to the hot laboratory.

Objectives:

Upon completion of this unit, students will have a broad understanding of the role of nuclear medicine in medical practice, the professional role of nuclear medicine scientists and workplace design and routines. Through means of appropriate rostering and clinical supervision students will gain clinical experience in routine nuclear medicine imaging studies addressed in *Nuclear Medicine and Radiopharmacy 1* and *Physics and Instrumentation 1*, and the professional skills addressed in *Professional Practice 1*. In this unit, emphasis is placed on students gaining experience in studies of the respiratory system, skeletal system, gastro-intestinal system and renal system, and develop beginner level competency in:

1. The interpretation of nuclear medicine referrals;
2. Patient identification, preparation, positioning and care during imaging procedures;
3. The selection of image acquisition parameters for planar studies, including radiopharmaceutical and collimator selection and counting statistics;
4. Image display and interpretation;
5. Maintaining a safe work environment, by practising the principles of radiation safety and protection, occupational health and safety, and infection control for patients, themselves and staff;
6. Administrative work practices, including the management of resources.

Students will also develop effective communication skills with clinical staff and patients (and their carers), and they will conduct nuclear medicine studies in a professional and ethical manner. During this clinical rotation, students will gain the equivalent of four days observational experience in the hot laboratory / radiopharmaceutical preparation.

Assessment:

Case reports related to examinations and patient interactions + Clinical skills assessment + Clinical studies professional portfolio

Off-campus attendance requirements:

Placement for 5 continuous weeks in a clinical nuclear medicine centre (4 weeks academic credit, 1 week professional credit).

MMR4020 RADIOBIOLOGY AND DOSIMETRY

Leader:	Dr Ray Budd
Credit points:	6
Prerequisites:	RTS4000, RTS4010, NMS4021
Co-requisites:	RTS4012, RTS4022

Synopsis:

Introduction to biological effects of ionizing radiation on cells & tissues and mechanisms repairing sustained biological damage, study of systemic and total body responses to early and late effects of radiation, hereditary effects and effects on the embryo & foetus. Detailed study of principles of radiation protection and possible risks associated with irradiation during diagnostic and therapeutic application from a risk vs. benefit perspective. Study of risk assessment based evaluation of radiation dose.

Objectives:

On successful completion of this unit students will be able to:

1. Discuss the known biological effects of radiation on cells and tissues;
2. Describe the difference in effectiveness of various types of ionising radiation;
3. Recognise and explain the mechanisms of cellular repair radiation damage;
4. Explain the difference between early and late effects of radiation damage;
5. Discuss the principles and practices used to minimise occupation radiation exposure,
6. Calculate radiation dose in selected diagnostic and therapeutic nuclear medicine scenarios; and
7. Discuss the current scientific theories relating to the risk associated with dose.

Assessment:

One three hour written examination (60%) + two assignments (40%)

MMR4022 CLINICAL STUDIES 2

Leader:	Ms Liz Parkinson
Credit points:	3
Prerequisites:	RTS4000, RTS4010, NMS4021
Co-requisites:	RTS4020, RTS4012

Synopsis:

This is the second clinical practice unit and it will allow students to continue their orientation to the nuclear medicine workplace and nuclear medicine procedures. Further experience in routine imaging studies on adult patients exhibiting a range of clinical conditions and presentations. Introduction to SPECT and gated imaging. During this clinical rotation, students will gain the equivalent of one week dedicated experience in the hot laboratory/radiopharmaceutical dispensing.

Objectives:

Through means of appropriate rostering and clinical supervision students will gain further clinical experience in routine nuclear medicine imaging studies and radiopharmacy practices addressed in *Nuclear Medicine and Radiopharmacy 1* and *Physics and Instrumentation 1*, and the professional skills addressed in *Professional Practice 1*.

In this clinical placement, students will build on experience gained in their first clinical practice unit and again place emphasis on performing studies of the respiratory system, skeletal system, gastro-intestinal system and renal system. Depending on the clinical load of the workplace, students are also encouraged to observe and gain some experience in SPECT and gated acquisitions. In the conduct of all studies, students are expected to continue to develop competency in:

1. The interpretation of nuclear medicine referrals;
2. Patient identification, preparation, positioning and care during imaging procedures;
3. The selection of image acquisition parameters for planar studies, including collimator selection and counting statistics;
4. Image display, basic processing and image interpretation;
5. Administrative work practices, including the management of resources.
6. Maintaining a safe work environment, by practising the principles of radiation safety and protection, occupational health and safety, and infection control for patients, themselves and staff;
7. Effective communication with clinical staff and patients (and their carers);
8. The conduct nuclear medicine studies in a professional and ethical manner.

Students will also be expected to be able to communicate understanding of the role of gated and SPECT imaging. Students will also gain clinical experience in the hot laboratory / radiopharmaceutical preparation practices. This will involve observation of laboratory procedures including radionuclide/pharmaceutical/radiopharmaceutical calculations, storage, preparation, quality control, dispensing and administration. Students are expected to develop beginner level competency in simulated/supervised radiopharmaceutical calculations, preparation and dispensing, storage and waste management, and will be able to communicate an understanding of radiation safety practices in the laboratory.

Assessment:

Case reports related to examinations and patient interactions + Clinical skills assessment + Clinical studies professional portfolio

Off-campus attendance requirements:

Placement for 5 continuous weeks in a clinical nuclear medicine centre (4 weeks academic credit, 1 week professional credit).

MMR4023 PROFESSIONAL PRACTICE 2

Leader:	Ms Caroline Wright
Credit points:	6
Prerequisites:	RTS4000, RTS4010, NMS4021, RTS4020, RTS4022
Co-requisites:	RTS4024, RTS4025

Synopsis:

Common pathophysiology of the cardiac and endocrine systems; blood and neurologic disorders relevant to nuclear medicine. Systematic introduction to sectional imaging anatomy and its relevance to nuclear medicine practice. Introduction to the concept of hybrid imaging systems and patient archival systems.

Objectives:

On successful completion of this unit students will be able to:

1. Describe common functional and structural changes related to disease processes and injury pertinent to nuclear medicine.
2. Continue to apply fundamental principles of pathophysiology to other disorders encountered in clinical practice.
3. Communicate a broad and critical conceptual understanding of hybrid imaging systems and their role in clinical care;
4. Communicate a broad and critical conceptual understanding of patient archival systems used in the health care setting;
5. Accurately locate and recognise anatomical structures of the musculoskeletal system, central nervous system, genitourinary system, respiratory and cardio-vascular systems and digestive tract demonstrated in sectional CT and MRI images;
6. Accurately locate and recognise key radiological features of common pathologies pertinent to nuclear medicine studies.

Assessment:

Written examination (one and a half hours): 40% + Image recognition exam (one hour): 40% + Assignment: 20%

MMR4024 PHYSICS AND INSTRUMENTATION 2

Leader:	Dr Ray Budd
Credit points:	6
Prerequisites:	RTS4000, NMS4021, RTS4020, RTS4022
Co-requisites:	RTS4023, RTS4025

Synopsis:

This unit expands on the topics and principles introduced in RTS4000. Topics include: electronic instrumentation for radiation detectors, advanced counting systems, performance characteristics of the Gamma Camera, image quality in nuclear medicine, SPECT and PET equipment, hybrid imaging systems and digital imaging processing.

Objectives:

On successful completion of this unit students will be able to:

1. Describe the basic components used in electronic radiation detection systems;
2. Recognise and discuss the inherent design advantages and disadvantages of different types of detecting systems,
3. Discuss the performance characteristics of the Gamma Camera;
4. Comprehend the principles of digital image processing;
5. Distinguish and explain the different imaging principles used in SPECT and PET equipment; and
6. Discuss the development of modern hybrid imaging equipment.

Assessment:

Written examination (three hours): 70% + Two assignments 1500 words each: 30%

MMR4025 CLINICAL STUDIES 3

Leader:	Ms Liz Parkinson
Credit points:	3
Prerequisites:	RTS4000, NMS4021, RTS4020, RTS4022,
Co-requisites:	RTS4023, RTS4024

Synopsis:

SPECT and gated nuclear medicine imaging studies. Further experience in routine planar imaging studies and patient care. Studies primarily on a range of adult patients, however students will be introduced to paediatric, geriatric and patients of non-English speaking background and those with special needs. Introduction to pharmacological interventions, common study contraindications and digital image processing. Quality assurance procedures in respect to imaging studies, equipment and radiopharmaceutical preparation. During this clinical rotation, students will gain the equivalent of one week of experience in the hot laboratory/radiopharmaceutical dispensing.

Objectives:

Through means of appropriate rostering and clinical supervision, students will continue to gain experience in the imaging and radiopharmacy practices addressed in *Nuclear Medicine and Radiopharmacy 1, Physics and Instrumentation 2* and *Professional Practice 3*. Upon successful completion of this unit, students will be able to:

1. Implement and adapt appropriate routine planar nuclear medicine imaging studies on adult patients with minimal supervision;
2. Implement basic SPECT and gated acquisitions on adult patients and conduct more complex imaging acquisitions under supervision;
3. Demonstrate beginner level expertise in digital image processing;
4. Demonstrate beginner level expertise in diagnostic radiopharmaceutical preparation and dispensing;
5. Apply quality assurance principles to nuclear medicine imaging systems and radiopharmacy procedures;
6. Evaluate routine imaging studies in terms of patient presentation, the clinical question, radiopharmaceutical biodistribution, results obtained, additional views or requirements and image quality;
7. Identify personal learning goals in respect to the development of professional expertise in imaging studies;
8. Appreciate the nature of the professional inter-relationship between all members of the nuclear medicine team during imaging procedures.
9. Demonstrate effective work practices, including the management of resources.
10. Provide a safe work environment, by practising the principles of radiation safety and protection, occupational health and safety, and infection control for patients, themselves and staff;
11. Demonstrate effective communication skills with clinical staff and patients (and their carers), and conduct nuclear medicine studies in a professional and ethical manner.

Assessment:

Case reports related to examinations and patient interactions + Clinical skills assessment (imaging & radiopharmacy) + Clinical studies professional portfolio

Off-campus attendance requirements:

Placement for 5 continuous weeks in a clinical nuclear medicine centre (4 weeks academic credit, 1 week professional credit).

NMS5000 NUCLEAR MEDICINE & RADIOPHARMACY 2

Leader:	Ms Liz Parkinson
Credit points:	6
Prerequisites:	Successful completion of all units in year 1 of the course
Co-requisites:	RTS5010

Synopsis:

This is the second of three units in the Master of Nuclear Medicine dealing specifically with nuclear medicine and radiopharmacy rationale and methods. This unit builds upon the previous unit and introduces the student to more nuclear medicine applications that present more advanced considerations. Solutions to more complex problems reflecting the organ or system to be examined, and more sophisticated radiopharmaceutical and equipment requirements will be developed. Cold laboratory procedures and simple radionuclide therapy techniques will also be introduced and the roles of the nuclear medicine scientist with respect to these procedures will be discussed. The content will be given structure and direction by addressing specific learning objectives related to (1) radiopharmacy techniques; (2) diagnostic imaging procedures; (3) non-imaging procedures, and (4) image processing and display.

Objectives:

On successful completion of this unit students will be able to demonstrate and communicate a broad and critical conceptual and practical understanding of:

1. More advanced radiopharmacy techniques, in particular radiopharmaceutical calibration and dispensing; advanced labelling techniques e.g. Indium, Iodine; radiopharmaceuticals for radionuclide therapy; PET radiopharmaceuticals and biochemistry
2. More advanced diagnostic imaging procedures including patient preparation, positioning and care, in relation to cardiovascular imaging; oncology; CNS imaging; endocrine; planar versus SPECT imaging, considerations and parameters; PET /molecular imaging; pharmacologic interventions
3. Non-imaging procedures, in particular cold laboratory and *in vitro* procedures; blood labelling techniques and considerations; introduction to haematopoietic procedures; less common non-imaging studies eg. Schilling test, C14 breath testing; calculate and evaluate results for non imaging procedures
4. Image processing and display including equipment checks and quality control; retrieval and evaluation of data prior to processing; gated, planar and SPECT image processing; image archival system, including PACS

Assessment:

Two clinical action plans of approximately 1500 words, and accompanying comparative reports of approximately 1500 words (40%) + One 180 minute end of semester written examination (60%).

MMR5010 CLINICAL STUDIES 4

Leader:	Ms Liz Parkinson
Credit points:	3
Prerequisites:	Successful completion of all units in year 1 of the course
Co-requisites:	NMS5000

Synopsis:

Students will develop clinical professional skills and proficiencies consistent with the requirements for more complex planar, SPECT and gated imaging studies, with emphasis on cardiovascular, oncology, CNS and endocrine imaging. Experience in performing studies on a range of patients including adult, paediatric, geriatric, those of a non-English speaking background and those with special needs. Students will commence the development of clinical professional skills and proficiencies consistent with the requirements of hybrid imaging systems, PET imaging, cell labelling, non-imaging procedures, radionuclide therapy and cannulation. Further experience in general nuclear medicine procedures, patient care, radiopharmacy and quality assurance procedures in the workplace.

Objectives:

Through means of appropriate rostering and clinical supervision, students will gain experience in the imaging and radiopharmacy practices outlined in *Nuclear Medicine and Radiopharmacy 2*, *Physics and Instrumentation 2* and *Professional Practice 2*. Upon successful completion of this unit, students will be able to:

1. Implement and evaluate more complex imaging studies on adult patients with minimal supervision;
2. Conduct radiopharmacy practices with minimal supervision;
3. Modify and adapt SPECT and gated imaging acquisitions;
4. Communicate understanding of the role of PET and hybrid imaging;
5. Communicate understanding of radionuclide therapy procedures;
6. Demonstrate beginner level expertise in cannulation, cell labelling and non-imaging procedures;
7. Demonstrate an understanding of the multidisciplinary approach to the clinical management of paediatrics, geriatrics and non-English speaking patients and those with special needs;
8. Apply quality assurance principles in the clinical setting;
9. Apply the principles of body section nuclear medicine imaging;
10. Identify personal learning goals in respect to the development of professional expertise in more complex imaging studies and radiopharmacy practice;
11. Manage a camera room in terms of patient sequencing, clinical staff and patient care;
12. Appreciate the nature of the professional inter-relationship between all members of the nuclear medicine team for imaging and non-imaging procedures;
13. Evaluate more complex imaging studies in terms of the condition of the patient, the clinical question, radiopharmaceutical biodistribution, results obtained, additional views or requirements and image quality.
14. Demonstrate effective communication skills with clinical staff and patients (and their carers), provide a safe working environment, demonstrate effective work practices, and conduct nuclear medicine studies in a professional and ethical manner.

Assessment:

Learning contract + Case reports related to examinations and patient interactions + Clinical skills assessment (imaging & radiopharmacy) + Clinical studies professional portfolio

Off-campus attendance requirements:

Five continuous weeks in a clinical nuclear medicine centre.

NMS5020 NUCLEAR MEDICINE & RADIOPHARMACY 3

Leader:	Ms Liz Parkinson
Credit points:	6
Prerequisites:	NMS5000, RTS5010
Co-requisites:	RTS5022

Synopsis:

This is final unit of the Master of Nuclear Medicine dealing specifically with nuclear medicine and radiopharmacy rationale and methods. The unit aims to utilise the knowledge and understanding gained in the previous two units and develop further the students understanding of complex nuclear medicine techniques. More advanced applications in oncology, infection, paediatrics, PET, hybrid imaging and radionuclide therapy are used to provide learning context. The complimentary nature of other imaging modalities, such as DEXA, Sonography, CT and MRI are also discussed. The unit content will be given structure and direction by addressing specific learning objectives related to (1) advanced radiopharmacy, (2) complex imaging and radionuclide therapy, (3) complimentary studies, and (4) complex image processing.

Objectives:

On successful completion of this unit students will be able to demonstrate and communicate a broad and critical conceptual and practical understanding of:

1. Advanced radiopharmacy, in relation to drug development, pre-clinical imaging and pharmacology; dosimetry; PET radiopharmacy, radiation safety and facility design
2. Complex imaging and radionuclide therapy procedures, including patient preparation, positioning and care, in relation to PET imaging; paediatric studies; oncology; CNS imaging; radionuclide therapy; PET/CT applications; SPECT / CT applications
3. Complimentary studies in Medical Radiations, in relation to CT for Nuclear Medicine; US for Nuclear Medicine; MRI for Nuclear Medicine; DEXA
4. Complex image processing and display, in particular raw data analysis; advanced image processing including co-registration and hybrid systems; image quality control; image interpretation & critique

Assessment:

Two clinical action plans and accompanying comparative reports: 40% + Written examination (three hours): 60%

MMR5022 CLINICAL STUDIES 5

Leader:	Ms. Liz Parkinson
Credit points:	3
Prerequisites:	NMS5000, RTS5010
Co-requisites:	NMS5020

Synopsis:

Clinical experience in nuclear medicine studies involving modification of general and advanced methods, techniques and other procedural variables. PET and hybrid imaging studies. Radionuclide therapy. Radiopharmacy and laboratory procedures. Paediatric studies. Quality assurance procedures in the clinical setting. Participation in complimentary imaging modalities in particular CT and sonography.

Objectives:

Through appropriate supervised clinical experience and rostering, students will extend the clinical knowledge, understanding and skills in nuclear medicine as addressed in *Nuclear medicine and radiopharmacy 3, Physics and Instrumentation 2 and Professional Practice 2*. Upon successful completion of this unit, students will be able to:

1. Demonstrate appropriate clinical professional skills and proficiencies in PET imaging, paediatric studies, cell labelling, non-imaging studies and cannulation;
2. Prepare radiopharmaceuticals for treatment purposes;
3. Implement and adapt imaging studies involving hybrid imaging systems;
4. Implement more complex imaging processing procedures, and demonstrate understanding of image archival systems;
5. Demonstrate an understanding of the multidisciplinary approach to patient management;
6. Manage a camera room in terms of patient sequencing, clinical staff and patient care;
7. Manage a hot laboratory / radiopharmacy procedures including ordering, receipt, storage, preparation, dispensing and waste management.
8. Demonstrate continued development of clinical professional skills and proficiencies in relation to general nuclear medicine practice, including SPECT and gated acquisitions, with experience of increasing complexity or difficulty of examination determined by either patient status, procedural technique, patient and professional communication, image processing, image evaluation, supplementary images or review, organisational or legal obligations.
9. Demonstrate effective communication skills with clinical staff and patients (and their carers), provide a safe working environment, demonstrate effective work practices, and conduct nuclear medicine studies in a professional and ethical manner.

Assessment:

Learning contract + Case reports related to examinations and patient interactions + Clinical skills assessment (imaging & radiopharmacy) + Clinical studies professional portfolio

Off-campus attendance requirements:

Placement for 14 continuous weeks in a clinical nuclear medicine centre (5 weeks academic credit, 9 weeks professional credit).

MMR5024 EVIDENCE BASED PRACTICE IN MEDICAL RADIATIONS

Leader:	Dr Karen Siu
Credit points:	3
Prerequisites:	NMS5020, RTS5022
Co-requisites	NMS5025

Synopsis:

This unit introduces students to the principles and practice of scientific research. A range of research methodologies will be explored together with the collection, analysis and interpretation of data, methods of communication and subsequent critique of the findings. This unit will also facilitate practical experience of the research process through the completion of an extensive literature research project related to the discipline of nuclear medicine.

Objectives:

On successful completion of this unit students will be able to demonstrate and communicate a broad and critical concept of:

1. The role of research in the profession of nuclear medicine;
2. The scope of research conducted in nuclear medicine;
3. Different methods of knowledge acquisition and synthesis and be aware of the moral, ethical and legal responsibilities of scientific investigation;
4. Basic research concepts and methodology and the different approaches in research in both qualitative and quantitative experimental design;
5. The process of research through participation, under supervision, in a research project.

Students will have a practical knowledge and understanding of the process of gaining ethics approval for a research project.

Assessment:

Assignment of 1500 words 20% + Project report: 80%

MMR5025 CLINICAL STUDIES 6

Leader:	Ms Liz Parkinson
Credit points:	3
Prerequisites:	NMS5020, RTS5022
Co-requisites:	NMS5024

Synopsis:

Clinical experience in PET, hybrid imaging and CT relevant to the use of hybrid imaging systems. Participation in radionuclide therapy (including iodine ablation therapy). Continued experience in paediatric studies and non-imaging studies. Radiopharmaceutical administration. Quality assurance procedures in the clinical setting. Students will also gain experience in complimentary imaging modalities including sonography, MRI and DEXA. Additional experience in routine nuclear medicine.

Objectives:

Through appropriate rostering, students will extend their clinical knowledge, understanding and skills addressed in *Nuclear medicine and radiopharmacy 3* and *Physics and Instrumentation 2*. This clinical placement will also contribute to the learning outcomes for Evidence based practice in Medical Radiations. Upon completion of this unit students will be able to practice as follows, to the level of a competent nuclear medicine scientist:

1. Conduct, modify and adapt routine and advanced nuclear medicine imaging and non-imaging studies and techniques, in relation to patient status, clinical question, procedural variations, patient or professional communication, image evaluation, organisational or legal obligations;
2. Prepare and administer radiopharmaceuticals for diagnostic purposes (intravenous administration exempted).
3. Prepare and administer oral Iodine-131 radionuclide therapy and manage patient requirements;
4. Facilitate administration of other radionuclide therapies and manage patient requirements;
5. Participate in CT examinations and demonstrate understanding of relevant techniques, radiation protection strategies, quality assurance principles and organisational and legal obligations pertinent to diagnostic hybrid imaging systems;
6. Recognise imaging / sectional anatomy as presented by CT.
7. Display a commitment to quality management, and perform quality control procedures;
8. Manage a camera room, hot laboratory/radiopharmacy practices;
9. Demonstrate effective communication skills with clinical staff and patients (and their carers), provide a safe working environment, demonstrate effective work practices, and conduct nuclear medicine studies in a professional and ethical manner.
10. Identify ongoing personal learning goals in respect to the continued development of professional expertise in nuclear medicine.

Assessment

Learning contract + Case reports related to examinations and patient interactions + Clinical skills assessment + Clinical studies professional portfolio

Off-campus attendance requirements:

Placement for 14 continuous weeks in a clinical nuclear medicine centre (5 weeks academic credit, 9 weeks professional credit).