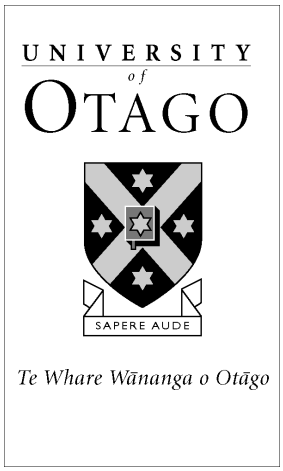
Department of Radiation Therapy
Wellington School of Medicine and Health Sciences



BACHELOR
OF
HEALTH SCIENCES
(Medical Radiation Therapy)

BHealSc (MRT)

CURRICULUM DOCUMENT

February 2007

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Stage III

1. Aims of the Programme

1.1 General Aims

The Bachelor of Health Sciences programme (Medical Radiation Therapy) aims to produce graduates with the following attributes:

1.1.1 clinical competence in medical radiation therapy, demonstrating safe and professional practice.

1.1.2 a sound understanding of the theoretical basis for clinical practice.

1.1.3 excellent interpersonal skills in the demonstration of empathy and sensitivity to all patients.

1.1.4 excellent communication skills, both oral and written in communicating with colleagues and the health care team.

1.1.5 the ability to act independently when professionally appropriate as well as co-operatively with colleagues and other health care team members.

1.1.6 sound analytical skills to enable flexible and creative responses to the changes and challenges presented by clinical practice.

1.1.7 the skills of the "reflective practitioner" in being willing and able to review their own clinical competence and be responsive to the need for personal and professional change.

1.1.8 the ability to apply the principles of research as a foundation for on-going personal and professional development.

1.1.9 an awareness of the importance of the Treaty of Waitangi to the delivery of health care in New Zealand.

Cognitive skills will be progressively enhanced throughout the learning activities that will develop both an academic foundation and technical skill. The student will deal with problems of increasing complexity, recognising increasing contextual dimensions and the recognition of a range of possible solutions. This will involve increasingly proficient and perceptive interpersonal skills.

2. Occupational Conditions

During the programme, students must undertake approved work experience hours.

- The Work Experience hours complement the formal academic clinical components of the BHealSc (MRT) ie Clinical Studies I, Clinical Studies II and Clinical Studies III and fully prepares students for clinical practice upon qualifying.
- Work Experience hours can be completed at times during the year which are not committed to academic studies, eg : mid November to mid February and inter-semester breaks.
- It is recommended that the Work Experience hours are evenly divided between Stage II and Stage III so that integration and consolidation of learning is based on a standard policy.
- Students will normally have completed approximately 2500 clinical hours (clinical studies plus work experience) at the completion of the degree.

3. Programme Development

Relocation to the University of Otago

With the dis-establishment of CIT in June 2001, the Bachelor of Health Science (Radiation Therapy) relocated to the University of Otago's Wellington School of Medicine and Health Science. The programme was renamed the Bachelor of Health Sciences (Medical Radiation Therapy).

The radiation therapy profession and the University of Otago took the opportunity to develop the programme in a university environment. This then permitted the opportunities for study and research at undergraduate and postgraduate levels in an internationally recognized university focused on health sciences.

Background

The Bachelor of Health Science (Radiation Therapy) programme was a development of the National Diploma in Medical Radiation Therapy – which in turn developed from the Central Institute of Technology Diploma in Therapeutic Radiography.

The radiation therapy profession had, for a number of years, considered that a degree level qualification should be available in New Zealand. In 1990 a survey of the profession was conducted in which 81% of the respondents favoured a degree as the standard qualification.

The British profession had a degree in radiation therapy for many years as had Australia. The USA moved in this direction also. Canada had announced a requirement for a degree level qualification as a pre-requisite for registration by the year 2005.

For New Zealand graduates to maintain parity with their overseas counterparts they required a bachelor's level degree. Between 50-75% of New Zealand graduates in radiation therapy gain overseas experience in Australia and the United Kingdom.

A degree in Diagnostic Imaging had been developed by UNITEC and commenced in 1995. Manawatu Polytechnic also offered a degree, a Bachelor in Applied Science (Medical Imaging Technology), which commenced in 1996. The Bachelor of Health Science (Radiation Therapy) allowed radiation therapists to maintain parity with their professional colleagues in New Zealand.

The degree had been developed in consultation with the radiation therapy profession. A sub-committee of the Radiation Therapy Advisory Committee was formed and had the major responsibility for both the structure and content of the degree programme.

4. Programme Description

The curriculum is designed so that papers are taught as part of an integrated and coherent structure, with a consistent overall process of learning and problem solving and a series of vertical and horizontal learning areas or strands. The programme is based on 35% practical content and 65% theoretical content with 132 points devoted to clinical studies and 240 points devoted to theory studies.

4.1 The Three Stage Programme

The Bachelor of Health Sciences (Medical Radiation Therapy) comprises three stages. Generally each stage will be completed in one year's full time study.

All papers are compulsory

1 point is equivalent to 10 hours of student learning.

4.2 Stage I

Stage I consists of the following papers:

Paper Title		Points
MERA 101	Anatomy, Physiology and Pathology I	48
MERA 102	Clinical Studies I	12
MERA 103	Radiation Physics	12
MERA 104	Behavioural Science I	12
MERA 105	Radiation Technology I	15
MERA 106	Radiation Therapy and Oncology I	24

4.3 Stage II

Stage II consists of the following papers:

Paper Title		Prerequisite	Points
MERA 201	Anatomy, Physiology and Pathology II	*Anatomy, Physiology and Pathology I*	9
MERA 202	Clinical Studies II	*Clinical Studies I*	60
MERA 203	Behavioural Science II	*Behavioural Science I*	9
MERA 204	Principles of Research		9
MERA 205	Radiation Technology II	*Radiation Technology I & Radiation Physics*	18
MERA 206	Radiation Therapy and Oncology II	*Radiation Therapy and Oncology I*	24

4.4 Stage III

Stage III consists of the following papers:

Paper Title		Prerequisite	Points
MERA 301	Clinical Studies III	*Clinical Studies II*	60
MERA 302	Applied Research Methods	*Principles of Research*	15
MERA 303	Radiation Technology III	*Radiation Technology II*	15
MERA 304	Radiation Therapy and Oncology III	*Radiation Therapy and Oncology II*	27

4.5 Integration of a Process Curriculum

Vertical and horizontal integration of the programme is important to enable students to develop increasingly complex cognitive, affective and psychomotor skills. This integration has been achieved by the overall programme design which links paper content and learning outcomes within and across stages.

Integration will also be achieved by the extensive use of case studies, projects, problem solving exercises, seminars etc, and through clinical situations. Sequencing will guide the student to obtain sufficient background information and level of skill to deal with progressively more complex material and situations.

Integration will require good communication among lecturers. To this end the Head of Department is responsible for regular and frequent communication between members of the teaching team.

4.6 Learning, Interacting and Self-Management

The way in which the student learns and interacts with others (staff, students, patients and other professionals) throughout the programme is considered to be the key to the achievement of the aims concerning personal growth. Students will be encouraged, from the outset, to develop the skills of an independent learner and to reflect upon their learning. The ability to self-assess is an integral part of the programme's objectives.

It is essential to facilitate the early adaptation of students to expectations regarding their role in the learning process and their ability to interact with others.

Exercises in independent learning and critical thinking are introduced at the start of the programme. Developing effective verbal and written communication skills is an important aim throughout the programme. There are papers which specifically address these areas, such as the Behavioural Science papers. However, there is also a formal expectation of early application of the principles in all courses in the first stage and beyond.

In all papers, students will be required to investigate topic areas to a greater depth than that provided during class contact hours. To this end, formal class contact will usually be no more than 20 hours per week.

4.7 Accessing a Specific Academic Base

Biological Sciences

Students will develop the ability to understand the basic systems of the human body and how they interact. Because of the nature of the professional activities of radiation therapists the emphasis in the study of pathology will be towards cancer and its associated conditions. The *Anatomy, Physiology and Pathology* paper forms a foundation for students to meet the learning outcomes of the *Radiation Therapy and Oncology* papers of the programme at the more advanced levels.

Students will be expected to develop an in-depth understanding of the relationship between pathology and treatment, relevant to radiation therapy.

4.8 Behavioural Science

Students need to have access to knowledge from behavioural science to enable them to perform as competent professionals in the field of radiation therapy.

This knowledge is essential to enable graduates to understand the context of illness and work with clients, colleagues and others they may interact with while performing as a professional in the field. These skills will be integrated into the *Clinical Studies* papers as well as the more specific *Behavioural Science* papers.

4.9 Physics and Allied Sciences

Since most radiation treatment is provided using advanced technology students require a sound knowledge of physics as well as sufficient understanding of electronics to enable them to perform in a professional manner. Specialist lecturers will be employed to ensure that the latest information is presented to students. The papers relevant to this area are *Radiation Physics* at Stage I and the three stages of *Radiation Technology*.

4.10 Clinical Studies

This section of the curriculum, which includes the *Clinical Studies* papers at all three stages, is designed to prepare the student for practice in a modern clinical setting. The clinical studies papers are designed to integrate the students' learning to a point where practical skills and theoretical understanding merge. Students currently have the opportunity to develop their clinical skills under supervision in well equipped radiation oncology departments in Auckland, Waikato, Palmerston North, Wellington, Christchurch and Dunedin.

4.11 Research

As professionals in the field of radiation therapy graduates must be able to critically analyse research published by others. To this end students will study the principles of good research methodologies. While these principles are covered in the *Principles of Research* and *Applied Research Methods* papers the concepts will be carried through all the subjects of the final stages of the programme.

5. Timing of the Programme

5.1 Duration of the Course

The Bachelor of Health Sciences (Medical Radiation Therapy) is a three year full time programme.

5.2 Composition of Each Stage

5.2.1 Stage I

30 weeks attending classes at the Department of Radiation Therapy, Wellington School of Medicine and Health Sciences, University of Otago

3 weeks clinical experience in a Sponsoring Hospital.

5.2.2 Stage II

1 semester clinical experience in the Sponsoring Hospital.

1 semester attending classes at the Department of Radiation Therapy, Wellington School of Medicine and Health Sciences, University of Otago

1 week clinical experience in a hospital other than the Sponsoring Hospital.

5.2.3 Stage III

1 semester attending classes at the Department of Radiation Therapy, Wellington School of Medicine and Health Sciences, University of Otago

1 semester clinical studies in a Sponsoring Hospital.

For Stage II and III, the week allocation for the time in the Sponsoring Hospital and at the University of Otago may alter slightly. This is dependent on the semester breaks during each academic year.

6. Structure of the Programme

The programme consists of 3690 notional hours of student learning divided into three stages.

6.1 Stage I

MERA 101	Anatomy, Physiology and Pathology I
MERA 102	Clinical Studies I
MERA 103	Radiation Physics
MERA 104	Behavioural Science I
MERA 105	Radiation Technology I
MERA 106	Radiation Therapy and Oncology I

6.2 Stage II

MERA 201	Anatomy, Physiology and Pathology II
MERA 202	Clinical Studies II
MERA 203	Behavioural Science II
MERA 204	Principles of Research
MERA 205	Radiation Technology II
MERA 206	Radiation Therapy and Oncology II

6.3 Stage III

MERA 301	Clinical Studies III
MERA 302	Applied Research Methods
MERA 303	Radiation Technology III
MERA 304	Radiation Therapy and Oncology III

7. Assessment

7.1 Assessment Philosophy

All assessment tasks will allow students to demonstrate their achievement of the learning outcomes being assessed.

This philosophy will be implemented by the use of the following strategies:

- All assessment tasks will be appropriate for the level and nature of the learning outcomes being assessed.
- Each assessment task will be clearly stated.
- Dates for assessments will be advised to students in advance. The dates for all summative assessments will be published at the beginning of each semester.
- Self and peer assessment will be encouraged and used whenever appropriate.
- Formative assessments will be carried out to identify difficulties students may be encountering, and to provide frequent feedback on learning progress.
- When it is appropriate for students work to be returned after marking, it will be returned as soon as practical.

7.2 Assessment Pattern

Students must have a current approved comprehensive first aid certificate before taking a final clinical or written assessment. This is relevant for Stage I, II and III.

MERA 101: Anatomy, Physiology and Pathology I
Summative assessment will consist of the following :

- one test = 15% of total mark
- one test = 15% of total mark
- one test = 15% of total mark
- one test = 15% of total mark
- one final 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

MERA 102: Clinical Studies I
Summative assessment will consist of the following :

- one theory test = Pass/Fail (60% pass mark)
- one clinical journal = Pass/Fail

A pass will be awarded to all students who gain a pass in both components and complete the coursework requirement of the computer assignments.

Reassessment:

Students can resit one assessment only.

MERA 103: Radiation Physics
Summative assessment will consist of the following :

- labs = 20% of total mark
- one test = 20% of total mark
- one test = 20% of total mark
- one final 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

MERA 104: Behavioural Science I
Summative assessment will consist of the following :

- one assignment = 20% of total mark
- one assignment = 20% of total mark
- one assignment = 20% of total mark
- one final 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall, and who complete the coursework requirement of the group presentation.

MERA 105: Radiation Technology I
Summative assessment will consist of the following :

- one test (photography) = 10% of total mark
- one test = 25% of total mark
- one test = 25% of total mark
- one final 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

MERA 106: Radiation Therapy and Oncology I
Summative assessment will consist of the following :

- one test = 20% of total mark
- one test = 20% of total mark
- one assignment = 10% of total mark
- one viva = 10% of total mark
- one final 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

MERA 201: Anatomy, Physiology and Pathology II

Summative assessment will consist of the following :

- one test (applied anatomy) = 40% of total mark
- one test (pathology) = 35% of total mark
- one assignment (pathology) = 25% of total mark

A pass will be awarded to all students who gain 50% overall.

MERA 202: Clinical Studies II

Summative assessment will consist of the following :

- one rotational assessment (simulation/CT) = Pass/Fail
- one rotational assessment (dosimetry) = Pass/Fail
- one rotational assessment (treatment) = Pass/Fail
- one clinical journal = Pass/Fail

A pass will be awarded to those students who gain a pass in each component.
Reassessment: A reassessment can occur for the clinical journal and one rotational assessment.

MERA 203: Behavioural Science II

Summative assessment will consist of the following :

- one assignment = 30% of total mark
- one assignment = 30% of total mark
- one assignment = 40% of total mark

A pass will be awarded to all students who gain 50% overall.

MERA 204: Principles of Research

Summative assessment will consist of the following :

- one assignment & poster (research) = 50%
- one test (statistics) = 50%

A pass will be awarded to all students who gain 50% overall.

MERA 205: Radiation Technology II

Summative assessment will consist of the following :

- one test = 20% of total mark
- one test = 25% of total mark
- one assignment = 15% of total mark
- one final 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

MERA 206: Radiation Therapy and Oncology II

Summative assessment will consist of the following :

- one test (radiobiology) = 20% of total mark
- one presentation (cancer) = 20% of total mark
- one practical assignment = 10% of total mark
- one viva = 10% of total mark
- one 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

REPLACEMENT PAGE
5th March 2007

MERA 301: Clinical Studies III

Summative assessment will consist of the following :

- one rotational assessment (simulation/CT) = Pass/Fail
- one rotational assessment (dosimetry) = Pass/Fail
- one rotational assessment (treatment) = Pass/Fail
- one OSCE = Pass/Fail
  (Objective Structured Clinical Examination)

A pass will be awarded to those students who gain a pass in each component.

Reassessment:

- A reassessment can occur for one rotational assessment in dosimetry and one rotational assessment in either simulation/CT or treatment.
- One reassessment can occur for the OSCE.

MERA 302: Applied Research Methods

Summative assessment will consist of the following :

- one written presentation = 70% of total mark
- one oral presentation = 15% of total mark
- one poster presentation = 15% of total mark

A pass will be awarded to those students who gain an A, B or C Grade.

Reassessment:

There is an opportunity for one resubmission of the research project.

MERA 303: Radiation Technology III

Summative assessment will consist of the following :

- one assignment
  - (IMRT, brachytherapy, quality assurance) = 30% of total mark
- one assignment
  - (imaging) = 15% of total mark
- one assignment
  - (resource management) = 15% of total mark
- one final 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

MERA 304: Radiation Therapy and Oncology III

Summative assessment will consist of the following :

- one test (radiobiology) = 15% of total mark
- one assignment (professional issues) = 15% of total mark
- one dosimetry assessment (20/30 pass mark) = 30% of total mark
- one 2 hour examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reassessment:

One reassessment can occur in the dosimetry assessment if the pass mark of 20/30 is not achieved.

7.3 Assessment Standards

The overall standards are laid out in the *Aims of the Programme* as the attributes of the graduate of the programme. (See 1. Aims of the Programme, p.1).

These aims have been developed in close association with the profession through the Radiation Therapy Advisory Degree Sub-committee.

7.4 Moderators

Internal moderation occurs for each paper within the Department of Radiation Therapy. Two external moderators are appointed from the profession (one clinical tutor and one senior clinical radiation therapist) to moderate written examinations. A clinical radiation therapist moderates a sampling of clinical journals.

7.5 Monitor

Monitoring occurs from the School of Medical Radiation Science, University of Sydney.

8. Procedures for Changes to the Programme

There are three levels of change in the programme which can take place:

8.1 Minimal Changes

Small alterations to the programme will be implemented within the Department of Radiation Therapy.

8.2 Minor Changes

Where the changes are more significant, but do not involve the structure of the programme they will be referred on to the Radiation Therapy Board of Studies and Examinations. Minutes from these minutes refer issues to the Health Sciences Divisional Board.

8.3 Major Changes

Any change to the overall structure will be referred to CUAP for approval following approval by the University of Otago Senate.

9. Management of the Programme

9.1 Programme Co-ordination

The Director and Head of Department has responsibility for the overall co-ordination of the programme.

9.2 Paper Convenors

Paper convenors are responsible for the efficient co-ordination and delivery of papers. The internal moderators work with the paper convenors on content and assessment.

9.3 Year Leaders

Year leaders have an overall responsibility for the students in a particular stage of the course. Responsibilities include pastoral care and assessment schedules.

10. Relationship to Other Programmes

10.1 Overseas Undergraduate Qualifications

A number of New Zealand radiation therapists have gained degree level qualifications in radiation therapy. The most popular programmes were the BHSc – Conversion Programme from the Central Institute of Technology and the BSc (Radiography) Conversion Programme from the Anglia Polytechnic University in England. These programmes and others such as the BSc(Hons) Radiotherapy from Southbank University, London, require students to attain high levels of competency, the skills of the reflective practitioner and the skills of critical analysis in relation to research. The outcomes of these qualifications are similar to those of the BHealSc(MRT) programme.

10.2 New Zealand Postgraduate Qualifications

There are a number of postgraduate qualifications available to the graduates from the BHealSc(MRT). For example the Master of Health Science Programmes offered by Otago University and the Auckland University of Technology.

11. Programme Regulations

11.1 Entry Requirements

All enrolments to the Bachelor of Health Sciences (Medical Radiation Therapy) degree programme are subject to the approval of the Radiation Therapy Admissions Committee. To gain entry to the programme applicants must satisfy the following criteria:

- Eligibility to enter the University having satisfied the University's admission requirements as stated in the University Calendar (ie. gained an entrance qualification based on NCEA Level 3 results or equivalent). **Priority will be given to those successfully completing English or an English rich subject, Mathematics (Statistics or Calculus), and either Biology or Physics at NCEA Level 3 or equivalent.**
- Demonstration of suitability to the profession by interview.

For a student whose application for admission is based on qualifications gained outside New Zealand and whose first language is not English or Maori, evidence of such competence and understanding to be supplied shall be in the form of certified results in:

- the International English Language Test (IELT) with a score of not less than 7.5 in the academic band, with a score of 8 or better in the listening band and 8 or better in the speaking band. This test is to be taken in New Zealand.

- In general students will be sponsored by the District Health Board which operates an oncology unit. This is to ensure that there is adequate access to an appropriate clinical environment. An exception to this may be made provided the applicant can provide evidence that she or he can obtain the required clinical experience and tuition.

- Students are required to hold a current comprehensive first aid certificate on entry to the programme. This Certificate is to be maintained throughout the duration of the programme.

Note: Student numbers will be limited to the availability of clinical placements.

11.2 Admission to the Course

(a) Admission to the course for the degree of Bachelor of Health Sciences shall be determined by the Assistant Vice-Chancellor (Health Sciences) on the advice of the Radiation Therapy Admissions Committee.

(b) The number of candidates to be admitted to the first year of the course will be determined by the number of places available for clinical teaching.

(c) Candidates will be selected by the Radiation Therapy Admissions Committee on the basis of their academic record and their interview.

Note: Applications for admission to first year classes must reach the Division of Health Sciences not later than 15th September in the year preceding desired entry.

11.3 Completion of the Programme

(a) The programme consists of three stages. Generally students must succeed at each stage to progress to the next stage.

(b) The structure of the programme makes it unlikely that a student would be able to complete a trailing subject and continue with the following stage of the programme.

(c) Students will be expected to complete the programme in five years or less. Students who do not complete the programme within a three year period will need to seek an extension of their sponsorship from the District Health Board or other approved clinical training institution.

(d) Every course of study must satisfy the requirements for one option in the schedule of endorsements for the degree.

(e) Every course of study for the degree shall normally be followed for not less than three years of full-time study.

11.4 Assessments

(a) Students will be given a range of formative assessments throughout the year as a basis for determining progress.

(b) Extensions to due dates will only be considered by the Head of Department in mitigating circumstances.

(c) In the case of illness at the time of a test, the student must notify the lecturer, either directly or through Reception, ***PRIOR*** to the start of a test. A medical certificate must be presented (dated the day of the test) to the Head of Department before an alternative test will be arranged. Failure to observe this procedure may result in the student being refused an opportunity to sit the test, and therefore receive a score of zero for it.

(d) Students must complete all coursework requirements, which includes formative and summative assessments to gain terms.

(e) Students who are refused terms will be required normally to repeat the year as a whole, subject to the approval by the Radiation Therapy Board of Studies and Examinations.

Submission of Previously Assessed Work

(f) Any student who attempts to pass off their own work, either in part or whole, which has previously been assessed in the same or another paper, **as original work** will receive no assessment result for that work, nor will they have an opportunity to resubmit the work for that assessment. In addition, the student may be subject to disciplinary action.

Plagiarism

(g) Students should make sure that all submitted work is their own. Plagiarism is a form of dishonest practice. Plagiarism is defined as copying or paraphrasing another's work and presenting it as one's own (University of Otago Calendar 2006 page 193). In practice this means plagiarism includes any attempt in any piece of submitted work (e.g. an assignment or test) to present as one's own work the work of another (whether of another student or a published authority). Any student found responsible for plagiarism in any piece of work submitted for assessment shall be subject to the University's dishonest practice regulations which may result in various penalties, including forfeiture of marks for the piece of work submitted, a zero grade for the paper, or in extreme cases exclusion from the University.

General

(h) Any student who attempts to deceive or practice deceit, or obtain unfair advantage by their actions as a student may be subject to disciplinary action.

11.5 Reassessment Policy

- There will be no reassessments except for the Clinical Studies, Research Project and Radiation Therapy & Oncology III papers.
- Clinical Studies I
  - students can resit one assessment only.
- Clinical Studies II
  - a reassessment can occur for the clinical journal and one rotational assessment.
- Clinical Studies III
  - a reassessment can occur for one rotational assessment in dosimetry and one rotational assessment in either simulation/CT or treatment.
  - one reassessment can occur for the OSCE
- Research Project
  - students have the opportunity of one resubmission for the research project.
- Radiation Therapy and Oncology III
  - one reassessment can occur if the pass mark of 20/30 is not achieved in the dosimetry assessment.

11.6 Examination

(a) Every candidate must gain terms before being admitted to examinations. This is defined as at least a 50% pass in the coursework component.

(b) Candidates will need to achieve at least 40% in any examination to be eligible to be awarded a pass overall.

(c) An OSCE (Objective Structured Clinical Examination) reassessment is offered in MERA 301: Clinical Studies III.

11.7 Awarding of Degree

Candidates must pass all papers in the programme and obtain a minimum of 369 points to be awarded the Bachelor of Health Sciences (Medical Radiation Therapy) degree by the University of Otago.

11.8 Withdrawal from the Course

A candidate who withdraws from the course must obtain the approval of the Radiation Therapy Board of Studies and Examinations before being readmitted to the course. Applications for readmission must be with the Board of Studies and Examinations by 1 November in the year prior to that for which readmission is sought.

11.9 Exclusion from the Course

Any candidate who fails to complete the requirements for a paper in two academic years may be excluded by the Board of the Division of Health Sciences on the recommendation of the Radiation Therapy Board of Studies and Examinations in Health Sciences.

11.10 Variations

The Pro-Vice-Chancellor (Health Sciences) may in exceptional circumstances approve a course of study which does not comply with these regulations.

PAPER
DESCRIPTORS

STAGE ONE PAPERS

MERA 101 Anatomy, Physiology and Pathology I

MERA 102 Clinical Studies I

MERA 103 Radiation Physics

MERA 104 Behavioural Science I

MERA 105 Radiation Technology I

MERA 106 Radiation Therapy and Oncology I

12. Anatomy, Physiology and Pathology I

Reference Number : MERA 101

Date : February 2007

Duration : 240 contact hours and 240 hours of independent learning

Points: 48

Aim : To enable students to gain a basic understanding of the principles and terminology of the anatomy, physiology and pathology of the human body.

Recommended Entry Level : Entry to programme

Learning Outcomes : On completion of this paper the successful student will be able to:

1. describe the normal anatomical organisation of the human body in terms of cells, tissues, organs and organ systems;
2. describe the principal systems of the human body and their functions;
3. explain the structure, function and lymphatic drainage of structures affected by cancer;
4. explain the ways in which body systems interact to maintain homeostasis;
5. identify the relationship of all organs to other organs, structures, and to the surface landmarks of the body;
6. discuss common pathological changes which can occur in the human body.

Content

Corresponding to Learning Outcome 1

1. Chemical level of organisation
2. Cellular level of organisation
3. Tissue level of organisation
4. Anatomical organisation and structure of the main body systems

Corresponding to Learning Outcome 2

1. Structure and function of :
   - skeletal system
   - muscular system
   - nervous system
   - cardiovascular system (heart, blood, vessels)
   - lymphatic system
   - immune system
   - respiratory system
   - urinary system
   - digestive system
   - endocrine system
   - male and female reproductive systems
   - integumentary system

Corresponding to Learning Outcome 3

1. Lymphatic drainage in organs and tissues of: head and neck, thorax, abdomen, pelvis, upper limbs, lower limbs

Corresponding to Learning Outcome 4

1. Principles of homeostasis
2. Roles of endocrine and nervous systems in maintenance of homeostasis

Corresponding to learning outcome 5

1. Body regions and planes
2. Boundaries and contents of body cavities
3. Main surface landmarks.
4. Introduction to radiographic anatomy

Corresponding to Learning Outcome 6

1. Common pathological changes in each of body's major systems

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following:

1. Lectures
2. Student centred tutorials
3. Practicals and laboratory demonstrations
4. The use of media such as videos, journals and texts

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one test = 15% of total mark
- one test = 15% of total mark
- one test = 15% of total mark
- one test = 15% of total mark
- one final 2 hour written examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Campbell, M.K. (1999). *Biochemistry*. (3rd Edition). Saunders College Publishing.

Cooper, G.M. (1997). *The Cell; A Molecular Approach*. ASM Press.

Cotran, R.S., Kumar, V., & Robbins, S.L. (1994). *Pathologic Basis of Disease*. (5th Edition). W.B. Saunders Company.

Cunningham, M.W. (2000). *Effects of Microbes on the Immune System.* Lippincott, Williams and Wilkins.

Edwards, C.R.W. (1995). *Davidson's Principles and Practice of Medicine*. Churchill Livingstone.

Hansen, J.T., & Koeppen, B.M. (2002). *Netter's Atlas of Human Physiology*. Icon Learning Systems LLC.

Lumley, J. (1990). *Surface Anatomy.* Churchill Livingstone.

McCance, K.L., & Huether, S.E. (1998) *Pathophysiology.* Mosby.

McPhee, S.J., Linqapappa, V.R., Ganong, W.F. & Lange, J.D. (1997). *Pathophysiology of Disease.* Appleton & Lange.

Martini, F.H. (2004). *Fundamentals of Anatomy and Physiology.* (6th Edition). Prentice Hall.

Moore, K.L., & Dalley, A.F. (1999). *Clinically Orientated Anatomy.* (4th Edition). Lippincott, Williams and Wilkins.

Netter, F.W., & Hansen, J.T. (2003). *Atlas of Human Anatomy*. (3rd Edition). Icon Learning Systems.

Richter, E., & Feyerabend, T. (2004). *Normal Lymph Node Topography CT Atlas.* (2nd Edition). Springer-Verlag.

Thibodeau, G.A., & Patton, K.T. (2003). *Anatomy and Physiology*. (5th Edition). Mosby.

Tortora, G. (2000). *Principles of Anatomy & Physiology.* (9th Edition). Harper Collins.

13. Clinical Studies I

Reference Number : MERA 102

Date : February 2007

Duration : 40 contact hours and 100 hours of independent learning

Points : 12

Aim : The student will gain a basic understanding of the role of the radiation therapist.

Recommended Entry Level : Entry to programme

Learning Outcomes :
On completion of this paper the successful student will be able to:

1. discuss the concepts of health and illness;
2. describe the role of the radiation therapist;
3. explain the uses of clinical information in a radiation therapy department;
4. describe the basic principles of infection control in a radiation therapy department.
5. apply the basic principles of nursing care;
6. demonstrate an understanding of the use of computers and their applications.

Content

Corresponding to Learning Outcome 1
1. Definitions of health and illness
2. Factors influencing health
3. Current health issues

Corresponding to Learning Outcome 2
1. Role of radiation therapist
2. Role of members of an oncology team
3. Role of student radiation therapist

Corresponding to Learning Outcome 3
1. Types of clinical information
2. Uses of clinical information
3. Legislation related to clinical information

Corresponding to Learning Outcome 4
1. Personal cleansing procedures
2. Methods by which infections spread
3. Methods of cleaning and sterilisation in a radiation therapy department

Corresponding to Learning Outcome 5

1. Department emergency procedures
2. Emergency first aid procedures including oxygen and suction
3. Manual handling/Transferring patients
4. Patient toileting including colostomy and urinary catheters
5. Specific patient needs eg blindness, hearing impairment, diabetes

Corresponding to Learning Outcome 6

1. Role of computers
2. Computer hardware and operation
3. Software applications (Windows, Word processing, Spreadsheets, Databases)
4. Network capabilities

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, exploration;
- use of a variety of small scale investigative techniques;
- clinically based observation.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one theory test = Pass/Fail (60% pass mark)
- one clinical journal = Pass/Fail

A pass will be awarded to all students who gain a pass in both components and complete the coursework requirement of the computer assignments.

Reassessment: students can resit one assessment only.

Reporting Results to Students

Results will be reported to students as Pass/Fail

Resources

Fully equipped and operational radiation therapy department.

Bomford, C., Kunkler, I., & Sheriff, S. (2003). *Walter and Miller's Textbook of Radiotherapy*. (6th Edition). Churchill Livingstone.

Faithfull, S., & Wells, M. (2003). *Supportive Care in Radiotherapy.* Churchill Livingstone, UK.

Murphy, G., Lawrence, N., & Lenhard, R. (1995). *American Cancer Society Textbook of Clinical Oncology.* American Cancer Society.

Berger, K.J., & Brinkman Williams, M. (Eds). (1999). *Fundamentals of Nursing: Nursing, Health and Patient*. Volume 1. Appleton & Lange, Stamford, Connecticut.

Berger, K.J., & Brinkman Williams, M. (Eds). (1999). *Fundamentals of Nursing: Nursing Collaboration and Health Care.* Volume 2. Appleton & Lange, Stamford, Connecticut.

Berger, K.J., &Brinkman Williams, M. (Eds). (1999). *Fundamentals of Nursing: Nursing Assessment and Management*. Volume 3. Appleton & Lange, Stamford, Connecticut.

Washington, C.M., & Leaver, D. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

14. Radiation Physics

Reference Number : MERA 103

Date : February 2007

Duration : 90 contact hours and 30 hours of independent learning

Points : 12

Aim : To introduce students to the principles of radiation physics and its application to radiation technology.

Recommended Entry Level : Entry to programme

Learning Outcomes :
On completion of this paper the successful student will be able to:

1. demonstrate skills of mathematical calculation as applied to radiation therapy;
2. demonstrate an understanding of general physics principles in relation to radiation therapy;
3. discuss basic principles of atomic physics;
4. discuss the basic physics of X and gamma radiation;
5. demonstrate an understanding of basic electrostatics, electric circuits, electrodynamics and electronics;

Content

Corresponding to learning outcome 1
1. Mathematical and algebraic calculations
2. Measurement - units and uncertainties
3. Normal distribution and experimental errors
4. Trigonometry and solid geometry

Corresponding to Learning Outcome 2
1. Kinematics, the description of motion
2. Dynamics - motion and force
3. Circular motion
4. Energy - types, transformations and conservation
5. Electromagnetic radiation
6. Optics - geometrical optics, lasers

Corresponding to Learning Outcome 3
1. Hydrogen spectrum
2. Emission and absorption spectra
3. Quantum mechanics
4. Electromagnetic spectrum

Corresponding to Learning Outcome 4

1. Ionizing radiation
2. Production of X-rays
3. Radioactive decay and the production of gamma rays
4. Interaction of radiation with matter
5. Application to radiation therapy

Corresponding to learning outcome 5

1. Electric charge and electric fields
2. Electric potential and electric energy
3. Electric currents and DC circuits
4. Magnetic fields and interactions with currents and moving conductors
5. Electrical measurements
6. Solid state components and devices

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- lectures, including laboratory demonstrations;
- practical sessions.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

• labs	=	20% of total mark
• one test	=	20% of total mark
• one test	=	20% of total mark
• one final 2 hour written examination	=	40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Chesney, D. (1994). *Chesney's Equipment for Student Radiographer*. Blackwell Scientific, Oxford.

Duncan, T. (1987). *Physics for today and tomorrow*. John Murray.

Freedman, D., Pisani, R., & Purves, R (1978). *Statistics.* W W Norton.

Giancoli, D. (2005). *Physics-Principles with Applications.* (6th Edition), Prentice Hall.

Griffiths, S., & Short, C. (1994). *Radiotherapy : Principles to Practice*. Churchill Livingstone.

Hendee, W. (1981). *Radiation Therapy Physics.* Year Book Medical Publishers.

Johns, H., & Cunningham, J. (1983). *The Physics of Radiology.* (4th Edition). Charles & Thomas.

Khan, F. (2003). *The Physics of Radiation Therapy*. (3rd Edition). Williams and Wilkins.

Meredith, W., & Massey, J. (1977). *Fundamental Physics of Radiology.* John Wright & Sons, Bristol.

National Radiation Laboratory. (1992). *Code of Safe Practice for the Use of Irradiating Apparatus in Therapy.* NRL, C12.

Stanton, R., & Stinton, D. (1996). *Applied Physics for Radiation Oncology.* (2nd Edition). Medical Physics Publishing, Wisconsin, US.

Washington, C M., & Leaver, D T. (2004). *Principles and Practice of Radiation Therapy.* (2nd Edition). Mosby, St Louis, Missouri.

15. Behavioural Science I

Reference Number : MERA 104

Date : February 2007

Duration : 70 contact hours and 50 hours of independent learning

Points : 12

Aim : To introduce students to the theoretical foundations of psychology and sociology as a basis for the understanding of the factors which influence human behaviour.

Recommended Entry Level : Entry to programme

Learning Outcomes : On completion of this paper the successful student will be able to :

1. identify the determinants of human behaviour in relation to personality, perception, learning, conditioning and motivation;
2. discuss the psychological consequences of health and illness with an emphasis on cancer;
3. describe the principles of human development across the lifespan;
4. demonstrate effective verbal and non-verbal communication in a range of contexts;
5. describe the attributes and responsibilities of an effective helper in a health care setting;
6. discuss the relevance of culture to an individual's and group's experience of society with particular reference to health and illness;
7. describe the relevance of the Treaty of Waitangi to New Zealand society and the delivery of health care;
8. identify the patterns of inequality which may arise in society with reference to health and illness and the delivery of health care.

Content

Corresponding to Learning Outcome 1

1. The breadth and scope of psychology and sociology
2. Research methodology commonly used in psychology and sociology
3. Major debates in psychology
4. Theoretical perspectives of personality, learning and conditioning, motivation and perception

Corresponding to Learning Outcome 2

1. Stress, illness and coping
2. Risk and protection factors
3. Living with life-threatening disease, especially cancer

Corresponding to Learning Outcome 3

1. Theoretical perspectives of life span development
2. The physical, cognitive and psychosocial changes which occur throughout the life span
3. The implications of the patient's developmental stage for the health worker/ patient relationship

Corresponding to Learning Outcome 4

1. Principles and models of effective verbal and nonverbal communication to demonstrate empathy, affirm, motivate, and educate others
2. Cross cultural communication
3. Management of the environment to facilitate communication
4. Political dimensions of communication
5. Ethical considerations in communication

Corresponding to Learning Outcome 5

1. Attributes of an effective helper
2. Responsibilities of an effective helper and the role of the radiation therapist

Corresponding to Learning Outcome 6

1. The meaning of "culture"
2. The relevance of culture to individual and group self perception, beliefs and practices
3. The relevance of culture to New Zealand society
4. Culture, health, illness, and health care delivery, with an emphasis on cancer
5. Cultural sensitivity in health care delivery, with an emphasis on cancer

Corresponding to Learning Outcome 7

1. The Treaty of Waitangi and its significance to Maori and Pakeha
2. The relevance of the Treaty of Waitangi to health, illness and health care delivery

Corresponding to Learning Outcome 8

1. Definitions of terms related to inequality, sexism, ageism, racism, prejudice, stereotype, discrimination and stigma
2. Systems of inequality based on class, age, gender, race, ethnicity, disability, etc
3. Inequalities in New Zealand society
4. The consequences of inequalities in access to resources, including health for the individual, family and society, with an emphasis on cancer

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- guest speakers who are able to offer current and practical information on topics;
- case studies and problem based learning;
- role plays, with the lecturer and others modelling and coaching appropriate behaviours;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, exploration and debate;
- use of a variety of small scale investigative techniques;
- the teaching material should draw on the student's personal and professional experiences and encourage critical inquiry and examination of the "taken for granted world".

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one assignment = 20% of total mark
- one assignment = 20% of total mark
- one assignment = 20% of total mark
- one final 2 hour written examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall, and who complete the coursework requirement of the group presentation.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Bird, L., & Drewery, W. (2004). *Human Development in Aotearoa*. (2nd Edition). McGraw Hill, Auckland.

Bolstad, R., Hamblett, M., Ohlson, T., & Hardie, J. (1992). *Communicating Caring : A Guide for Health Workers and Caregivers*. Longman Paul, Auckland.

Clarke, A, (Ed.). (1992). *Understanding Cancer*. Cancer Society, Wellington.

Davey, J. (1998). *Tracking social change in New Zealand: From birth to death iv*. Wellington: Institute of Policy Studies.

Davis, P., &Dew, K. (1999). *Health and Society in Aotearoa New Zealand*. Wellington: Oxford University Press.

Dew, K., & Kirkman, A. (2002). *Sociology of Health in New Zealand*. Auckland: Oxford University Press.

Durie, M. (1998). *Whaiora: Maori Health Development*. (2nd Edition). Auckland: Oxford University Press.

Durie, M. (2001). *Mauri ora: The dynamics of Maori health.* Auckland. Oxford University Press.

Germov, J. (Ed.). (2000*). Second opinion; An Introduction to Health Sociology*. (2nd Edition). Melbourne: Oxford University Press.

Giddens, A. (1992). *Sociology*. Polity Press, Cambridge.

Hopkins; Kavanagh, K; Kennedy, P; (1992). Promoting Cultural Diversity. Strategies for Health Care Professionals. Sage, London.

Howden-Chapman, P., & Cram, F.(1998). *Social, economic and cultural determinants of health*. National Health Committee.

Kinloch, P. (1985). *Talking Health But Doing Sickness. Studies in Samoan Health*. Victoria University Press.

Lee, C., & Glynnowens, R. (2002). *The psychology of men's health.* Buckingham. Open University Press.

Lupton, D. (1994). *Medicine as culture: Illness, disease and the body in Western Societies*. London: Sage Publications.

Metge, J., & Kinloch P. (1984). *Talking Past Each Other. Problems of Cross Cultural Communication.* Victoria University Press, Wellington.

Ministry of Health (2002). *Reducing Inequalitites*. Wellington: Ministry of Health.

Ministry of Health (2002). *He Korowai Oranga (Maori Health Strategy).* Wellington. Ministry of Health.

Ministry of Health (2003). *New Zealand Cancer Control Strategy*. Wellington: Ministry of Health.

Nettleton, S. (1995). *The Sociology of Health and Illness*. Cambridge: Polity Press

Peterson, C. (2000). *Looking Through the Life Span.* (4th Edition). Prentice Hall, New York.

Ramsden, E.L (Ed.). (1999). *The Person as Patient: Psychosocial Perspectives for the Health Care Professional.* London: Harcourt Brace and Company.

Ratima, M.M. (2001). *Kia uruwru mai a harora: Being healthy, being Maori.* Conceptualising Maori health promotion. Unpublished dissertation.

Santrock, J.W. (2004). *Life-Span Development*. (9th Edition). Boston: McGraw-Hill.

Sarafino, E.P. (2002). *Health Psychology: Biopsychosocial interactions*. (4th Edition). New York: Wiley.

Spoonley, P. (1993). *Racism and Ethnicity*. Auckland: Oxford University Press.

State Services Commission. (2004). *The Treaty or Waitangi*. Wellington. State Services Commission.

Swan, R. (1996). *The Big C: My experience with cancer*. Auckland: Hoddermoa Beckett Publishers.

Te Whaiti, P., McCarthy, M., & Durie, A. (1997). *Mai I Rangiatea*. Auckland: Auckland University Press.

Weiten, W. (2004). *Psychology: Themes and Variations*. (6th Edition). Brooks/Cole.

Wepa, D; (2005). *Cultural safety in Aotearoa NZ.* Auckland: Pearson Education NZ.

16. Radiation Technology I

Reference Number : MERA 105

Date : February 2007

Duration : 100 contact hours and 50 hours of independent learning

Points : 15

Aim : To introduce students to the basic principles relevant to the use of computers, radiation therapy equipment and radiographic photography.

Recommended Entry Level : Entry to programme

Learning Outcomes : On completion of this paper the successful student will be able to :

1. describe the principles of construction and operation of radiation therapy and imaging equipment;
2. describe the principles of radiation protection and safety;
3. describe the functions and procedures used in radiographic photography;
4. describe the principles of diagnostic imaging methods.

Content

Corresponding to Learning Outcome 1

1. Kilovoltage X-ray units
2. Megavoltage X-ray units
3. Gamma ray units
4. Radiation protection and safety issues
5. Differences between imaging and radiation therapy equipment
6. Electrical safety and power supplies

Corresponding to Learning Outcome 2

1. Radiation protection principles
2. Radiation safety legislation
3. Personnel monitoring
4. Radiation measurement

Corresponding to Learning Outcome 3

1. Photographic process
2. Film construction
3. Intensifying screens
4. X-ray cassettes
5. Photographic chemistry
2. Radiographic image
3. Digital processing
8. Contrast agents
9. Quality assurance
10. Storage of x-ray films (unexposed and exposed)

Corresponding to Learning Outcome 4

1. Conventional diagnostic imaging
2. CT Scanning
3. MRI
4. Ultrasound
5. Nuclear medicine imaging
6. Other imaging methods

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- seminar and project presentations;
- laboratory demonstrations and practical sessions.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one test (photography) = 10% of total mark
- one test = 25% of total mark
- one test = 25% of total mark
- one final 2 hour written examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain a minimum of 40% in the examination and 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Students have access to a variety of databases and CD Roms

Textbooks

Ball, J., & Moore, A. (1986) *Essential Physics for Radiographers*. Blackwell Scientific.

Chesney, D., & Chesney, M. (1984). *Chesney's equipment for student radiographers*. Blackwell Scientific.

Giancoli, D.C. (2005). *Physics - Principles with Applications*. (6th Edition). Prentice Hall, USA.

Hendee, W. (1981). *Radiation Therapy Physics*. Year Book Medical Publishers.

Jenkins, D. (1980). *Radiographic Photography & Imaging.* Lancaster MTP.

Johns, H., & Cunningham, J. (1983). *The Physics of Radiology.* (4th Edition). Charles C Thomas.

Khan, F. (2003). *The Physics of Radiation Therapy.* (3rd Edition). Williams and Wilkins, Baltimore.

Klevenhagen, S. (1985). *The Physics of Electron Beam Therapy*. Adam Hiler in collaboration with the Hospital Physicians Association, Bristol.

KODAK; (1980). *The Fundamentals of Radiography.* Eastman Kodak Company.

Meredith, W., & Massey, J. (1983). *Fundamental Physics of Radiology.* Springfield.

Morris, S. (2001). *Radiotherapy physics and equipment*. Churchill Livingstone.

Roberts, D., & Smith, N. (1988). *Radiographic Imaging*. Churchill Livingstone.

Stanton, R., & Stinton, D. (1992). *An Introduction to Radiation Oncology Physics*. Medical Physics Publishing.

Taylor, J. (1988). *Imaging in Radiotherapy*. Groom Helm.

Washington, C.M., & Leaver, D.T. (1996). *Introduction to Radiation Therapy*. Volume 1. Mosby, St Louis, Missouri.

Washington, C.M., & Leaver, D.T. (2004) *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

17. Radiation Therapy and Oncology I

Reference Number : MERA 106

Date : February 2007

Duration : 180 contact hours and 60 hours of independent learning

Points : 24

Aim : To enable students to gain a basic understanding of oncology, and the treatment modalities available to treat malignant disease.

Recommended Entry Level : Entry to programme

Learning Outcomes : On completion of this paper the successful student will be able to :

1. describe the pathology of common tumours and the ways in which they are classified;
2. describe the treatment modalities used to treat malignant disease;
3. describe radiation therapy techniques used in the treatment of disease;
4. describe the general principles of radiobiology;
5. discuss the basic care a patient may require when receiving radiation therapy;
6. discuss legal and ethical issues related to radiation therapy and patient care;
7. demonstrate a knowledge of basic calculations used in radiation therapy;
8. demonstrate the basic principles of treatment planning;
9. discuss commonly used mould room techniques.

Content

Corresponding to Learning Outcome 1

1. Malignant tumours
2. Benign tumours treated with radiation therapy
3. Epidemiology
4. Aetiology
5. Classification systems

Corresponding to Learning Outcome 2

1. Surgery
2. Radiation therapy
3. Chemotherapy
4. Hormone therapy
5. Other treatment modalities
6. Principles underlying the choice of treatment

Corresponding to Learning Outcome 3

1. Radical techniques
2. Palliative techniques
3. Pre and post operative techniques
4. Adjuvant techniques

Corresponding to Learning Outcome 4

1. Pathology and kinetics of radiation injury in normal tissues
2. Tumour radiobiology
3. Molecular and cellular aspects of radiobiology
4. Cell survival curves
5. The '4Rs' of radiobiology

Corresponding to Learning Outcome 5

1. Local reactions to radiation therapy
2. Systemic reactions to radiation therapy
3. Blood counts
4. Diet and fluid intake
5. Optimum healing techniques
6. Patient information

Corresponding to Learning Outcome 6

1. Code of Ethics
2. Ethical issues and privacy
3. Relevant legislation
4. Informed consent
5. Professional organizations/Registration Boards
6. Introduction to the health system

Corresponding to Learning Outcome 7

1. Calibration conditions
2. Inverse square law
3. Attenuation factors for SSD techniques
4. Manual calculations of basic radiation therapy SSD treatment techniques

Corresponding to Learning Outcome 8

1. Isodose distributions
2. Manual planning principles
3. Computer planning principles
4. Field verification

Corresponding to Learning Outcome 9

1. Immobilisation devices
2. Tissue compensators
3. Electron cut outs
4. Shielding blocks
5. Bolus

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, and exploration;
- laboratory demonstrations.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

• one test	=	20% of total mark
• one test	=	20% of total mark
• one assignment	=	10% of total mark
• one viva	=	10% of total mark
• one final 2 hour written examination	=	40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of:	60
Final examination, out of:	40
TOTAL:	**100**

Student result notices will carry grades from A to E.

Resources

Textbooks

A Guide to Palliative Care in New Zealand. (2nd Edition). Douglas Pharmaceuticals 1992.

Baird, S. (1991). *A Cancer Source Book for Nurses*. (6th Edition). American Cancer Society.

Blackburns Introduction to Clinical Radiation Therapy. Medical Physics Publishing Co-Op, Madison 1989.

Bomford, C., Kunkler, I., & Sherriff, S. (2003). *Walter & Miller's Textbook of Radiotherapy.* (6th Edition). Churchill Livingstone.

Coia, L., & Moycan, D. (1989). *Introduction to Clinical Radiation Oncology*. Medical Physics Publishing Co-Op, Madison.

Griffiths, S., & Short, C. (1994). *Radiotherapy : Principles to Practice*. Churchill Livingstone.

International Commission on Radiation Units and Measurements: (1993) Prescribing, Recording, and Reporting Photon Beam Therapy. *(ICRU Report 50)*

International Commission on Radiation Units and Measurements: (1999) Prescribing, Recording, and Reporting Photon Beam Therapy. Supplement to ICRU 50 *(ICRU Report 62).*

Neal, A., & Hoskin, P. (2003). *Clinical Oncology - Basic Principles and Practice*. (3rd Edition). Edward Arnold.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

STAGE TWO PAPERS

MERA 201	Anatomy, Physiology & Pathology II
MERA 202	Clinical Studies II
MERA 203	Behavioural Science II
MERA 204	Principles of Research
MERA 205	Radiation Technology II
MERA 206	Radiation Therapy and Oncology II

STAGE THREE PAPERS

MERA 301 Clinical Studies III

MERA 302 Applied Research Methods

MERA 303 Radiation Technology III

MERA 304 Radiation Therapy and Oncology III

18. Anatomy, Physiology and Pathology II

Reference Number : MERA 201

Date : February 2007

Duration : 40 contact hours and 50 hours of independent learning

Points : 9

Aim : To enable students to apply their understanding of the anatomy, physiology and pathology of the human body to the diagnosis and treatment of cancer.

Recommended Entry Level: Satisfactory completion of Anatomy, Physiology and Pathology I

Learning Outcomes : On completion of this paper the successful student will be able to:

1. use knowledge of anatomy to recognise structures on X-ray, CT and MRI scans;
2. demonstrate a basic understanding of pathology seen on X-ray, CT and MRI scans;
3. apply knowledge of surface anatomy to the clinical situation;
4. discuss common pathological conditions;
5. demonstrate a basic understanding of the process of carcinogenesis and the major relevant tumours found in the body.

Content

Corresponding to Learning Outcome 1

1. Diagnostic purpose of X-ray, CT and MRI scans.
2. Representation of anatomical structures visible on X-ray, CT, and MRI scans.

Corresponding to Learning Outcome 2

1. Diagnosis of basic pathological changes seen on X-ray, CT and MRI scans.

Corresponding to Learning Outcome 3

1. Clinical significance of main landmarks and planes of :
   - head
   - thorax
   - abdomen
   - extremities

Corresponding to Learning Outcome 4

1. Infectious diseases (viral, bacterial, fungal, protozoal).
2. Generic disorders and cancers.

Corresponding to Learning Outcome 5

1. Mutagenesis (chemically induced, radiation induced, virus induced);
2. Carcinogenesis (oncogenes, tumour suppressor genes, angiogenesis, staging and grading);
3. Major relevant tumours in:
    a. head and neck region
    b. integumentary system, skeletal system
    c. blood and lymphatics
    d. endocrine system
    e. urinary system
    f. digestive system
    g. male and female reproductive systems (including breast).

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, and exploration;
- laboratory demonstrations.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one test (applied anatomy) = 40% of total mark
- one test (pathology) = 35% of total mark
- one assignment (pathology) = 25% of total mark

A pass will be awarded to all students who gain 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of 100

Student result notices will carry grades from A to E.

Resources

Electronic Media

Wetsite: Netanatomy.com

Textbooks

Backhouse, K., & Hutchings, R. (1986). *A Colour Atlas of Surface Anatomy.* Wolfe.

Carter et al; (1977). *Cross Sectional Anatomy, CT and Ultrasound Correlation.* Prentice Hall.

Field, D. (2001). *Anatomy, Palpation and Surface Markings*. (3rd Edition). Butterworth-Heinemann.

Hansen, J.T., & Koeppen, B.M. (2002). *Netter's Atlas of Human Physiology*. Icon Learning Systems LLC.

Martini, F. (2003). *Fundamentals of Anatomy and Physiology*. (6th Edition). Prentice Hall.

Moeller, T.B. & Reif, E. (2007). *Pocket Atlas of Sectional Anatomy, CT and MRI, Vol 1 & Vol 2.* (3rd Edition). Thieme, New York.

Netter, F.W., & Hansen, J.T. (2003). *Atlas of Human Anatomy*. (3rd Edition). Icon Learning Systems.

Taylor, A. (1987). *Atlas of Radiologic Anatomy*. (4th Edition). Munich-Baltimore.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

Westbrooke & Watson (1993). *MRI in Practice*. Blackwell Science.

19. Clinical Studies II

Reference Number : MERA 202

Date : February 2007

Duration : 640 hours

Points : 60

Aim : The student will gain skills and knowledge which will enable them to carry out the basic skills of a radiation therapist under supervision.

Recommended Entry Level : Successful completion of all Stage I courses.

Learning Outcomes : On completion of this paper the successful student will be able to :

1. demonstrate consistently the application of routine radiation therapy techniques;
2. demonstrate consistent safe practices when working with patients and equipment;
3. communicates information accurately and effectively;
4. recognises patients' needs and/or significant changes in patients' condition;
5. identify the key elements of teamwork with reference to the health care setting;
6. discuss and demonstrate methods of quality assurance in radiation therapy;
7. demonstrate consistently appropriate self-management techniques;
8. demonstrate the ability to identify problems in the clinical setting;

Content

Corresponding to Learning Outcome 1

1. Description of routine radiation therapy techniques
2. Rationale for routine radiation therapy techniques

Corresponding to Learning Outcome 2

1. Potential hazards in a radiation therapy department
2. Safety regulations and procedures
3. Equipment faults
4. Patient safety and comfort

Corresponding to Learning Outcome 3

1. Written records and reports
2. Verbal reporting
3. Verification of information
4. Establish appropriate rapport within the workplace
5. Verbal and non-verbal communication skills
6. Cross-cultural communication/special needs

Corresponding to Learning Outcome 4

1. Physical, social and emotional needs of patients
2. Side effects and the treatement of these, to include medication
3. Normal range of responses to treatment
4. Indicators for reassessing patient condition
5. Appropriate referrals

Corresponding to Learning Outcome 5

1. Roles of healthcare team members
2. Channels of communication
3. Sources of conflict in teams
4. Conflict resolution skills

Corresponding to Learning Outcome 6

1. Importance of quality assurance in a radiation therapy department
2. Clinical quality assurance

Corresponding to Learning Outcome 7

1. The range of emotional responses radiation therapists may have when working with patients and colleagues
2. Appropriate coping strategies
3. Time management skills

Corresponding to Learning Outcome 8

1. Identification of problems in the clinical setting

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, exploration;
- use of a variety of small scale investigative techniques;
- clinically based practice;
- visit to another radiation therapy department.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one rotational assessment
  - (simulation/computed tomography) = Pass/Fail
- one rotational assessment (dosimetry) = Pass/Fail
- one rotational assessment (treatment) = Pass/Fail
- one clinical journal = Pass/Fail

A pass will be awarded to all students who gain a pass in <u>each</u> component.
Students will need to gain 640 clinical hours for the semester in which they have enrolled.

Reassessment: A reassessment can occur for the clinical journal and one rotational assessment.

Reporting Results to Students

Results will be reported to students as Pass/Fail

Students will normally be required to retake all assessment components in a repeat enrolment.

Resources

Fully equipped and operational radiation therapy department.

Bomford, C., Kunkler, I., & Sherriff, S. (2003). *Walter & Miller's Textbook of Radiotherapy*. (6th Edition). Churchill Livingstone.

International Commission on Radiation Units and Measurements: (1993) Prescribing, Recording, and Reporting Photon Beam Therapy. *(ICRU Report 50)*

International Commission on Radiation Units and Measurements; (1999) Prescribing, Recording, and Reporting Photon Beam Therapy. Supplement to ICRU 50 Report *(ICRU Report 62)*

Faithfull, S., & Wells, M. (2003). *Supportive Care in Radiotherapy.* Churchill Livingstone, UK.

Khan, F.M., & Potish, R.A. (1998). *Treatment Planning in Radiation Oncology.* Williams and Wilkins. Baltimore.

Ruben, P. (2001). *Clinical Oncology: A multidisciplinary approach for physicians and students***.** (8th Edition). W.B. Saunders Company, Philadelphia, Pennsylvania.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

20. Behavioural Science II

Reference Number : MERA 203

Date : February 2007

Duration : 40 contact hours and 50 hours of independent learning

Points : 9

Aim : To enable the student to apply theoretical perspectives from psychology and sociology to their role as a radiation therapist.

Recommended Entry Level : Satisfactory completion of Behavioural Science I

Learning Outcomes : On completion of this paper the successful student will be able to :

1. distinguish factors which are likely to influence the perception of pain and relate these to the role of the radiation therapist;
2. discuss the psychosocial consequences of terminal illness for the individual and the family;
3. demonstrate appropriate responses to individuals and family members who are coping with terminal illness;
4. determine appropriate personal and group management techniques for a range of situations in radiation therapy;
5. demonstrate conflict resolution strategies appropriate to the radiation therapy context.

Content

Corresponding to Learning Outcome 1

1. Culture, age, gender, psychosocial factors which influence the perception of pain
2. Strategies to facilitate the identification of pain in the radiation therapy setting
3. Strategies to assist patients cope with pain

Corresponding to Learning Outcome 2

1. Terminal illness and models of grieving
2. Psychosocial consequences of terminal illness for the individual and family

Corresponding to Learning Outcome 3

1. Identification of grief responses in self and others
2. Appropriate responses to grieving individuals
3. Cross cultural differences in coping with hospitalisation, illness and terminal illness
4. Counselling as a helping tool
5. Identification of support systems for patients receiving radiation therapy

Corresponding to Learning Outcome 4

1. Personal management strategies
2. Group/team dynamics and roles of participants
3. Managing group process
4. Management/leadership styles
5. Problem-solving and management

Corresponding to Learning Outcome 5

1. Common sources of conflict
2. Sources of conflict in a health care setting
3. Strategies for dealing with conflict

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- guest speakers who are able to offer current and practical information on topics;
- case studies and problem based learning;
- role plays, with the lecturer and others modelling and coaching appropriate behaviours;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, exploration and debate;
- use of a variety of small scale investigative techniques;
- the teaching material should draw on the student's personal and professional experiences and encourage critical inquiry and examination of the "taken for granted world".

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one project = 50% of total mark
- one test = 50% of total mark

A pass will be awarded to all students who gain 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of 100

Student result notices will carry grades from A to E.

Resources

Aranda, S., & O'Connor, M.M. (2003). *Palliative care nursing: a guide to practice.* Melbourne: Ausmed Publications.

Bayne, R.S., & Nicholson, P. (1993). *Counselling and psychology for health professionals*. London: Chapman and Hall.

Benson, H. (1996). *Timeless healing: The power and biology of belief*. London; Simon & Schuister.

Berglund, C. (2004). *Ethics fpr jea;tj care.* (2nd Edition). Melbourne. Oxford University Press.

Cornelius, H., & Faire, S. (1994). *Everyone can win: How to resolve conflict*. (10th Edition). Ease Roseville; Simon & Schuster.

Doka, K.J., & Davidson, J.D. (Eds.). (1998). *Living with grief: Who we are, how we grieve*. Brunner/Mazel; Hospice Foundation of America.

Ferrell, B.R., & Coyle, N. (Eds.). (2001). *Textbook of palliative nursing*. Oxford; Oxford University Press.

Gatchel, R., Baum, A., & Krantz, D. (1989). *An Introduction to Health Psychology*. (2nd Edition). McGraw Hill, New York.

Gatenby, B.I. (1998). *For the rest of our lives: after the death of a child.* Auckland: Reed.

Hamilton, J., & Kiefer, M. (1986). *Survival Skills for the New Nurse.* J B Lippincott, London.

Klass, D., Silverman, P.R., & Nickman, S.L. (1998). *Continuing bonds: new understandings of grief.* Washington DC: Taylor and Francis.

Kubler-Ross, L. (1969). *On Death and Dying*. New York: Macmillan.

Lloyd-Williams, M. (2003). *Psychosocial issues in palliative care*. Oxford: Oxford University Press.

Main, C.J., & Spanswick, C.C. (Eds.). (2000). *Pain Management: An interdisciplinary approach.* Edinburgh: Harcourt Publishes Ltd.

McGuire, D.B., Yarbo, C.H. and Ferrell, B; (1995). Cancer pain management. Boston: Jones and Bartlett.

Ministry of Health (2001). *The New Zealand Palliative Care Strategy.* Wellington: Ministry of Health.

Neimeyer, R.A. (Ed.). (2002). *Meaning reconstruction and the experience of loss*. (2nd Edition). Washington DC; American Psychological Association.

Northouse, L.L., & Northouse, P.G. (1998). *Health communication.* (3rd Edition). Appleton & Hall, USA.

Penson, J., & Fisher, R. (Eds.). (1991). *Palliative Care for People with Cancer.* Edward Arnold.

Rando, T.A. (1988). *Grieving and how to go on living when someone you love dies*. Lexington, Mass: Lexington Books.

Sarafino, G. (2002). *Health Psychology: Biopsychosocial Interactions.* (4th Edition). New York.

Skevington, S. (1995). *Psychology of pain.* Chichester: Wiley.

Staudacher, C. (1987). *Beyond Grief. A Guide for Recovering from the Death of a Loved One*. Souvenir Press, London.

Steptoe, A. & Wardle, J. (Eds.). (1994). *Psychosocial Processes and Health.* A Reader. Cambridge University Press, Cambridge.

Weiten, W. (2004). *Psychology: Themes and Variations*. (6th Edition). Brooks Cole.

Worden, J. (2002). Grief Counselling and Grief Therapy. (3rd Edition). A Handbook for the Mental Health Practitioner. Springer, New York.

21. Principles of Research

Reference Number : MERA 204

Date : February 2007

Duration : 30 contact hours 60 hours of independent learning

Points : 9

Aim : The student will gain a working knowledge of basic research methodology; they will also gain basic skills in critical analysis to enable them to evaluate research findings.

Recommended Entry Level : Entry to programme

Learning Outcomes : On completion of this paper the successful student will be able to:

1. analyse research methodology including the use of information technology and identify the research processes involved;
2. critically appraise scientific papers and give a clear and rational interpretation of the material in a literature review;
3. document the history of research ethics; informed consent and experimental design;
4. explain the importance of mathematical measurements and statistical analysis in research;
5. assess the importance of research to the professional field of practice.

Content

Corresponding to Learning Outcome 1

1. Qualitative and quantitative research
2. Hypotheses, research questions, null hypotheses
3. Types of research
4. Boundaries for research

Corresponding to Learning Outcome 2

1. Making sense of professional papers
2. Analysis of authors' methods, results and discussions, synthesizing information from a variety of sources

Corresponding to Learning Outcome 3

1. Informed consent and the ethics of research
2. Data gathering, use of existing information, interviews, observation techniques (participant and non-participant observation)
3. Bias, validity, reliability, repeatability, questionnaire design, experimental design
4. Combined methods of data gathering, data analysis, double blind trials, placebos

Corresponding to Learning Outcome 4

1. Confidence levels, statistical inferences, linear correlation coefficient and tests of significance, linear regression, interpretation of distributions
2. Population and samples, sample criteria, large and small sample theory
3. Significance testing, variables and control of variables - placebos, double blind trials, sources of error, statistical hypotheses, student t-test

Corresponding to Learning Outcome 5

1. Developing databases and referencing system
2. Consider the effects of applied research to medicine
3. History of research in radiation therapy research and the present culture

Suggested Learning and Teaching Approaches :

- A number of papers should be given to students to allow them to practise evaluating them. Check lists and group discussions can be used to allow the students to question the findings of articles.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one assignment & poster (research) = 50%
- one test (statistics) = 50%

A pass will be awarded to all students who gain 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work out of 100

Student notices will carry grades from A to E.

Resources

Gilbert, N. (Ed.). (1993). *Researching Social Life*. Sage, London.

Hulley, S., & Cummings, S. (1988). *Designing Clinical Research : An Epidemiological Approach.* Williams and Wilkins.

Jenkins, S., Price C.J., Straker, L. (1998). *The Researching Therapist*. Churchill Livingstone.

Kellehear, A. (1993). *The Unobtrusive Researcher : A Guide to Methods*. Allen & Unwin, St Leonards, NSW.

Marshall, C., & Rossman, G. (1989). *Designing Qualitative Research.* Sage, London.

Moore, D., & McCabe, G. (1994). *Introduction to the Practice of Statistics.* (2nd Edition). Freeman, NY.

Polgar, S. (1991). *Introduction to Research in Health Sciences.* (2nd Edition). Churchill Livingstone.

Polgar, S., & Thomas, S. (2000). *Introduction to Research in the Health Sciences.* (4th Edition). Churchill Livingstone.

22. Radiation Technology II

Reference Number : MERA 205

Date : February 2007

Duration : 100 contact hours and 80 hours of independent learning

Points : 18

Aim To enable students to apply their understanding of computers, radiation therapy equipment and radiographic photography to the planning and delivery of radiation therapy.

Recommended Entry Level : Successful completion of Radiation Technology I and Radiation Physics

Learning Outcomes : On completion of this paper the successful student will be able to :

1. use a range of computer programmes relevant to radiation therapy;
2. describe the role of the different types of radiation for use in radiation therapy;
3. describe radiation detection and measurement;
4. apply the principles of radiation protection and safety;
5. discuss equipment and technologies used in radiation therapy;
6. explain the use of radioactive materials in radiation therapy;
7. describe the use of linear accelerators in radiation therapy;
8. describe computed tomography (CT) as a treatment planning tool.

Content

Corresponding to Learning Outcome 1
1. Radiation therapy software usage
2. Optimal planning procedures
3. Record and verification systems

Corresponding to Learning Outcome 2
1. Photons
2. Electrons
3. Other particles

Corresponding to Learning Outcome 3
1. Radiation detectors
2. Radiation measurement
3. Machine calibration

Corresponding to Learning Outcome 4

1. Radiation protection and safety equipment checking procedures
2. Protection and safety reporting procedures
3. Fault identification
4. Radiation monitoring

Corresponding to Learning Outcome 5

1. Linear accelerators versus ^{60}Co for teletherapy
2. Conebeam CT
3. On Board Imaging (OBI)

Corresponding to Learning Outcome 6

1. Sealed sources
2. Unsealed sources
3. Safety procedures

Corresponding to Learning Outcome 7

1. Multileaf collimators (MLC)
2. Electronic portal imaging (EPI)
3. Wedges

Corresponding to Learning Outcome 8

1. Evolution of CT/MRI
2. Codes of Practice
3. Practical applications
4. Image interpretation

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- seminar and project presentations;
- the use of media such as videos, journals and texts;
- laboratory demonstrations;
- practical sessions.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one test = 20% of total mark
- one test = 25% of total mark
- one assignment = 15% of total mark
- one final 2 hour written examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Electronic Media :

Students have access to a variety of data bases and CD Roms.

Textbooks

Ball, J., & Moore, D. (1986). *Essential Physics for Radiographers*. Blackwell Scientific.

Bomford, C., Kunkler, I., & Sherriff, S. (2003). *Textbook of Radiotherapy.* (6th Edition). Churchill Livingstone.

Bushong, S. (1993). *Radiologic Science for Technologists - Physics, Biology and Protection*. Mosby.

Chesney, D., & Chesney, M. (1994). *Chesney's Equipment for Student Radiographers.* Blackwell Scientific.

Dowd, S., & Steven, B. (1994). *Practical Radiation Protection & Applied Radiobiology*. W B Saunders Company.

Hendee, W. (1981). *Radiation Therapy Physics*. Year Book Medical Publishers.

Jenkins, D. (1980). *Radiographic Photography & Imaging*. Lancaster MTP.

Johns, H., & Cunningham, J. (1983). *The Physics of Radiology.* Springfield.

Karzmark, C. (1998). *Theory of Operation of Linear Accelerators in Radiation Therapy.* Medical Physics Pub, Madison, Wis.

Khan, F. (2003). *The Physics of Radiation Therapy*. Williams and Wilkins. Baltimore.

Khan F., & Potish R.A. (1998). *Treatment Planning in Radiation Oncology*. Williams and Wilkins. Baltimore.

Klevenhagen, S. (1985). *The Physics of Electron Beam Therapy*. Adam Hiler in collaboration with the Hospital Physicians Association. Bristol.

Meredith, W., & Massey, J. (1977). *Fundamental Physics of Radiology*. John Wright & Sons Ltd, Bristol.

Morris, S. (2001). *Radiotherapy physics and equipment*. Churchill Livingstone.

Nag, S. (1994). *Textbook on High Dose Rate Brachytherpy.* Blackwell Science.

National Radiation Code of safe practice for the use of irradiating apparatus in medical Laboratory Therapy, NRL 1992

Roberts, D., & Smith, N. (1988). *Radiographic Imaging.* Churchill Livingstone.

Stanton, R., & Stinton D. (1996). *Applied Physics for Radiation Oncology*. (2nd Edition). Medical Physics Publishing, Wisconsin, USA.

Taylor, J. (1988). *Imaging in Radiotherapy.* Groom Helm.

Wilks, R. (1987). *Principles of Radiological Physics*. Churchill Livingstone.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

23. Radiation Therapy and Oncology II

Reference Number : MERA 206

Date : February 2007

Duration : 140 contact hours and 100 hours of independent learning

Points : 24

Aim : To enable the student to integrate their knowledge of oncology and treatment modalities to determine optimal treatment for malignant disease.

Recommended Entry Level : Successful completion of Radiation Therapy and Oncology I

Learning Outcomes : On completion of this paper the successful student will be able to :

1. describe the pharmacological approach to patient care during radiation therapy;
2. identify the role of chemotherapy for patients with malignant disease;
3. discuss the oncology of and the clinical rationale for selecting appropriate treatment for the stated 'Site List';
4. demonstrate the basic principles of treatment planning and dose calculation;
5. discuss the effects of radiation on biological systems.

Content

Corresponding to Learning Outcome 1

1. Pharmacological principles
2. Adverse reactions to drugs
3. Medications used for radiation therapy reactions

Corresponding to Learning Outcome 2

1. Principles of chemotherapy for cancer
2. Classification of chemotherapy drugs
3. Side effects of chemotherapy
4. Management of side effects

Corresponding to Learning Outcome 3

Site List
- urogenital
- head and neck
- gynaecological
- skin
- haematological
- lymphoma
- paediatric tumours

1. Patient assessment methods
2. Tumour characteristics
3. Optimal treatment techniques
4. Combined modality treatments
5. Typical treatment reactions

Corresponding to Learning Outcome 4

1. Basic planning techniques
2. Tumour localisation
3. Contouring methods
4. Manual calculations for basic SSD and SAD treatment techniques
5. Factors affecting dosage

Corresponding to Learning Outcome 5

1. Radiation chemistry
2. Mammalian cell sensitivity
3. Physical modification of radiation exposure
4. Acute radiation syndrome
5. Late effects of radiation

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, and exploration;
- laboratory demonstrations.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- One test (radiobiology) = 20% of total mark
- One group presentation (cancer) = 20% of total mark
- One practical assignment = 10% of total mark
- One viva = 10% of total mark
- One final 2 hour written examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Electronic Media

Students have access to a variety of data bases and CD Roms

Textbooks

A Guide to Palliative Care in New Zealand. (2nd Edition). Douglas Pharmaceuticals 1992

Beal, A., & Hoskin, P. (1994). *Clinical Oncology: A Textbook for Students*. Edward Arnold, London.

Bentel, G., Nelson, C., & Noell, K. (1989). *Treatment Planning and Dose Calculation in Radiation Oncology.* Pergamon Press.

Bomford, C., Kunkler, I., & Sherriff, S. (2003). *Textbook of Radiotherapy.* (6th Edition). Churchill Livingstone.

Dobbs, J., Barrett, A., & Ash, D. (1994). *Practical Radiotherapy Planning*. (2nd Edition). Edward Arnold, London.

Dowd, S. (1994). *Practical Radiation Protection and Applied Radiobiology*. W B Saunders Company.

Greening, J. (1981). *Fundamentals of Radiation Dosimetry*. Medical Handbooks 6, Adam Hilger Ltd.

Griffiths, S., & Short, C. (1994). *Radiotherapy : Principles to Practice*. Churchill Livingstone.

Haskell, C. (1980). *Cancer Treatment*, W B Saunders Company.

International Commission on Radiation Units and Measurements: (1993) Prescribing, Recording, and Reporting Photon Beam Therapy. *(ICRU Report 50)*

International Commission on Radiation Units and Measurements: (1999) Prescribing, Recording, and Reporting Photon Beam Therapy. Supplement to ICRU 50 *(ICRU Report 62).*

Moss, W., Brand, W., & Battifora, H. (1979), *Radiation Oncology - Rationale, Technique, Results.* (5th Edition). The CV Mosby Company.

Mould, R. (1981). *Radiotherapy Treatment Planning*. Medical Physics Handboooks 7, Adam Hilger Ltd.

Murphy, G., Lawrence, W., & Lenhard, R. (1995). *American Cancer Society Textbook of Clinical Oncology.* American Cancer Society.

National Radiation Code of Safe Practice for the Use of Irradiating Apparatus in Medical Laboratory Therapy, NRL 1992

POSTGRAD Papers Higher Diploma of College of Radiographers; (1986). *Process of Patient Care. Oncology. Therapeutic Radiography. Science and Instrumentation.*

Ruben, P. (2001). *Clinical Oncology: A Multidisciplinary approach for physicians and students*. (8th Edition). W.B. Saunders Company, Philadelphia, Pennsylvania.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

24. Clinical Studies III

Reference Number : MERA 301

Date : February 2007

Duration : 640 hours

Points : 60

Aim : The student will demonstrate their ability to effectively carry out the duties of a radiation therapist, taking responsibility for their actions while still being under the supervision of a qualified radiation therapist.

Recommended Entry Level : Successful completion of all Stage II courses.

Learning Outcomes : On completion of this paper the successful student will be able to :

1. demonstrate consistently the application of a range of radiation therapy techniques with minimal supervision;
2. demonstrate consistent safe practice and optimal patient care;
3. demonstrate consistently the ability to problem solve in the clinical setting;
4. analyse the resource implications of managing an oncology department;
5. demonstrate an understanding of pharmaceuticals used in oncology.

Content

Corresponding to Learning Outcome 1

1. Description and rationale of routine radiation therapy techniques
2. Demonstrate consistently the application of routine radiation therapy techniques

Corresponding to Learning Outcome 2

1. Demonstrates safe practices and optimal patient care
2. Demonstrates quality assurance practices in the clinical setting
3. Communicates information accurately and effectively
4. Recognises patient needs and/or significant changes in patient condition

Corresponding to Learning Outcome 3

1. Identification of problems in clinical setting
2. Problem solving techniques in clinical setting
3. Evaluation of problem solving outcomes

Corresponding to Learning Outcome 4

1. Human resource management
2. Financial resource management
3. Time management
4. Equipment/plant/stock/management
5. Use of statistics in management

Corresponding to Learning Outcome 5

1. Chemotherapy
2. Adjuvant chemotherapy and radiation therapy
3. Analgesics
4. Other routine medications used in a radiation therapy department

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- clinically based practice;
- student centred tutorials with an emphasis on class discussion;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, exploration;
- use of a variety of small scale investigative techniques.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one rotational assessment
  - (simulation/computed tomography) = Pass/Fail
- one rotational assessment (dosimetry) = Pass/Fail
- one rotational assessment (treatment) = Pass/Fail
- one OSCE = Pass/Fail
  (Objective Sturctured Clinical Examination)

A pass will be awarded to all students who gain a pass in <u>each</u> component.

OSCE Eligibility

1. Students will need to have passed MERA 302, MERA 303, MERA 304 and coursework requirements of MERA 301.
2. Students will need to receive a minimum of **TWO** mock OSCEs in each of the areas: simulation/computed tomography, and treatment, prior to the OSCE examination.
3. Students will need to gain 640 clinical hours for the semester in which they have enrolled.

Reassessment:

- A reassessment can occur for one rotational assessment in dosimetry and one rotational assessment in either simulation/CT or treatment
- One reassessment can occur for the OSCE

Reporting Results to Students

Results will be reported to students as Pass/Fail

Students will normally be required to retake all assessment components in a repeat enrolment.

Resources

Fully equipped and operational radiation therapy department.

Baird, S. (1991). *A Cancer Source Book for Nurses*. (6th Edition). American Cancer Society.

Bentel, G., Nelson, C., & Noell, K. (1989). *Treatment Planning and Dose Calculation in Radiation Oncology.* Pergamon Press.

Bomford, C., & Kunkler, I. (2003). *Walter & Miller's Textbook of Radiotherapy*. (6th Edition) Churchill Livingstone.

Dobbs, J., Barrett, A., & Ash, D. (1994). *Practical Radiotherapy Planning*. (2nd Edition). Edward Arnold, London.

Dowd, S. (1994). *Practical Radiation Protection and Applied Radiobiology*. WB Saunders Company.

Faithfull, S., & Wells, M. (2003). *Supportive Care in Radiotherapy.* Churchill Livingstone, UK.

Griffiths, S., & Short, C. (1994). *Radiotherapy : Principles to Practice*. Churchill Livingstone.

International Commission on Radiation Units and Measurements: (1993) Prescribing, Recording, and Reporting Photon Beam Therapy. *(ICRU Report 50)*

International Commission on Radiation Units and Measurements: (1999) Prescribing, Recording, and Reporting Photon Beam Therapy. Supplement to ICRU 50 Report *(ICRU Report 62)*.

Khan, F.M., & Potish, R.A. (1998). *Treatment Planning in Radiation Oncology*. Williams and Wilkins. Baltimore.

Lau, L., & Campo, J. (1985). *Radiological Diagnosis*. Holt-Saunders.

Mould, R. (1985). *Radiotherapy Treatment Planning*. (2nd Edition). (Medical Physics Handbook 14), Adam Hilger Ltd.

New Ethical Catalogue. 1994.

Osten, R., & Shahabi, S. (1990). *Cancer Manual*. (8th Edition). American Cancer Society.

Ruben, P. (2001). *Clinical Oncology: A multidisciplinary approach for physicians and students***.** (8th Edition). W.B. Saunders Company, Philadelphia, Pennsylvania.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

25. Applied Research Methods

Reference Number : MERA 302

Date : February 2007

Duration : 30 contact hours and 120 hours of independent learning

Points : 15

Aim : To enable students to demonstrate their abilities to apply knowledge of research, design and analysis to a topic of their choice.

Recommended Entry Level : Satisfactory completion of MERA 204 Principles of Research

Learning Outcomes : On completion of this paper the successful student will be able to :

1. demonstrate skills of research design;
2. critically evaluate research design in clinical, epidemiological and social science research particularly in relation to radiation therapy;
3. identify the appropriate protocol for writing up and publishing research and for applying for research funding;
4. produce a research project following specific guidelines and procedures commensurate with degree level studies.

Content

Corresponding to Learning Outcome 1
1. Design of research protocols
2. Ethical considerations in design

Corresponding to Learning Outcome 2
1. Critical analysis of clinical, epidemiological and social science research related to radiation therapy

Corresponding to Learning Outcome 3
1. Research paper presentation
2. Publishing criteria
3. Application for research funding

Corresponding to Learning Outcome 4
1. Production of research project

Suggested Learning and Teaching Approaches:

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- guest speakers who are able to offer current and practical information on topics;
- seminar and project presentations;
- use of a variety of small scale investigative techniques.

Assessment of Learning Outcomes:

Summative assessment will consist of the following :

- one written presentation = 70% of total mark
- one oral presentation = 15% of total mark
- one poster presentation = 15% of total mark

A pass will be awarded to those students who gain an A, B or C grade

Reassessment:

There is the opportunity for one resubmission of the research project.

Reporting Results to Students

Results will be reported to students as

A+, A, A-, B+, B, B-, C+, C, C-	pass grades
D E	fail grades

Resources

Cohen, L., Manion, L., Morrisonk. (2000). *Research methods in education*. (5th Edition). Routledge Falmer, London.

Gilbert, N. (Ed.). (1993). *Researching Social Life*. Sage, London.

Hall, G (Ed). (1998). *How to write a paper*. (2nd Edition). BMJ Publishing Group, London.

Jenkins, S., Price, C.J., & Straker, L. (1998). *The Researching Therapist*. Churchill Livingstone.

Katzer, J., Cook, H., Crouch, W. (1998). *Evaluating information: A guide for users of social science research*. (4th Edition). McGraw-Hill, USA.

Kellehear, A. (1993). *The Unobtrusive Researcher: A Guide to Methods.* Allen & Unwin, St Leonards.

Polgar, S., & Thomas, S. (2000). *Introduction to Research in the Health Sciences.* (4th Edition).

Preece, R. (1994). *Starting Research.* Pinter, London.

Reid, N. (1993). *Health Care Research by Degrees*. Blackwell, Oxford.

Rudestain, K. (1992). *Surviving Your Dissertation: A Comprehensive Guide to Content and Process.* Sage, London.

26. Radiation Technology III

Reference Number : MERA 303

Date : February 2007

Duration : 60 contact hours and 90 hours of independent learning

Points : 15

Aim : To enable students to use radiation therapy equipment safely and effectively with minimal supervision.

Recommended Entry Level : Successful completion of Radiation Technology II

Learning Outcomes : On completion of this paper the successful student will be able to:

1. evaluate the suitability of radiation therapy equipment for different clinical situations and evaluate the skills of resource management in relation to a radiation therapy department;
2. evaluate Intensity Modulated Radiation Therapy (IMRT).
3. discuss the use of brachytherapy equipment in radiation therapy;
4. discuss quality assurance systems in radiation therapy;
5. discuss the principles of planning and treatment in specialised techniques;
6. evaluate diagnostic imaging as a treatment planning tool, to include CT, MRI, SPECT and PET;
7. discuss the potential future developments of radiation therapy equipment;

Content

Corresponding to Learning Outcome 1

1. Equipment currently available
2. Clinical resource management
3. Service planning and strategic planning
4. Human resource management
5. Problem solving

Corresponding to Learning Outcome 2

1. Aim and theory of IMRT
2. Delivery of IMRT – methods and equipment required
3. Treatment planning for IMRT
4. Quality assurance methods
5. Comparison of dose distributions and outcomes with other treatment modalities

Corresponding to Learning Outcome 3

1. Applications and source placement
2. Sources
3. Loading techniques and systems
4. Safety and quality assurance

Corresponding to Learning Outcome 4

1. Principles of quality assurance
2. Systems of quality assurance
3. Rationale for quality assurance

Corresponding to Learning Outcome 5

1. Stereotactic techniques
2. Specialist techniques, eg. IGRT, Gating
3. Protons, neutrons and other particles in radiation therapy

Corresponding to Learning Outcome 6

1. Image interpretation to include fusion and co-registration
2. Role of diagnostic imaging in treatment planning (CT, MRI, SPECT, PET)
3. Simulators with CT options
4. CT as a simulation tool

Corresponding to Learning Outcome 7

1. Future technological trends
2. Computer networking
3. Information resources

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- seminar and project presentations;
- the use of media such as videos, journals, and texts;
- practical sessions.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- one assignment
  - (IMRT, brachytherapy, quality assurance) = 30% of total mark
- one assignment
  - (imaging) = 15% of total mark
- one assignment
  - (resource management) = 15% of total mark
- one final 2 hour written examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.

A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Electronic Media :

Students have access to a variety of data bases and CD Roms

Textbooks

Bomford, C., Kunkler, I., & Sherriff, S. (2003). *Textbook of Radiotherapy.* (6th Edition). Churchill Livingstone.

Bushong, S. (1993). *Radiologic Science for Technologists*. Physics Biology and Protection, Mosby.

Dobbs, J., Barrett, A., & Ash, D. (1994). *Practical Radiotherapy Planning*. (2nd Edition). Edward Arnold, London.

Griffiths, S., & Short, C. (1994). *Radiotherapy : Principles to Practice*. Churchill Livingstone.

Khan, F. (2003). *The physics of radiation therapy*. Williams & Wilkins, Baltimore.

Morris, S. (2001). *Radiotherapy physics and equipment*. Churchill Livingstone.

Nag, S. (1994). *Textbook on High Dose Rate Brachytherapy*. Blackwell Science.

Purdy, J. (2001). *3-D Conformal and Intensity Modulated Radiation Therapy*. Advanced Medical Publishing Inc., Madison, Wi.

Stanton, R., & Stinson, D. (1996). *Applied Physics for Radiation Oncology.* (2nd Edition). Medical Physics Publishing, Wisconsin, USA.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

Webb, S. (1994). *The Physics of Three Dimensional Radiation Therapy*. Institute of Physics Publishing, Bristol.

Webb, S. (2001). *Intensity Modulated Radiation Therapy*. IOP Publishing Ltd , Bristol, UK.

27. Radiation Therapy and Oncology III

Reference Number : MERA 304

Date : February 2007

Duration : 140 contact hours and 130 hours of independent learning

Points : 27

Aim : For students to apply their understanding of oncology by demonstrating the appropriate use of radiation therapy techniques.

Recommended Entry Level : Successful completion of Radiation Therapy and Oncology II

Learning Outcomes : On completion of this paper the successful student will be able to :

1. identify the structure and functions of the health care system in New Zealand and the role of radiation therapy within the health care system.
2. evaluate the ways in which effects of radiation therapy can be enhanced;
3. critically analyse standard radiation therapy techniques with application to variations in clinical conditions;
4. apply their knowledge of radiobiology to the clinical setting;
5. discuss the oncology of and the clinical rationale for selecting appropriate treatment for the stated 'Site List';
6. demonstrate the principles of treatment planning and dose calculation;
7. determine a personally and professionally acceptable version of the role of a radiation therapist and be able to integrate this professional role into all their other life roles;
8. consider issues relevant to future professional development and career planning;
9. determine the causes and effects of stress on the human organism and ways in which stress can be managed;
10. describe appropriate strategies for dealing with burnout in the workplace.

Content

Corresponding to Learning Outcome 1

1. Structure of the New Zealand health care system, historical and current
2. Role of radiation therapy in the New Zealand health care system
3. Medico-legal dimensions of the role of the radiation therapist
4. Codes of ethics and the radiation therapist

Corresponding to Learning Outcome 2

1. Chemotherapeutic agents
2. Radiosensitising drugs
3. Other methods

Corresponding to Learning Outcome 3

1. Standard protocols
2. Anatomical and physiological differences
3. Radiosensitive structures
4. Dose limits

Corresponding to Learning Outcome 4

1. Radiobiological principles
2. Clinical decision making
3. Factors influencing cell response
4. Fractionation
5. Hypoxia and radiosensitivity
6. Dose and dose rate
7. Time and dose relationships
8. Acute radiation syndrome
9. Acute and late effects

Corresponding to Learning Outcome 5

Site List:
- gastrointestinal
- lung
- breast
- sarcomas
- head and nect
- central nervous system

1. Patient assessment methods
2. Tumour characteristics
3. Optimal treatment techniques
4. Combined modality treatments
5. Typical treatment reactions

Corresponding to Learning Outcome 6

1. 2D and 3D computer planning
2. Plan and dose optimisation
3. Describe major factors affecting dosage
4. Manual calculation of dose for radiation therapy treatment techniques
5. Spatial perception

Corresponding to Learning Outcome 7

1. Personal management strategies
2. Professional socialisation
3. Radiation therapists as members of a profession - roles and responsibilities
4. Problem solving within a moral/ethical and medico-legal framework
5. Moral dimensions of the role of the radiation therapist

Corresponding to Learning Outcome 8

1. Issues relevant to future professional development and career planning – CV's, letters of application, interview skills

Corresponding to Learning Outcome 9

1. Definitions of terminology, "stress", "stressor"
2. Origins of stressors
3. Consequences of stress: cognitive, emotional, physical, behavioural
4. Positive and negative coping mechanisms
5. Strategies to prevent or minimise the effects of stress

Corresponding to Learning Outcome 10

1. Definitions of burnout
2. Causes of burnout in a health care setting
3. Consequences of burnout
4. Strategies for dealing with burnout

Suggested Learning and Teaching Approaches :

The learning outcomes of this paper could be achieved by the following :

- student centred tutorials with an emphasis on class discussion and debate;
- seminar and project presentations;
- the use of media such as videos, journals, texts, newspaper articles and television will provide a rich source of material for discussion, and exploration;
- laboratory demonstrations.

Assessment of Learning Outcomes :

Summative assessment will consist of the following :

- One test (radiobiology) = 15% of total mark
- One assignment (professional issues) = 15% of total mark
- One dosimetry assessment (20/30 pass mark) = 30% of total mark
- One final 2 hour written examination = 40% of total mark

50% must be gained in the coursework to be eligible to take the final examination.
A pass will be awarded to all students who gain 40% minimum in the examination and 50% overall.

Reassessment:

One reassessment can occur in the dosimetry assessment if the pass mark of 20/30 is not achieved.

Reporting Results to Students

Results will be reported to students as follows:

Course work, out of	60
Final examination, out of	40
TOTAL	100

Student result notices will carry grades from A to E.

Resources

Electronic Media

Students have access to a variety of data bases and CD Roms

Textbooks

A Guide to Palliative Care in New Zealand. (2nd Edition). Douglas Pharmaceuticals 1992

Bentel, G., Nelson, C., & Noel, K. (1989). *Treatment Planning and Dose Calculation in Radiation Oncology.* Pergamon Press.

Bolles, R. (2004). *What colour is your parachute*? Ten Speed Press.

Bomford, C., Kunkler, I., & Sherriff, S. (2003). *Walter & Miller's Textbook of Radiotherap.* (6th Edition). Churchill Livingstone.

De Vita, V., Hellman, S., & Rosenbera, S. *Cancer - Principles and Practice of Oncology.* (6th Edition). J B Lippincott Company.

Dowd, S. (1994). *Practical Radiation Protection and Applied Radiobiology.* W B Saunders Company.

Fry, S.T., & Johnstone, M.J. (2002). *Ethics in nursing practice: a guide to ethical decision making.* (2nd Edition). Blackwell Science.

Griffiths, S. & Short, C. (1994). *Radiotherapy : Principles to Practice*. Churchill Livingstone.

International Commission on Radiation Units and Measurements: (1993) Prescribing, Recording, and Reporting Photon Beam Therapy. *(ICRU Report 50)*

International Commission on Radiation Units and Measurements: (1999) Prescribing, Recording, and Reporting Photon Beam Therapy. Supplement to ICRU 50 *(ICRU Report 62).*

Khan, F.M., & Potish, R.A. (1998). *Treatment Planning in Radiation Oncology*. Williams and Wilkins. Baltimore.

Ministry of Health. (2001). *The New Zealand Palliative Care Strategy*. Wellington: Ministry of Health.

Murphy, G., Lawrence, W., &Lenhard, R. (1995). *American Cancer Society Textbook of Clinical Oncology.* American Cancer Society.

Neal, A., & Hoskin, P. (2003). *Clinical Oncology: Basic Principles & Practice*. (3rd Edition). Edward Arnold, London.

Skovholt, T.M. (2000). *The resilient practitioner: Burnout prevention and self-care strategies for counsellors, therapists, teachers and health professionals*. Pearson. Allyn & Bacon.

Stanton, R., & Stinson, D. (1996). *Applied Physics for Radiation Oncology*. (2nd Edition). Medical Physics Publishing, Wisconsin, USA.

Washington, C.M., & Leaver, D.T. (2004). *Principles and Practice of Radiation Therapy*. (2nd Edition). Mosby, St Louis, Missouri.

Weiten, W. (2004). *Psychology: themes and variations*. (6th Edition). Brooks Cole

Wilson, P. (1999). *Calm at work*. Penguin Putnam, NY.

APPENDIX A

APPENDIX A

EXTERNAL MODERATORS

1. Functions

- External moderators shall be responsible for providing an impartial evaluation of student assessment for degree programme papers.
- Two external moderators will be appointed from the profession to moderate written examinations (one clinical tutor and one senior clinical radiation therapist).
- One clinical tutor will be appointed to moderate clinical journals.

More Specifically

The functions of the external moderators are to ensure that:

- the evaluation of students' performance was fair and impartial;
- the standard of achievement required of students is comparable with that required in other institutions offering degree qualifications.

2. Specific Responsibilities

- To report to the Radiation Therapy Board of Studies and Examinations Committee on the effectiveness of assessments and any conclusions drawn from them.
- To have authority to report directly to the Head of Department where there are concerns about standards of assessment and performance.
- To participate as required in any meeting of the Board of Studies and Examinations which relates to results recommended during the moderator's period of office.
- To concur with the form and content of summative assessments for the paper.
- To ensure that the assessments are conducted in accordance with programme regulations.

3. Appointment Criteria

To carry out their responsibilities, external moderators must be:

- competent in assessing student knowledge and skills at degree level;
- expert in the field of study concerned;
- impartial in judgement;
- properly briefed on their role and on the guiding principle and philosophy of the course.

4. Appointment Procedure

- The appointment of all external moderators must be approved by the Board of Studies and Examinations based on the recommendations of the Head of Department.
- External moderators will normally be appointed for a term of three years.
- New moderators should take up their appointment on or before the retirement of their predecessors. Moderators should remain available after the last assessments with which they are to be associated in order to deal with any subsequent reviews of decisions.

INTERNAL MODERATORS

1. Functions

Internal moderators shall be responsible for peer review of student assessment for all degree programme papers.

2. Specific Responsibilities

- To concur with the form and content of summative assessments for the paper.
- To ensure that the assessments are conducted in accordance with programme regulations.

3. Appointment Procedure

The appointment of all internal moderators must be approved by the Head of Department.

APPENDIX B

APPENDIX B

DEGREE MONITOR

This person will have responsibility for the following:

- appraising the quality management systems for the programme on an ongoing basis;
- assisting the University of Otago in identifying ways to maintain and enhance the quality of the programme;
- notifying the Head of Department and the Board of Studies and Examinations of any concerns regarding the standards or integrity of the programme.

This is to be achieved by:

- Providing verbal feedback to the Head of Department.
- Providing a report on the quality of the qualification, plus the teaching and research that support the qualification, to the Head of Department.

Person Specification

A monitor should:

- Be external to the University.
- Act as a critical colleague and make constructive comment.
- Possess appropriate research and academic expertise and experience to support a sound judgement on the quality of the qualification and the systems which support it.

In appointing a monitor the following should be taken into account:

- Qualifications appropriate to the profession.
- Present and/or past position of employment, preferably a current or recent academic position.
- Breadth of experience across teaching, research and/or employment.

Appointment Process

The appointment is approved by the Radiation Therapy Board of Studies and Examinations.

Term of Monitoring

Monitors will normally be appointed for a period of three years and will not normally serve for more than six years in total.

Procedures

A copy of the Annual Self Evaluation Report will be sent to the monitor which will include:

- A copy of the External Moderator's Reports
- A copy of the Research Report
- A five-year projected research plan and objectives for the department
- A copy of staff professional development reports

Monitor's Report

Content:

The report will address the following issues:

- An outline of the monitoring process
    - areas visited
    - meetings held
    - summary of topics discussed
    - any recommendations for future action
- Progress in responding to matters specified in the self-evaluation report.
- Progress in responding to recommendations at the previous monitor's visit.
- Moderation processes and performance.
- Proposed changes to the programme.
- Areas of strength and good practice.
- Areas of concern.
- Appropriateness of infrastructure to support research.
- Physical and financial resources in the context of achieving teaching and research objectives.
- Overall quality of research in the context of international research in similar areas.

Report:

- The report will be drafted and submitted to the Head of Department for comment.
- Any discrepancies must be discussed between the Head of Department and the monitor.
- The final signed report will be submitted to the Radiation Therapy Board of Studies and Examinations through the Head of Department.

Response:

- A draft response will be prepared by the Head of Department.
- The report and draft response will be discussed at the Radiation Therapy Board of Studies and Examinations where the final response from the University will be approved.
- The Head of Department will submit the response to the report to the monitor.

APPENDIX C

APPENDIX C

APPENDIX D

APPENDIX D