Master of Applied Science (Research) (SC80)

Year offered: 2011
Admissions: Yes
CRICOS code: 007897G
Course duration (full-time): Standard duration is 2 years
Course duration (part-time): Standard duration is 4 years
Domestic Fees (indicative): Aust citizens or PRs will be awarded an RTS/RTA place or a QUT sponsorship for tuition fees. If you exceed the max time, you will be charged - 2011: $9,375 per semester (indicative)
International Fees (indicative): 2011: $12,125 (indicative) per semester
Domestic Entry: At any time
International Entry: At any time
Total credit points: 144
Standard credit points per full-time semester: 48
Standard credit points per part-time semester: 24
Course coordinator: Associate Professor Terry Walsh
Discipline coordinator: Aspro Louise Halner (Cell & Molecular Biosciences); Aspro Peter Fredericks (Chemistry); Professor Vo Anh (Mathematics); Dr Fiona Harden (Medical Radiation Sciences); Aspro Lisa Chopin (Medical Science); Aspro Tony Clarke (Biogeosciences); Dr Andrew Fielding (Physics); Dr Trudi Collet (Pharmacy)
Campus: Gardens Point

Entry Requirement
- A Bachelor of Applied Science, equivalent qualification or other evidence of qualifications that demonstrate that the applicant possesses the capacity to pursue the course of study.

In addition to assessing qualifications, the Faculty must also be satisfied that adequate supervision and resources are available to support the applicant's proposed research.

Course Design
This degree consists of coursework that can comprise up to one-third of the course and research, which must be at least two-thirds of the course. The assessed coursework may be in the form of advanced lectures, seminars, reading courses or independent study designed to focus on information retrieval skills. The research component is a program of supervised research and investigation at a level of scientific competence significantly higher than that expected from an undergraduate degree and, typically, a masters thesis does not need to be as substantial as a Doctor of Philosophy thesis.

Students undertake a program of research and investigation on a topic approved by the Academic Board. All projects should be sponsored either by outside agencies such as industry, government authorities, or professional organisations, or by the University itself.

Students entering the course with an honours degree or equivalent substantial relevant work experience normally gain exemptions to a maximum of 96 credit points at the discretion of the Academic Board on the recommendation of the Head of School.

Students entering the course with a graduate diploma may gain exemption to a maximum of 96 credit points at the discretion of the Academic Board on the recommendation of the Head of School.

A full-time candidate who does not hold an honours degree appropriate to the course of study will normally be required to complete both course and research work, including submission of the thesis for examination during a period of registration of 24 months. The corresponding period in the case of a part-time candidate shall be 48 months. In special cases the Academic Board may approve a shorter period.

A holder of an honours degree or its equivalent appropriate to the course of study may submit the thesis for examination after not less than 12 months of registration if a full-time student, or 24 months if a part-time student. In special cases the Academic Board may approve a shorter period.

Overview
The objectives of this course are to:
- provide postgraduate educational opportunities in specialised fields of applied science by means of a program that involves either an original contribution to knowledge or an original application of existing knowledge
- provide education in research methods
- enable graduates employed in industry to undertake further education by a combination of coursework, research and thesis
- expand the involvement of students employed in industrial organisations and external agencies in undertaking relatively short-duration applied research or investigation.

Students can undertake an approved project in any area of interest supported by a research area or school within the Faculty of Science. Please note that these areas of research specialisation are only a guide.
are happy to discuss study choices directly with students.

1. General Conditions

1.1 The Council of the Queensland University of Technology was established in 1989 under the Queensland University of Technology Act 1988.

1.2 The Council's power to approve recommendations from faculty academic boards regarding the registration, supervision and examination of research degree candidates and to develop policy and procedure relating to research degrees is exercised through a Research Management Committee which shall be a subcommittee of University Academic Board.

1.3 Research Management Committee has delegated responsibility for day-to-day administration of research masters degree courses to Faculty academic boards. Academic boards shall report semiannually to the Research Management Committee on progress made by research masters degree candidates.

1.4 Unless the context otherwise indicates or requires, the words academic board and faculty shall refer to the faculty in which the candidate registers.

1.5 In order to qualify for the award of the degree of Master of Applied Science, a candidate must:

- have completed the approved course of study under the supervision prescribed by the Academic Board
- have submitted, and the Academic Board have accepted, a thesis prepared under the supervision of the supervisor
- have completed any other work prescribed by the Academic Board and submit to the Academic Board a declaration signed by the candidate that he/she has not been a candidate for another tertiary award without permission of the Academic Board during the term of enrolment.

2. Registration

2.1 Applications shall be accepted subject to the availability of facilities and supervision.

2.2 Applications may be lodged with the Registrar at any time.

2.3 The minimum academic qualifications for admission to a program leading to a Master of Applied Science shall be:

- possession of a bachelor degree in applied science from the Queensland University of Technology, or
- possession of an equivalent qualification, or
- submission of such other evidence of qualifications as will satisfy the Academic Board that the applicant possesses the capacity to pursue the course of study.

2.4 Additional requirements for admission to a particular program may be laid down by the Academic Board.

2.5 In considering an applicant for registration the Academic Board shall, in addition to assessing the applicants suitability, assess the proposed program and its relevance to the aims and objectives of the University.

2.6 A candidate may register either as a full-time or as a part-time student.

2.6.1 To be registered as a full-time student, a candidate must be able to commit to the course not less than three-quarters of a normal working week, averaged over each year of candidacy. Such a student may not devote more than 300 hours annually to teaching activities (or other paid work), including preparation and marking.

2.6.2 A candidate who is unable to devote to the course the proportion of time specified in section 2.6.1 may register as a part-time student.

2.7 A candidate may be internal or external. An external candidate is one whose program of research and investigation is based at a place of employment or sponsoring institution. Normally, support of the sponsoring institution for the candidate’s application is required for a registration.

2.8 The Academic Board may cancel a candidate’s registration if, after consulting the supervisors and having taken account of all relevant circumstances, the Academic Board is of the opinion that the candidate either has effectively discontinued his/her studies or has no reasonable expectation of completing the course of study within the maximum time allowed (see section 4).

2.9 A candidate whose registration has lapsed or has been cancelled and who wishes subsequently to re-enter the course to undertake a program which is the same or essentially the same as the previous program may be readmitted under such conditions as the Academic Board may prescribe.

3. Course of Study

3.1 A candidate for the degree of Master of Applied Science shall undertake a program of research and investigation on a topic approved by the Academic Board. All projects should be sponsored either by outside agencies such as industry, government authorities, or professional organisations, or by the University itself.
3.2 The program must be such as to enable the candidate to develop and demonstrate a level of scientific competence significantly higher than that expected of a first degree graduate. The required competence normally would include mastery of relevant techniques, investigatory skills, critical thinking, and a high level of knowledge in the specialist area.

3.3 The program includes both coursework and research.

For all Schools except Mathematical Sciences the coursework is a program of up to 52 credit points as defined in sections 3.9 and 3.12 as appropriate for each candidate. The unit IFN001 Advanced Information Retrieval Skills (4 credit points) should normally be included.

The research component is a program of supervised research and investigation of at least 140 credit points as described in 3.1 and 3.2.

For Mathematical Sciences the proportion of coursework to research work is tailored to the individual student and will be approved by the School Director of Research.

3.4 The student’s progress will be monitored throughout the first 96 credit points of the course. Between 9 and 12 months into the program the student is required to undertake a Confirmation process. Where the School Research & Postgraduate Training Committee, or the School Director of Research, on the advice of the examination panel, is of the opinion that progress is not satisfactory, the student will be advised to transfer his/her enrolment to the SC71 Graduate Diploma in Applied Science course.

3.5 The Confirmation will comprise several elements:

(i) a literature survey of the topic under study
(ii) a seminar on the background to the topic, progress to date, and future work to be presented to the School
(iii) a plan of work (including timeline) which will lead to submission of the thesis by the defined submission date.

3.6 At Confirmation an Examination Panel will be appointed consisting of three members, two of whom should be the Principal Supervisor and the Associate Supervisor (if one has been appointed) and other Academic Staff member(s) appointed by the School Director of Research. This Panel will decide if progress is satisfactory and if the plan of research is realistic. If necessary, they will assist the student to formulate an improved plan.

3.7 The student is normally required to submit their thesis by a particular date 1 year and nine months after commencing the Program. This date will be calculated when the student commences the Program and the student will be advised of its significance.

3.8 If a student is unable to undertake confirmation or submit his/her thesis then he/she may request an extension from the School Research & Postgraduate Training Committee. Such a request should be made at least one month before the due date. The student is expected to have a good reason, backed by hard evidence, for such a request.

3.9 Coursework at masters level may be conducted in a number of ways such as:

- advanced lecture courses
- seminars in which faculty and students present critical studies of selected problems within the subject field
- independent study or reading courses.

In all cases, coursework is based upon a formal syllabus setting out the educational outcomes expected from the course, a list of topics to be covered, the prescribed reading material and the method of assessment of progress through and at the end of the course.

3.10 A candidate shall be required to participate in and present seminars as considered appropriate by the Principal Supervisor. The candidate shall be notified of minimum attendance requirements at the time of acceptance of enrolments.

3.11 Students entering the course with an Honours degree or its equivalent, or candidates with substantial relevant work experience, may gain exemptions to a maximum of 96 credit points at the discretion of the Academic Board on the recommendation of the Head of School.

3.12 Students entering the course with a Graduate Diploma may gain exemption to a maximum of 96 credit points at the discretion of the Academic Board on the recommendation of the Head of School.

3.13 An application for registration should set out the candidate’s intended course of study in broad outline but with specific objectives for the first year. The description should include the area of study within which the candidate’s course lies, the coursework to be undertaken and the proposed title of the thesis to be written.

4. Period of Time for Completion of Course of Study

4.1 A full-time candidate who does not hold an Honours degree appropriate to the course of study will normally be required to complete both course and research work, including submission of the thesis for examination during a
period of registration of 24 months. To assist in meeting this goal there is a fixed submission date for the thesis 1 year and 9 months after commencing the Program. For students enrolled part-time the thesis submission date will be 3 years and 6 months after commencement.

4.2 A holder of an Honours degree or its equivalent appropriate to the course of study may submit the thesis for examination after not less than 12 months of registration if a full-time student, or 24 months if a part-time student. In special cases the Academic Board may approve a shorter period.

4.3 Where application is made for permission to extend the fixed submission date, details of the candidate’s progress shall be presented to the School Research & Postgraduate Studies Committee together with the reasons for the delay in completing the work and the expected date of completion. Where the Committee agrees to an extension, it will set a new submission date and may set a limit to the maximum period of registration in the program.

5. Transfer of Registration

5.1 Where a candidate has undertaken part of a proposed course of study as a registered student in another institution, this period of registration may, on application in writing to the Academic Board at the time of application for registration, be counted towards the candidate’s period of registration in the QUT course. The application must include details of the work already undertaken, the reasons for the transfer and the expected date of completion.

5.2 Applications for transfer normally should be submitted at least 12 months in advance of the probable date of submission of the thesis.

6. Supervision

6.1 For each candidate the Academic Board shall appoint one or more supervisors with appropriate experience provided that, where more than one supervisor is appointed, one shall be nominated as the Principal Supervisor and the others as Associate Supervisors.

6.2 In the case of an internal student, the Principal Supervisor normally shall be from the academic staff of the school where the student carries out the work.

6.3 In the case of an external student, the Principal Supervisor normally shall be from the academic staff of the school supporting the work and at least one Associate Supervisor shall be from the sponsoring organisation.

7. Place and Conditions of Work

7.1 The research program is carried out under supervision in a suitable environment normally in Australia.

7.2 The Academic Board shall not admit a candidate to undertake a program of research based at the University unless it has received a statement from the Head of School in which the study is proposed that, in their opinion, the applicant is a fit person to undertake a research program leading to the masters degree, that the program is supported, and that the school/centre is willing to undertake the responsibility of supervising the applicants work.

7.3 The Academic Board shall not admit a candidate to undertake a research program based at a sponsoring establishment unless it has received:

- a statement from the employer or director of the sponsoring institution that the applicant will be provided with facilities to undertake the research project and that they are willing to accept responsibility for supervising the applicants work, and
- a statement from the Head of School or the Director of the Centre in which the study is proposed that, in their opinion, the applicant is a fit person to undertake a research program leading to the Masters degree, that the program is supported, and that after consideration of the proposed external facilities and supervision, the school is willing to accept the responsibility of supervising the work.

8. Thesis

8.1 In the form of presentation, availability and copyright, the thesis shall comply with the provisions of the document Requirements for Presenting Theses.

8.2 The candidate’s application for registration should set out the intended course of study in broad outline but with specific objectives for the first year. The description should include the area of study within which the candidate’s course lies, the coursework to be undertaken and the proposed title of the thesis to be written.

Between 9 and 12 months into the program the student is required to undertake a Confirmation process which will include a plan of work (including timeline) which will lead to submission of the thesis by the defined submission date.

The candidate shall give two months notice of intention to submit the thesis. Such notice shall be accompanied by the appropriate fee, if any.

8.3 The thesis shall comply with the following requirements:

- a significant portion of the work described must have been carried out subsequent to initial registration for the degree.
- it must describe a program of work carried out by the
candidate, and must involve either an original contribution to knowledge or an original application of existing knowledge. - it must reach a satisfactory standard of literary presentation. - it shall be the candidate's own account of the work. Where work is carried out jointly with other persons, the Academic Board shall be advised of the extent of the candidate's contribution to the joint work. - the thesis shall not contain as its main content any work or material which the student has previously submitted for another degree or similar award. - supporting documents, such as published papers, may be submitted with the thesis if they have a bearing on the subject of the thesis. - the thesis shall contain a concise abstract.

8.4 Except with the specific permission of the Academic Board, the thesis must be presented in the English language. Such permission must be sought at the time of application for registration, and will not be granted solely on the grounds that the candidate's ability to satisfy the examiners will be affected adversely by the requirement to present the thesis in English.

8.5 Subject to QUT's Intellectual Property policy, the copyright of the thesis is vested in the candidate.

8.6 Where a candidate or the sponsoring establishment wishes the thesis to remain confidential for a period of time after completion of the work, application for approval must be made to the Academic Board when the thesis is submitted. The period of confidentiality normally shall not exceed two years from the date on which the examiners recommend acceptance of the thesis, during which time the thesis will be held on restricted access in the QUT Library.

9. Examination of Thesis

9.1 The Academic Board shall appoint at least two examiners, of whom at least one shall be from outside the University. Normally examiners will be required to agree to read and report upon the thesis within two months of its receipt.

9.2 A candidate may be required to make an oral defence of the thesis.

9.3 On receipt of satisfactory reports from the examiners, and when the provisions of 7.1 have been fulfilled, the Academic Board shall recommend to University Academic Board that the candidate be awarded the degree.

9.4 If the examiners reports are conflicting, the Academic Board may, after appropriate consultation with the Principal Supervisor, seek advice from a further external examiner.

9.5 If, on the basis of the examiner's reports, the Academic Board does not recommend that the degree be awarded, then it shall:

- permit the student to resubmit the thesis within one year for re-examination, or cancel the student's registration.

If a candidate is required to revise and resubmit a thesis, the examiner's reports will be made available to the candidate, the anonymity of the examiners being maintained.

9.6 After the examination process is complete, examiner's reports are to be made available to the candidate on request. The names of examiners will be released on request providing the examiner has indicated willingness to have his/her identity revealed to the candidate.

Further Information

For further information about this course, please contact:

Terry Walsh
Phone: +61 7 3138 2782
Email: enquiry.scitech@qut.edu.au

Limits on grades of 3

A new policy concerning grades of 3 came into effect from 1 January 2009 (QUT MOPP C/5.2). With effect from this date grades of 3 are no longer considered a conceded or low pass but are classified as a fail grade. Any grades of 3 awarded prior to 1 January 2009 retain the conceded pass status and will be counted for graduation purposes up to the maximum number of grades of 3 permitted for your course. Grades of 3 incurred in units that commence after 1 January 2009 will not count towards your degree. Further information is available on the Student Services website.

Course structure - Chemistry

PCN701 Topics in Advanced Chemistry 1
PCN705-1 Research Methodology
PCN705-2 Research Methodology
PCN710 Chemical Instrumentation
PCN720 Chemometrics
PCN730 Advanced Physical Methods in Chemistry
PCN740 Laboratory Techniques for Preparative Chemistry
PCN801 Topics in Advanced Chemistry 2
Course structure - Biogeosciences

Essential units:
NRN100 Readings in Natural Resource Sciences 1
NRN102 Confirmation of Candidature Seminar
NRN103 Final Seminar
Select up to one of the following units if required:
NRN101 Readings in Natural Resource Sciences 2
NRN104 Advanced Topics in Natural Resource Sciences 1
NRN105 Advanced Topics in Natural Resource Sciences 2

Course structure - Cell & Molecular Science, Medical Sciences and Pharmacy

LSN011 Research Seminars in Life Science 1
LSN013 Readings in Life Science 3
LSN023 Research Seminars in Life Science 3

Course structure - Mathematics

Selections from other School programs, such as MA75 Graduate Diploma in Mathematical Science and MA85 Master of Mathematical Science, to a maximum of 60 credit points

Course structure - Medical Radiation Sciences

PCN718 Advanced Topics in Medical Radiation Sciences 1
PCN719 Advanced Topics in Medical Radiation Sciences 2
and alternative unit(s) approved by the Medical Radiation Sciences coordinator

Course structure - Physics

PCN715 Advanced Topics in Physics 1
PCN716 Advanced Topics in Physics 2
and/or alternative unit(s) approved by the Physics coordinator

Research Work

The Research Work component of the degree must constitute at least 96 credit points. The units below have been devised to represent the

EFTSU (Effective Full-time Student Unit) and attendance type of graduate research students.

At the end of each semester a grade of T - Assessment Continues will be awarded in any IFNXXX units provided satisfactory progress is being maintained. A final grade (S - Satisfactory or U - Unsatisfactory) will be awarded once the thesis has been examined according to the degree rules.

Disciplines

1. Mathematical Sciences
IFT611 Thesis

2. Chemical Sciences
IFT612 Thesis

3. Earth Sciences
IFT613 Thesis

4. Biological Sciences, Agriculture, Horticulture & Viticulture, Forestry Studies, Fisheries Studies, Environmental Studies, Other Agriculture, Environmental & Related Studies
IFT614 Thesis

5. Physics & Astronomy, Other Natural & Physical Sciences
IFT615 Thesis

6. Computer Science
IFT621 Thesis

7. Information Systems & Other Information Technology
IFT622 Thesis

8. Electrical & Electronic Engineering
IFT635 Thesis

9. Environmental Engineering, Biomedical Engineering
IFT637 Thesis

10. Medical Studies, Pharmacy, Dentistry
IFT661 Thesis

11. Political Science & Policy Studies; Human Welfare Studies & Services; Behavioural Science; Librarianship, Information Management & Curatorial Studies; Language & Literature; Philosophy & Religious Studies; Sport & Recreation; Other Society & Culture
IFT696 Thesis

Potential Careers:
Actuary, Analytical Chemist, Astrophysicist, Biochemist, Biologist, Biotechnologist, Chemist, Chemist Industrial, Coastal Scientist, Conservation Biologist, Database Manager, Ecologist, Environmental Scientist, Forensic

**UNIT SYNOPSES**

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<td>READINGS IN LIFE SCIENCE 3</td>
<td>12</td>
<td>LSN011, LSN013</td>
<td>2011 SEM-1 and 2011 SEM-2</td>
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**LSN023 RESEARCH SEMINARS IN LIFE SCIENCE 3**

Your transition from undergraduate scholar to reliable and productive researcher requires an ability to present research findings and their critical analysis in an oral form. Oral presentation is a significant skill in academic, industrial and clinical research settings. The primary aim of this unit is to help you communicate your research ideas and outcomes effectively and articulately.

**Corequisites:** LSN011  Credit points: 24  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

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This unit includes a review of literature in an area of direct relevance to the research project. The review should be designed in conjunction with the supervisor and demonstrate a broad appreciation of the literature, a critical appraisal of research to date, and the relevance of the research project within the framework of current understanding. Reviews should normally be approximately 5000 words.

**Prerequisites:** LSN011 and LSN013  Credit points: 12  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

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<td>READINGS IN NATURAL RESOURCE SCIENCES 2</td>
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This is a companion unit to NRN100 that allows students to (a) prepare a review of a second area relevant to the research project or (b) consider a wider subject area in greater depth. If option (b) is chosen, a single review can qualify as total assessment for both NRN100 and NRN101. In this case, the review should be approximately 10,000 words and be a critical analysis of a substantial research area.

**Credit points:** 12  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2
NRN102 CONFIRMATION OF CANDIDATURE SEMINAR
This unit includes a public seminar plus an extensive discussion period designed to provide positive feedback from staff and students on the proposed research project. The presentation should be designed in conjunction with the supervisor and include background to the project area, specific objectives of the proposed project, methodology to be followed and possible outcomes. The seminar should normally be presented after the project outline has been developed and before any significant amount of research has been undertaken.
Credit points: 12  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

NRN103 FINAL SEMINAR
This unit includes a public seminar plus an extensive discussion period designed to provide positive feedback from staff and students on the progress of the research project. The presentation should be designed in conjunction with the supervisor and include project objectives, progress to date, preliminary data and problems for discussion. The seminar should normally be presented within 12 months (full-time) or 24 months (part-time) of commencement of the postgraduate program.
Prerequisites: NRN102  Credit points: 12  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

NRN104 ADVANCED TOPICS IN NATURAL RESOURCE SCIENCES 1
Students develop an advanced understanding of a topic in the natural resource sciences that is highly relevant to the general area of their proposed research project. The structure and content is variable and can be tailored to the specific requirement of each project and the background of the student. A formal outline of the unit including objectives, content and assessment relevant to the individual course of study will be developed by the supervisor and approved by the Head of School. Content may include active participation in tutorials, workshops, laboratory/field techniques and components of advanced level undergraduate units. If components of advanced level undergraduate units are included, they should not exceed 70% of the total assessment.
Credit points: 12  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

NRN105 ADVANCED TOPICS IN NATURAL RESOURCE SCIENCES 2
Material presented in this unit must be distinct from that covered in NRN104. Students develop an advanced understanding of a topic in the natural resource sciences relevant to the area of their proposed research project. A formal outline of the unit outlining objectives, content and assessment relevant to the individual course of study will be developed by the supervisor and approved by the Head of School. Content may include active participation in tutorials, workshops and laboratory/field techniques and components of advanced level undergraduate units. If components of advanced level undergraduate units are included, they should not exceed 70% of the total assessment.
Credit points: 12  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

PCN701 TOPICS IN ADVANCED CHEMISTRY 1
The complexity of the chemical systems studied in a research program and the sophistication of the instrumentation used demand that deeper theoretical understanding than that acquired in an undergraduate program. The aims of this unit are to teach and extend knowledge and comprehension of Advanced Chemical Techniques and assess application of knowledge; and to provide the candidate with the appropriate theoretical and practical background, at an advanced level, necessary for the completion of a research program.
Credit points: 12  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

PCN705 RESEARCH METHODOLOGY
This unit is a guided program of literature surveys to provide the background information for the research project. This unit enables students to develop verbal and oral communication skills required for the successful conduct of a chemical research project. During the course students will be required to attend and participate in seminars. Students must present two seminars on their own research. (12 credit points achieved at completion of PCN705-1 and PCN705-2.)
Credit points: 6  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

PCN705 RESEARCH METHODOLOGY
This unit includes a guided program of literature surveys to provide the background information for the research project. This unit enables students to develop verbal and oral communication skills required for the successful conduct of a chemical research project. During the course students will be required to attend and participate in seminars. Students must present two seminars on their own research. (12 credit points achieved at completion of PCN705-1 and PCN705-2.)
Credit points: 6  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

PCN710 CHEMICAL INSTRUMENTATION
For those projects in which instrumental design forms a major part of the research activity a knowledge of the mode of operation of existing chemical instrumentation provides an important basis for further progress. Students will
undertake study in chemical instrumentatoin via both practical and theoretical means.

**Credit points:** 12  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1 and 2011 SEM-2

**PCN715 ADVANCED TOPICS IN PHYSICS 1**
This unit provides a focused theoretical foundation for each students research program or other advanced topics in physics and develops a high level of theoretical understanding of the physical principles involved.

**Credit points:** 12  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1 and 2011 SEM-2

**PCN716 ADVANCED TOPICS IN PHYSICS 2**
This unit provides a focused theoretical foundation for each students research program or other advanced topics in physics and develops a high level of theoretical understanding of the physical principles involved.

**Credit points:** 12  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1 and 2011 SEM-2

**PCN718 ADVANCED TOPICS IN MEDICAL RADIATION SCIENCES 1**

**PCN719 ADVANCED TOPICS IN MEDICAL RADIATION SCIENCES 2**

**PCN720 CHEMOMETRICS**
This unit includes the following: the concepts of chemical data acquisition and interpretation; computational methods and existing software packages for statistical analysis in chemistry; statistical methods in quality and process control; sampling procedures; multivariate analysis and optimisation techniques.

**Credit points:** 12  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1

**PCN730 ADVANCED PHYSICAL METHODS IN CHEMISTRY**
Research projects in chemistry are frequently dependent on instrumental and physical procedures both for monitoring preparative procedures and for studying fundamental chemical phenomena. The aim of this unit is to prepare students to undertake practical work in instrumental and physical procedures.

**Credit points:** 12  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1 and 2011 SEM-2

**PCN740 LABORATORY TECHNIQUES FOR PREPARATIVE CHEMISTRY**

Before an advanced practical project, particularly one involving organic synthesis, is undertaken it is necessary to develop specialised laboratory skills in preparative chemistry so that the candidate can have the confidence to handle and purify the small quantities of often precious material which he will encounter during the project. The aim of work in this unit is to cultivate and deepen understanding of systems and processes related to organic synthesis, to develop and enhance laboratory skills and techniques related to handling and purifying precious materials. Development of these skillsets is designed to lead to competence in designing and undertaking advanced practical work.

**Credit points:** 12  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1 and 2011 SEM-2

**PCN801 TOPICS IN ADVANCED CHEMISTRY 2**
The complexity of the chemical systems studied in a research program and the sophistication of the instrumentation used demand that deeper theoretical understanding than that acquired in an undergraduate program. The aims of this unit are to extend and deepen the theoretical and practical background required for undertaking a research program and to provide the candidate with the appropriate theoretical and practical background, at an advanced level, necessary for the completion of a research program.

**Credit points:** 12  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1 and 2011 SEM-2