Master of Applied Science (Medical Physics) (PH80)

Year offered: 2010
Admissions: Yes
CRICOS code: 043548G
Course duration (full-time): 3 semesters (1.5 years)
Course duration (part-time): 6 semesters (3 years)
Domestic fees (indicative): 2010: CSP $3,150 (indicative) per semester; Full tuition fees $7,250 (indicative) per semester
International Fees (indicative): 2010: $10,750 (indicative) per semester
Domestic Entry: February and July
International Entry: February and July
Total credit points: 144
Standard credit points per full-time semester: 48
Standard credit points per part-time semester: 24
Course coordinator: Dr Andrew Fielding
Campus: Gardens Point

Other Majors
See also the separate entry for the following major in this course: Master of Applied Science (Medical Ultrasound).

Entry Requirements
Applicants must possess an acceptable tertiary course with a major in physics. Applicants with other qualifications (e.g., engineering) may enrol with the approval of the Head of the School of Physical and Chemical Sciences. In some instances, a modified program may be necessary.

Course Design
This degree consists of two stages. Stage 1 (which is equivalent to the Graduate Diploma - PH71) comprises assessed coursework such as advanced lectures, seminars, reading courses or independent study. If undertaken full-time, students will need an average of 14 hours a week of formal contact.

In Stage 2 (Master of Applied Science - PH80) students undertake a program of supervised research and investigation that can be completed at QUT, or in a suitable external institution. Students can graduate with a Graduate Diploma in Medical Physics after satisfactory completion of Stage 1.

Professional Recognition
The course has been accredited by the Australasian College of Physical Sciences and Engineers in Medicine (ACPSEM) and graduates of the course will receive exemptions for the academic requirements of the ACPSEM Training, Education and Accreditation Program (TEAP) for Medical Physicists. Full exemption will be granted for the Master of Applied Science and coursework component exemption will be granted for the Graduate Diploma. The TEAP is a 5 year registrar training program leading to accreditation as a Medical Physicist and further details may be found at www.acpsem.org.au.

Overview
The Graduate Diploma/Master of Applied Science (Medical Physics) deals with well-established and emerging areas of medical and health physics and includes the following topics: clinical measurement, computing, health physics, instrumentation, medical electronics, medical imaging, physiological monitoring, physics of radiotherapy, radiobiology, radiological imaging sciences.

The coursework also contains an introduction to the clinical sciences. From this, prospective medical physicists learn to appreciate the clinical nature of medical situations and how to communicate better with other clinical staff.

Graduates can seek employment in hospitals, health departments, mining companies, tertiary institutions and medical instrumentation companies. Depending on the field of employment, graduates may be known as a medical physicist, health physicist or bio-engineer. Duties as a professional medical physicist include:

- applying electronics, ultrasonics, radiation and computers to clinical and environmental problems
- monitoring the environment to maintain acceptable standards in the workplace and the community
- applying fundamental physical research in development programs
- responsibility for calibration, care and maintenance of instruments and apparatus.

Further Information
For further information about this course, please contact:

Dr Andrew Fielding
Phone: +61 7 3138 2782
Email: enquiry.scitech@qut.edu.au

Course structure - First Semester Entry - Full-time Course

STAGE 1: Students must complete units from the list below, totalling 96 credit points:

Year 1, Semester 1 (February to June)
LSB142 Human Anatomy and Physiology
PCN113 Radiation Physics
PCN114  Microprocessors and Instrumentation
PCN211  Physics of Medical Imaging

Year 1, Semester 2 (July to October)
PCN112  Medical Imaging Science
PCN212  Radiotherapy
PCN214  Health and Occupational Physics
PCN218  Research Methodology and Professional Studies

STAGE 2: Project over One Semester or Summer Program
PCN520  Project (Full-time)

Course structure - First Semester Entry - Part-time Course

STAGE 1: Students must complete units from the list below, totalling 96 credit points:

Year 1, Semester 1 (February to June)
LSB142  Human Anatomy and Physiology
PCN113  Radiation Physics

Year 1, Semester 2 (July to October)
PCN112  Medical Imaging Science
PCN212  Radiotherapy

Year 2, Semester 1 (February to June)
PCN114  Microprocessors and Instrumentation
PCN211  Physics of Medical Imaging

Year 2, Semester 2 (July to October)
PCN212  Radiotherapy
PCN214  Health and Occupational Physics
PCN218  Research Methodology and Professional Studies

STAGE 2: Project over Two Semesters:
PCN540-1  Project (Part-time)
PCN540-2  Project (Part-time)

Course structure - Mid-Year Entry - Full-time Course

STAGE 1: Students must complete units from the list below, totalling 96 credit points:

Year 1, Semester 2 (July to October)
LSB182  Bioscience 1

Year 2, Semester 1 (February to June)
PCN113  Radiation Physics
PCN114  Microprocessors and Instrumentation

Year 2, Semester 2 (July to October)
PCN212  Radiotherapy
PCN214  Health and Occupational Physics
PCN218  Research Methodology and Professional Studies

STAGE 2: Project over Two Semesters:
PCN540-1  Project (Part-time)
PCN540-2  Project (Part-time)

Potential Careers:
Health Physicist, Medical Equipment Sales, Medical Physicist, Medical Scientist.

UNIT SYNOPSES
LSB142 HUMAN ANATOMY AND PHYSIOLOGY
The aim of this unit is to provide grounding in the principles of human anatomy and physiology. Following an introduction to the structure of the cell and the organisation of tissues, each of the major systems that constitute the human body are examined by the integrated study of their anatomy and physiology.
**Antirequisites:** LSB131, LSB182, LSB258  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

LSB182 BIOSCIENCE 1
This unit develops an understanding of normal human structures in relation to their functions at the cellular, tissue and organ levels. This is a foundation course in anatomy and physiology for nursing students. Topics covered are: the cell, tissues; systems of the body and their functions; surface anatomy and body topography; musculoskeletal adaptations; posture control and balance.
**Antirequisites:** LSB131, LSB142  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Kelvin Grove and Caboolture  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

PCN112 MEDICAL IMAGING SCIENCE
This unit offers an introduction to programming techniques and algorithms and digital image processing; the principles of display, perception and interpretation of medical images; image quality. The second part, nuclear medicine, describes radioactive decay, radionuclide production, imaging systems and internal dosimetry.
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

PCN113 RADIATION PHYSICS
This unit includes the following: radioactivity and the interaction of ionising radiation with matter; applied radiation counting techniques; radiation detectors; radiation dosimetry.
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

PCN 114 MICROPROCESSORS AND INSTRUMENTATION
This unit includes the capabilities and limitations of a given instrument; design of interfaces between microcomputers and transducers; signal conditioning and signal conversion circuits for data acquisition.
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

PCN211 PHYSICS OF MEDICAL IMAGING
This unit addresses the physical principles involved in the production of radiographic, ultrasonic and magnetic resonance images, and quality control protocols.

PCN212 RADIOTherapy
This unit provides an overview of the application of physics to radiotherapy including theoretical and practical aspects of the major topics in radiotherapy physics.
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

PCN214 HEALTH AND OCCUPATIONAL PHYSICS
This unit introduces the philosophy, protocols and practices of safety in the medical and industrial physics fields and the minimisation of hazards associated with radiation, and laser techniques.
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

PCN218 RESEARCH METHODOLOGY AND PROFESSIONAL STUDIES
In the rapidly changing technological environment of medical physics and medical ultrasound it is essential that students develop basic research skills, data interpretation skills and written communication skills. Topics include the research process, data collection and analysis techniques, and writing and evaluating research reports. Students also require knowledge of the professional, basic management, legal and ethical issues involved in their particular speciality area. Topics include the role and purpose of professional bodies, professional communication, legal and ethical issues, and basic professional management techniques and issues.
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2 and 2010 SUM

PCN520 PROJECT (FULL-TIME)
The project may take the form of research development, a design, a feasibility study, or the collection of scattered information on a given topic. The project can be undertaken externally under QUT supervision. Time spent on projects is one semester for full-time and two semesters for part-time students.
**Credit points:** 48  
**Contact hours:** 18 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

PCN540 PROJECT (PART-TIME)
The project may take the form of research development, a design, a feasibility study, or the collection of scattered information on a given topic. The project can be undertaken externally under QUT supervision. Time spent on projects is one semester for full-time and two semesters for part-time students. (48 credit points achieved at completion of PCN540-1 and PCN540-2.)
Credit points: 24  
Contact hours: 9 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

PCN540 PROJECT (PART-TIME)
The project may take the form of research development, a design, a feasibility study, or the collation of scattered information on a given topic. The project can be undertaken externally under QUT supervision. Time spent on projects is one semester for full-time and two semesters for part-time students. (48 credit points achieved at completion of PCN540-1 and PCN540-2.)

Credit points: 24  
Contact hours: 9 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM