

## 290-AA Postgraduate Diploma in Science

<b>Year and Campus:</b>	2008
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Level:</b>	Graduate/Postgraduate
<b>Duration &amp; Credit Points:</b>	
<b>Contact:</b>	<p>Faculty of Science The University of Melbourne</p> <p>Tel: + 61 3 8344 6404 Fax: +61 3 8344 5803 Web: <a href="http://www.science.unimelb.edu.au">www.science.unimelb.edu.au</a> (<a href="http://www.science.unimelb.edu.au/">http://www.science.unimelb.edu.au/</a>)</p>
<b>Course Overview:</b>	<p>The Faculty of Science offers the Postgraduate Diploma in Science program through a number of departments.</p> <p>The Postgraduate Diploma in Science is a fourth-year equivalent program, and students who successfully complete this course with an H2A (75%) average are eligible to apply for Master of Science and PhD-Science candidature.</p> <p><b>Areas of Study</b></p> <ul style="list-style-type: none"> <li># <b><u>Anatomy &amp; Cell Biology</u></b></li> <li># <b><u>Botany</u></b></li> <li># <b><u>Chemistry</u></b></li> <li># <b><u>Computer Science</u></b></li> <li># <b><u>Oral Biology (Dental Science)</u></b></li> <li># <b><u>Earth Sciences</u></b></li> <li># <b><u>Genetics</u></b></li> <li># <b><u>History &amp; Philosophy of Science</u></b></li> <li># <b><u>Mathematics and Statistics</u></b></li> <li># <b><u>Medicine (St Vincent's Hospital)</u></b></li> <li># <b><u>Microbiology &amp; Immunology</u></b></li> <li># <b><u>Obstetrics &amp; Gynaecology</u></b></li> <li># <b><u>Otolaryngology</u></b></li> <li># <b><u>Pathology</u></b></li> <li># <b><u>Pharmacology</u></b></li> <li># <b><u>Physics</u></b></li> <li># <b><u>Physiology</u></b></li> <li># <b><u>Vision Science</u></b></li> <li># <b><u>Zoology</u></b></li> </ul>
<b>Objectives:</b>	<p>Postgraduate Diploma programs are designed to:</p> <ul style="list-style-type: none"> <li># enable the acquisition of research skills (for example, laboratory techniques and data collection and analysis);</li> <li># engage students in research, under supervision;</li> <li># increase students' knowledge and understanding of the relevant discipline and awareness of current developments and issues relating to the discipline;</li> <li># develop independent and critical thinking; and</li> <li># improve oral and written communication skills.</li> </ul>
<b>Course Structure &amp; Available Subjects:</b>	<p>The Postgraduate Diploma in Science course requires the completion of 100 points (100 points = one year of full-time study). The 100 points comprises two components:</p> <ul style="list-style-type: none"> <li># a coursework component (sometimes requiring the completion of up to 25 points of later-year, normally third-year, undergraduate subjects); and</li> </ul>

# a minor thesis research project component (normally 10 000 - 12 000 words).

The weight of each component varies between departments.

To be eligible for the award of the Postgraduate Diploma in Science, students must successfully complete both the research and the coursework components of the course.

#### Subject Options:

### **Anatomy and Cell Biology**

#### **Coordinator**

Assoc. Prof. Colin Anderson

#### **Objectives**

The program in Anatomy and Cell Biology is designed to:

Provide an introduction to advanced biomedical research in molecular, cell and systems biology;

Enable the acquisition of current research skills in specific areas;

Encourage the development of the abilities to think both independently and critically, through the continual analysis and evaluation of experimental data;

Improve oral and written communication skills.

#### **Course Structure**

Anatomy Research Project (75 points)

Content: An original, supervised research project.

Assessment: A written report (thesis) at the end of the year.

Anatomy Advanced Coursework (25 points)

Content: Lectures and seminars covering a wide range of biomedical research. Lectures and workshops in topics such as animal welfare, library resources, experimental design and statistical analysis, writing skills and seminar preparation.

#### **Assessment:**

Attendance at lectures, workshops and seminars.

A literature review (no more than 3000 words) which forms the basis of the introduction to the thesis. A journal review. An exam in statistics. An oral defence of the thesis.

### **Botany**

#### **Coordinator**

Assoc. Prof. Rick Wetherbee

#### **Objectives**

The program in Botany aims to provide students with skills in original research in plant science and help students develop a capacity for critical thinking and evaluation of information. The course also strives to instil in students a knowledge of a wide area of plant sciences, and to enhance their communication skills.

#### **Areas of Specialisation**

The coursework and research components of this Postgraduate Diploma enable students to further their knowledge in areas of cellular and molecular biology, systematics and evolution, plant ecology and physiology, and plant pathology.

#### **Course Structure**

The research component is worth 75 points and is assessed from a written report (10 000 words maximum) which forms the basis of 60 per cent allocated of the year's assessment, with a further 10 per cent allocated on the basis of a 30 minute seminar presentation and another five per cent allocated on performance in an oral examination concerning the research project. The remaining 25 per cent of assessment is on the basis of coursework as follows: a literature review (3500 words), and two written or oral assignments focussing on topics presented in the series of advanced lectures (2500 words each), awarded a total of 25 points.

## **Chemistry**

### **Coordinator**

Prof. Richard O'Hair

### **Administrator**

Ms Vicki Burley

### **Objectives**

The program in Chemistry is designed to;

- # increase the student's knowledge and understanding of chemical science;
- # develop the process and practice of chemical research;
- # encourage the development of individual investigative skills, critical thought and the ability to evaluate information and analyse experimental data;
- # promote the acquisition of experimental or theoretical skills in areas currently relevant to one of the research groups in the School of Chemistry;
- # improve oral and written communication skills;
- # ensure that students receive essential training skills in laboratory safety procedures.

### **Course Structure**

This course may be commenced in either first or second semester. It is not offered as a part-time course.

#### **Chemistry Research Project (50 points)**

The Research Project involves the completion of:

- A 1500 word research project outline to be submitted during the first semester of enrolment;
- A seminar of 20 minutes towards the end of the second semester of study;
- A written report (thesis) submitted at the end of the course;
- And an oral defence of the thesis over a period of 30 minutes.

Application towards, and progress in, the achievement of the research objectives will be assessed by the research supervisor.

#### **Chemistry Advanced Coursework (50 points)**

Students select five lecture subjects from a list of ten offered. Each of these subjects will be examined by a formal written examination, examination and assignment, or assignment alone and will be examined during the first semester of each year. The satisfactory completion of 'Safety and Induction program' is a requirement before students will be permitted to commence laboratory work.

Combined Chemistry/Pharmacology and Chemistry/Biochemistry Postgraduate Diploma may be possible depending on research collaboration at the time and would be considered on a case by case basis. Please refer to the BSc Honours entry requirements for these combined research areas. All enquiries should be directed to the Course Administrator for further information.

## **Computer Science**

### **Coordinator**

Dr. Adrian Pearce

The program in Computer Science allows students to study a selection of topics in some depth and to work independently on a medium-sized project. It provides an introduction to research methodology and greater experience in system development. It may be used as a preparation for postgraduate studies in computer science, and opens additional career opportunities in systems design and implementation and in research support.

The Postgraduate Diploma in Science is designed to:

- # allow students to study a selection of Computer Science topics in depth and to work on an investigative project;

- # provide an introduction to research methodology;
- # provide experience in system development;
- # improve career opportunities in research-oriented jobs, or in systems design and implementation;
- # encourage critical thought and novel ideas in computer science;
- # improve abilities to evaluate information and analyse experimental data;
- # improve oral and written communication skills.

It can be taken full time over 2 semesters or part-time over 4 semesters.

The course consists of 75% coursework and 25% research.

The coursework is shared with BCS (Hons) and BSc (Hons) in Computer Science.

#### **Coursework Component**

Students (full-time or part-time) must pass 6 subjects. Students can take one 600-level subject as part of their coursework. They can also take up to three 300-level subjects. A student can also ask the Honours Coordinator's permission to take a relevant 400-level subject outside the Department. Assessment consists of written assignments, oral presentations and written examinations.

#### **Thesis Component**

As well as advancing the student's knowledge of computer science, the Postgraduate Diploma is intended to introduce students to the world of research. Part way through their first semester, students will select a supervisor and project from a list of topics that academic staff have indicated they are willing to supervise. These projects involve a search of the relevant literature, some investigation or application by the student, and preparation of a final written report summarising the results of the investigation and its relation to other work in the area. Students are required to present a written summary of their project proposals towards the end of their first semester, and to give a final oral presentation of their research shortly after the deadline for theses. The thesis should not exceed 12,000 words. The thesis contributes 25% towards the final mark. The thesis will be examined by the supervisor and two other members of academic staff. Guidelines for marking will be made available to students.

#### **Seminars**

The Department of Computer Science and Software Engineering holds regular seminars; attendance at these is required for Postgraduate Diploma students. Other talks may also be recommended by the teaching staff; these, too, are considered to be part of the course.

#### **Entry Requirements**

To be eligible for the course, a student must have a three-year degree with substantial computing content as well as an average final-year mark at the level of at least the equivalent of 65. Industrial experience may also be taken into account. As a minimum, computing background should include solid experience with Unix and C programming, as well as good knowledge in the areas of data structures and algorithms for sorting, searching and graph manipulation, software development principles and tools, and software design, including object-oriented design. A student's computing background should also include good knowledge of several more specialised areas, such as artificial intelligence, computability and logic, operating systems, databases, human-computer interaction, computer networks, compilers, computer graphics, and software engineering. Finally, a student must have passed the equivalent of at least 25 points of 100-level Mathematics or Statistics.

#### **School of Dental Science**

##### **Oral biology postgraduate diploma program**

#### **Overview**

We offer research within a multidisciplinary environment. Hence we welcome students from a variety of backgrounds including chemistry, biochemistry, biophysics, molecular biology, microbiology, immunology, genetics and anatomy. The research component offers students the opportunity to use state-of-the-art techniques in protein chemistry, molecular biology, microbiology, immunobiology, mass spectrometry, NMR spectroscopy, molecular modelling, skeletal biology, histomorphometry, aging of the skeleton and image analysis.

Web site: [http://www.dent.unimelb.edu.au/dsweb/postgrad\\_programs/honours.html](http://www.dent.unimelb.edu.au/dsweb/postgrad_programs/honours.html).

#### **Admission requirements**

Students must satisfy the Faculty of Science entry requirements. Information about the departmental entry requirements can be obtained from the department.

#### **Coordinators**

Dr Laila Huq (academic)

Ms Kim Hanson (administrative)

### **Duration and commencement of course**

This program can be undertaken on a full-time basis only. The program commences in February and finishes in November.

### **Assessment**

#### **Components of assessment**

The program comprises a research project subject and an advanced coursework subject. These subjects with their relative weightings are as follows:

- # Dental Science: Oral Biology Research Project subject = 75 percent
- # Dental Science: Oral Biology Advanced Coursework subject = 25 percent

#### **Research project**

Students conduct an original research project supervised by a member of staff in one of the four research units within the School of Dental Science.

Current areas of major research activity with the school include the molecular biology of oral diseases and microbial pathogens, the cell biology and development of oral tissues, dental epidemiology, and the evaluation and development of novel dental restorative materials.

Students prepare a report (thesis) at the end of the period not exceeding 10,000 words

#### **Advanced coursework**

Students undertake:

- # lectures and seminars on selected topics of oral biology including oral molecular biology, oral microbiology, growth and development, oral biochemistry, biomaterials and biostatistics;
- # lectures or workshops on the critical analysis of a scientific paper, library resources, research design, and writing and communication skills;
- # participation in the school and research unit's research seminars;
- # an oral presentation of the aims and methods of the research project during the period, and a seminar to the school on the research project at the end of the period;
- # an essay of not more than 2000 words on a selected topic of dental science;
- # a written assignment (scientific critique of a journal article) of not more than 2000 words; and
- # written assignments based on the lecture series.

#### **Assessment:**

- # attendance at no less than 75 percent of lectures, workshops and seminars;
- # give an oral presentation of aims and methods of research project;
- # give an oral presentation to the School on the research project towards the end of second semester;
- # an essay of not more than 2000 words on a selected topic in dental science;
- # a written assignment (specific critique of a journal article) of not more than 2000 words; and
- # a written assignment or a two hour examination based on the lecture series.

#### **Further information**

If you require further information about this program please contact:

Dr Laila Huq

Tel: +61 3 9341 0821

Email: [l.huq@dent.unimelb.edu.au](mailto:l.huq@dent.unimelb.edu.au)

Ms Kim Hanson

Tel: +61 3 9341 1507

Email: [khanson@unimelb.edu.au](mailto:khanson@unimelb.edu.au)

#### **Earth Sciences**

#### **Coordinator**

Dr. Kevin Walsh

The Postgraduate Diploma is designed to allow Earth Scientists to upgrade their skills and/or retrain by undertaking a year (or longer part time) of coursework and thesis studies. In addition, the Diploma is open to Science graduates with a background or work experience in Earth Sciences who wish to undertake further studies in Earth Science for business or pleasure. The Diploma studies are modular and available part-time to encourage participation from industry Earth Scientists.

#### **Objectives**

- increase their knowledge and understanding of Earth Sciences and awareness of current developments and issues relating to studies of our planet
- develop independent and critical thinking skills
- improve oral and written communication skills

#### **Course Structure**

The School of Earth Sciences offers a wide variety of one week theory/practical or field studies from which to choose; typically there are 30 such short courses available each year, of which candidates must complete 12. This allows the Postgraduate Diploma candidate to specialise in a particular aspect of Earth Science or attain a more broadly based expertise.

Candidates who attain an average mark of over 70% are eligible to upgrade their studies to the Master of Earth Science Degree (MESc).

Two options are available regarding your research topic. 1) You may have your own research topic and dataset in mind, particularly if you are coming from industry. 2) You may wish to undertake a research project offered by one of the many academics within the School of Earth Sciences. In both cases you can contact the MESc Coordinator directly at [mesc-coord@earthsci.unimelb.edu.au](mailto:mesc-coord@earthsci.unimelb.edu.au) who will direct your enquiry to the appropriate specialist in the School of Earth Sciences, or you can investigate the Earth Sciences staff members on this website and contact them directly.

#### **Duration**

The Postgraduate Diploma (PGrad Dip) can be completed full-time in one year (100 points) or part-time over several years, allowing industry Earth Scientists to attend courses in 2-6 week blocks to complete subjects and carry out thesis and literature review studies remotely, if necessary. International students must take the degree full-time.

The degree involves completion of 12 one week short courses, a literature review and a minor thesis.

#### **Entry Requirements**

Admission is open to candidates with a Bachelor of Science degree specialising in Earth Sciences, or with a Bachelor of Science degree with a background or work experience in Earth Sciences. Candidates will usually commence studies at the beginning of February, but mid-year starts are also possible.

#### **Contacts**

For more information see [www.earthsci.unimelb.edu.au](http://www.earthsci.unimelb.edu.au)

Or contact the postgraduate course coordinator - [mesc-coord@earthsci.unimelb.edu.au](mailto:mesc-coord@earthsci.unimelb.edu.au)

#### **Genetics**

##### **Coordinator**

Prof. Jim Camakaris

##### **Objectives**

On completion of this course students should have achieved:

- # A broad knowledge in the field of genetics;
- # A capacity to use experimentation in genetics to understand aspects of biology; and
- # A capacity to integrate various theoretical and experimental approaches to problems in genetics.

##### **Areas of specialisation**

The coursework and research components of this Postgraduate Diploma in Science enable students to further their knowledge in the following areas: classical genetics; the history of genetics; population and evolutionary genetics; ecological genetics; molecular genetics; and developmental genetics. Typical research projects study aspects of heavy metal detoxification mechanisms in plants and animals; copper metabolism in mammals and the role of copper

in neurodegenerative diseases; gene regulation in fungi;; the ecological, evolutionary and molecular genetics of insecticide resistance; evolutionary genetics; and developmental genetics.

### **Course structure**

#### **Genetics Research Project (62.5 Points)**

Content: An original, supervised research project.

Assessment: A research report of 40 pages (excluding figures, tables and appendices).

An oral exam.

An assessment of research performance.

#### **Genetics Advanced Coursework (37.5 Points)**

Content: Lectures and discussions on advanced topics in genetics eg. developmental genetics, molecular genetics and population and evolutionary genetics.

One essay. Up to 25 points of appropriate Bachelor of Science subjects as required by the Head of Department.

Assessment: An essay on the background area of the research project (3000 word maximum). Up to four written exercises of less than 1000 words.

### **History and Philosophy of Science**

#### **Coordinator**

Dr. Kristian Camilleri

#### **Areas of Specialisation**

Research projects can be accommodated in a variety of areas and prospective students should contact the coordinator for assistance with selection of a topic. The Department specialises in the following areas:

- # History of the physical sciences
- # Relations of science, philosophy and political thought in the early modern Europe and in the twentieth century
- # History of medicine and the biomedical sciences
- # Metaphysics of scientific realism
- # Epistemic naturalism
- # The nature of risk in relation to contemporary technological innovation
- # The idea of 'Nature' in the context of contemporary environmental and human sciences
- # How science might generatively engage other knowledge traditions
- # Social context of computer-based technologies

### **Course structure**

The course consists of a 12 000 word supervised research project (37.5%) and a coursework component of five of the Department's honours and postgraduate level seminars (each weighted 12.5%, and requiring the equivalent of 5000 words each). The seminars, of which students are required to complete four, may be chosen from the following:

- # 136-442 Directed Study (Sem 1, Sem 2)
- # 136-509 Physics, Culture and Ideology (Sem 2)
- # 136-544 Beyond the Spin: Techno-scientific Failure (Sem 2)
- # 136-528 Medicine, Biology and Culture (Sem 2)
- # 136-542 Practicum (Sem 1, Sem 2)
- # 136-545 Science and its Publics (Sem 1)
- # 136-527 Ecology and Environmentalism (Sem 1)
- # 136-536 Scientific Realism and Anti-Realism (Sem 2)

Students may choose a maximum of two honours subjects in philosophy as electives from the following:

- # 161-434 Epistemology and Metaphysics (Sem 1)
- # 161-445 Current Issues in Philosophy (Sem 2)

- # 161-447 Topics in Advanced Logic (Sem 1)
- # 161-436 Issues in Analytic Metaphysics (Sem 2)

### **Mathematics and Statistics**

#### **Postgraduate Diploma in Science (Applied Statistics)**

#### **Postgraduate Diploma in Science (Mathematics and Statistics)**

#### **Objectives**

The objectives of both diplomas are to:

- # Further the understanding of mathematics and statistics across a range of theoretical and practical topics;
- # Encourage the development of the abilities to think critically and independently;
- # Provide an introduction to the process and practice of research in mathematics and statistics;
- # Improve oral and written communication skills; and
- # Provide a pathway for entry into graduate study in mathematics and statistics for students whose main undergraduate field of study was not mathematics and/or statistics.

#### **Areas of Specialisation**

Two postgraduate diploma programs are available in the Department, one in Mathematics and Statistics and one in Applied Statistics. The Applied Statistics program is more accessible than the Mathematics and Statistics program to students who have a restricted mathematics background, but have some experience at 200-level (second-year) or 300-level (third-level) in economics and commerce, the biological sciences, or social sciences.

#### **Applied Statistics**

##### **Coordinator**

Assoc. Prof. Kostya Borovkov

##### **Course Structure**

The Applied Statistics program consists of a research project plus six units of advanced coursework. The relative weighting of the two components is:

Research Project (25%)

Advanced Coursework (six units) (75%)

##### **Research Project:**

This subject comprises a Research Project completed under the supervision of a staff member in an area of statistics approved by the program coordinator. Intending students should approach individual staff members to discuss possible research projects. Any difficulties in reaching decisions about research topics should be discussed with the program coordinator.

The reports are assessed on:

- # Clarity of exposition;
- # Statistical insight displayed; and
- # Coverage of field, and references.

and may be complemented by one or more of the following:

- # description of the application and/or business context;
- # statistical modelling;
- # presentation and analysis of numerical results.

##### **Advanced Coursework:**

Students must complete six units chosen from those offered through the Key Centre for Statistical Sciences (KCSS) at the University of Melbourne, RMIT and La Trobe and Monash Universities. Each unit consists of 24 hours of lectures during first or second semester. Full details of these units are set out in the KCSS booklet, which is available from the Mathematics

and Statistics Department office. In addition, students may be required to take up to 50 points of 300-level subjects offered by the Department.

Unit selection requires Departmental approval. In some cases, approval may be given to substitute units of comparable standard from other areas such as mathematics and statistics, economics and computer science.

#### **Coursework Assessment:**

The assessment of the Advanced Coursework subject entails assignments (up to 50 pages) and a written exam for each of the KCSS units taken by the student. All KCSS units are of equal weight.

#### **Mathematics and Statistics**

##### **Coordinator**

Dr. Sanming Zhou

##### **Course Structure**

The Mathematics and Statistics program consists of a research project plus six units of advanced coursework.

The relative weightings of the two components are:

Research Project (25%)

Coursework (six units) (75%)

##### **Research Project:**

A list of the research interests of the department can be found on the departmental Web site at <http://www.ms.unimelb.edu.au/>. Intending students should approach individual staff members to discuss possible research projects. Any difficulties in reaching decisions about research topics should be discussed with the program coordinator. Project Report will be assessed by the supervisor and one other examiner nominated by the program coordinators.

The reports are assessed on:

- # clarity of exposition;
- # mathematical accuracy;
- # mathematical insight displayed;
- # coverage of the field and references;

and may be complemented by one or more of the following:

- # description of the application and/or business context;
- # mathematical modelling;
- # presentation and analysis of numerical results.

##### **Advanced Coursework:**

Students must complete six units of honours course work. Each unit will be one semester long and will consist of 24 hours of lectures. Full-time students usually undertake four units in the first semester and two units in second semester. In addition, students may be required to take up to 50 points of 300-level subjects offered by the Department of Mathematics and Statistics. There are ten streams of study: Analysis, Algebra, Applied Statistics, Discrete Mathematics, Geometry and Topology, Methods and Modelling, Mathematical Physics and Statistical Mechanics, Operations Research, Probability and Stochastic Processes, and Statistics. As a rule, each stream will offer three units, two of which will usually be available in Semester 1 and one in Semester 2. Each student will normally take at least two units from each of two different streams, one of which will normally be in the same stream as that of the research project. Under special circumstances, approval may be given for a student to do one unit of a comparable standard from outside the Department's honours offering.

Students without the listed prerequisites for a chosen unit will need to discuss possible enrolment in the unit with the lecturer in charge before taking the unit.

##### **Assessment of Coursework:**

For each unit, up to 50 pages of written assignments and up to three hours of written and/or oral examinations are required.

### **Medicine (St. Vincent's Hospital)**

#### **Coordinator**

Dr Sue Rogers

#### **Objectives**

- # To develop further knowledge and skills in the area of biomedical science, including experimental design, laboratory techniques, data analysis and interpretation and oral and written presentation.
- # To complete a research project, which involves carrying out individual project work under the supervision of a nominated supervisor.
- # To attend departmental seminars and complete appropriate coursework and assignment.

#### **Course Structure**

Research Project (75 points)

Advanced Coursework (25 points)

**Content:** An original, supervised research project in the field of biomedical science.

#### **Assessment:**

Completion of a Literature Review (5000 words)

Undertake Oral Presentations

Attendance at Biomedical Statistics program and submit written assignment

Completion of set coursework/assignment

Submission of thesis (10 000 words)

Supervisor/lab competence assessment

### **Microbiology and Immunology**

#### **Coordinator**

Dr. Mike Dyll-Smith

Dr. Odilia Wijburg

Dr. Stephen Turner

#### **Objectives**

The Postgraduate Diploma in Science program in Microbiology and Immunology is designed to

- # Train students to plan and carry out original experiments and to rigorously interpret results;
- # Facilitate students' ability to analyse and communicate scientific results and ideas, both those generated by their own work and those reported by others;
- # Engender an enthusiasm for scientific inquiry;

And

- # Encourage each individual to develop skills requiring both analytical and creative thought.

#### **Areas of Specialisation**

The coursework and research components of this Postgraduate Diploma in Science enable students to further their knowledge in some of the following areas: Microbiology (including Virology, Bacteriology and Parasitology), Biotechnology, Immunology, and Environmental Microbiology.

#### **Course Structure**

Research Points (75 points)

This comprises an original, supervised research project and report and an oral presentation.

#### **Assessment:**

A written report (thesis) and oral presentation will be assessed at the end of the year.

### **Coursework (25 points)**

This comprises lectures and seminars on selected topics within microbiology and immunology, discussion of research data and its interpretation, detailed study of original literature, and one or more oral presentations and literature surveys on selected topics.

### **Assessment:**

Written examinations, literature survey and/or seminar presentations.

To successfully complete the Postgraduate Diploma in Science program in Microbiology and Immunology students must obtain passes of 50 per cent or better in both the Research Project and Coursework. In order to apply for higher degrees, students must obtain 75 per cent or better in both the Research Project and Advanced Coursework.

## **Obstetrics and Gynaecology**

### **Coordinators**

Prof Shaun Brennecke

### **Objectives**

The program in Obstetrics and Gynaecology is designed to help students to:

- # acquire advanced knowledge in certain aspects of reproductive/obstetric/gynaecologic research;
- # foster the development of research skills and design and execute a research project including hypothesis testing, experimental design and practical experimentation;
- # develop the ability to critically analyse the scientific literature;
- # develop advanced oral and written communication skills through the presentation of seminars and the preparation of a research thesis; and
- # enhance the understanding of the broader areas of contemporary medical research.

### **Obstetrics and Gynaecology Research project (50 points)**

Content: An original supervised research project.

Current areas of research activity in the Departments of Obstetrics and Gynaecology, Perinatal Medicine, Gynaecological Cancer and Reproductive Biology Unit at the Royal Women's Hospital include oocyte cryopreservation, oocyte factors in fertilisation, implantation, sperm function, in vitro fertilisation, causes of male infertility, prediction of results of medical intervention in fertility, gynaecology, preterm labour, genetics of pre-eclampsia, placental transport, regulation of placental blood flow, perinatal epidemiology, biochemistry and molecular biology of gynaecological cancers.

**Assessment:** Attendance at 80 per cent of research group meetings, journal club and relevant departmental lecture and seminar program; a written report (thesis) on the research project.

### **Obstetrics and Gynaecology Advanced Coursework (50 points)**

Content:

Advanced lecture and seminar program and journal club on recent concepts and techniques in the areas of reproductive biology, pregnancy, gynaecology and perinatal physiology. To improve the academic understanding of students undertaking this course, up to 30 additional points can be undertaken at the third year level. Oral presentations (one at the beginning and one at the end of the year) and literature review on the research project will be assessed.

There will be a written assignment on an area distinct from the research project. The student will be required to critically evaluate, present, and discuss selected research articles at a journal club presentation.

**Assessment** : Attendance at 80 per cent of the research group meetings, journal club and relevant departmental lecture and seminar program. Oral presentations on the research project. Literature review, of no more than 1500 words, regarding the research project. Written assignment, of no more than 3000 words. Journal club presentation.

## **Otolaryngology**

**Coordinator**

Assoc. Prof. Gary Rance

**Course Structure**

Otolaryngology Research Project (75 Points)

**Content:**

An original, supervised research project.

**Assessment:**

Submission of a literature review, of no more than 1500 words on the research project early in the year. A written report (thesis) at the end of the year, not exceeding 15,000 words. Two Departmental Seminars, one early in the year and one towards the end of the year, on the research work.

Otolaryngology Advanced Coursework (25 points)

**Content:**

Lectures and seminars in the areas of Research Methods in Communication Science, and Introduction to Hearing Science.

**Assessment:**

A written exam and a written assignment in the middle of the year.

**Pathology****Coordinator**

Dr John R Underwood and Dr Margaret Ayers

**Objectives**

Research Projects and the Advanced Coursework offered in Pathology enable students to:

- # develop an understanding of scientific investigation as part of a research team;
- # understand the principles of hypothesis formation;
- # design experiments to test hypotheses;
- # develop an understanding of, and practical expertise in, complex laboratory techniques;
- # use scientific literature, information, and protein and DNA sequence databases;
- # communicate experimental findings logically and coherently in both oral and written forms;
- # become familiar with statistical analyses of experimental data; and
- # develop skills in the interpretation and critical analysis of experimental data and scientific literature.

**Areas of Specialisation**

A wide range of research projects are offered in the areas of investigation of neurological disorders, including Alzheimer's disease; liver disease; regulation of inflammatory processes; immunology; transplantation; and cellular and genetic strategies for control and detection of neoplasia.

**Course Structure**

Advanced Coursework subject (25 points)

**Content:** A series of lectures.

**Assessment:**

Two three-hour data examinations will assess the capacity of students to interpret previously unseen research data based on lectures during the honours year and data published in high quality scientific journals.

Research Project subject (75 points)

**Content:**

A novel Research Project under the supervision of academic or research staff.

**Assessment:**

An 'introductory' seminar outlining the project hypothesis, aims and methods presented early in the year (5%). Critical review of literature relevant to the Research Project (3000 - 5000 words) submitted mid-year (10%). A 'defence of thesis' seminar delivered to the Department after submission of the thesis (10%).

### **Pharmacology**

#### **Coordinator**

Dr. Tony Hughes

#### **Objectives**

This Postgraduate Diploma program is designed to give the committed student an understanding of advanced pharmacological theory and to provide an introduction to pharmacological experimental research. Emphasis is placed on developing skills in experimental design, technical expertise, thinking, analysis and presentation skills.

#### **Areas of Specialisation**

Advanced coursework covers topics in analytical pharmacology, molecular pharmacology, and the basis of drug design and action. Strong emphasis is placed on experimental research training.

#### **Course Structure**

Advanced Coursework subject (25 points)

#### **Content:**

The Advanced Coursework subject comprises 28 examinable lectures and 23 tutorials in pharmacology in the first half of the year.

#### **Assessment:**

An Introductory Seminar outlining the project hypothesis, aims and methods presented early in the year (5%); a course work component including a Data Assessment Examination (25%) in the second half of the year; a critical review of the literature relevant to the Research project (3000-5000 words) submitted mid-year (10%); a defence of thesis seminar (10%) to be delivered to the Department after submission of the Thesis (50%)

### **Physics**

#### **Coordinators**

Assoc. Prof. Chris Chantler

#### **Objectives**

The program in Physics is designed to:

- # increase students' knowledge of physics on a broad front and to a professional level;
- # introduce students to the current research literature in specialized areas; and
- # engage students in their own research by participation in the activities of a research group in the School of Physics.

#### **Course Structure**

Physics Research Project (50 points)

#### **Content:**

An original, supervised research project (experimental and/or theoretical) in one of the School's current fields: pure and applied nuclear physics (photonuclear reactions, proton microbe and microanalysis), gravitation, astrophysics, optics (light, x-rays, neutrons, atoms), particle physics, atomic physics, and solid state physics (high resolution electron microscopy and physics of materials).

#### **Assessment:**

A written report on the research done during the year. Preparation and delivery of a 15 minute talk to the School on the research work.

Physics Advanced Coursework (50 points)

#### **Content:**

Six of the lecture subjects 640-401 or 640-416 comprising Quantum Mechanics A and B and choice of four others (from Diffraction, Experimental Methods in Condensed Matter Physics, Extragalactic Astrophysics and Cosmology, General Relativity, Quantum Structure, Particle Physics I, Particle Physics II, Quantum Field Theory, Quantum Optics and Electronics, Scattering Theory, Solid State Physics, Stars and Compact Objects, and Statistical Mechanics).

**Assessment:**

Written examinations at the end of each demi-semester. Assignments

**Physiology**

**Coordinator**

Dr. Glenn McConell

Prof. Mark Hargreaves

**Objectives**

The program in physiology is designed to:

- # enhance students' knowledge and understanding of the principles of the control of body function and the current development in a specific area of interest;
- # engage students in research in a structured and supervised environment;
- # introduce students to the professional skills required of a successful physiologist (grant writing, critical appreciation of scientific writing, peer communication); and
- # develop the processes of independent, lifelong learning using the scientific literature.

**Areas of Specialisation**

Research within the department is grouped into three areas of specialization /clusters. 1) **CARDIOVASCULAR HEALTH:** Cardiac Phenomics, Central Cardiovascular Regulation, Fetal, Postnatal & Adult Physiology and Disease, Behaviour & Blood Pressure. 2) **MUSCLE AND EXERCISE:** Exercise Physiology and metabolism, Basic and Clinical Myology, Confocal & Fluorescence Imaging; 3) **NEUROPHYSIOLOGY:** Enteric Neuroscience, Molecular Neurophysiology.

**Course Structure**

536-496 Physiology Research Project (75 points):

This involves undertaking an original, supervised research project. A written report (thesis), not exceeding 10 000 words, is to be submitted at the end of the program. In addition, assessment includes two oral presentations and supervisor's assessment of student's research performance.

536-497 Physiology Advanced Coursework (25 points):

The advanced coursework subject comprises the following a literature review, a statistics assignment and an ethics assignment. Attendance and participation in departmental seminars, ethics seminars and statistics lectures is also required.

**Vision Science**

**Coordinator**

Dr Larry Abel

**Objectives**

The course provides advanced training in vision science or optical science, and preliminary training in research methods.

Vision Science Research Project (50 points)

**Content:** An Original, supervised research project.

**Assessment:** A written report of about 10 000 words, prepared in the form of a paper for submission to a scientific journal, assessed by two examiners.

Vision Science Advanced Coursework (50 points)

	<p><b>Content:</b> Attendance at and participation in weekly seminars at which current issues and recent publications are discussed.</p> <p>Statistics for research workers.</p> <p>Four undergraduate courses or assignments at the 200- and 300-level chosen from those offered by the department of Optometry and Vision Sciences, in consultation with the candidate's supervisor, taking into account the candidate's interests and prior academic studies.</p> <p><b>Assessment:</b> Written examinations or assignments. Attendance at seminars.</p> <p>Completion of the Statistics for Research for Workers or equivalent subject.</p> <p><b>Zoology</b></p> <p><b>Coordinator</b></p> <p>Dr Laura Parry</p> <p>Dr Steve Swearer</p> <p><b>Objectives</b></p> <p>The program in Zoology is designed to provide a broad introduction to current processes and practices in zoological research, and to enable students to acquire current research skills in specific areas of biological sciences.</p> <p><b>Areas of Specialisation</b></p> <p>The coursework and research components of this Postgraduate Diploma in Science allow students to tailor a program to further their knowledge of any of the research strengths of the Department. The main areas of specialisation are animal behavior and evolution, animal physiology, conservation and Australian wildlife biology, marine ecology and physiology, and reproduction and development.</p> <p><b>Course Structure</b></p> <p>The course includes advanced coursework (25%) and a research project (75%). Coursework includes lectures and seminars in physiology, reproduction and development, ecology, behaviour, conservation, and evolutionary biology, as well as experimental design and analysis.</p> <p>Assessment is based on written assignments and a research seminar. The research project is an original, supervised piece of zoological research, resulting in an assessed thesis, not exceeding 10 000 words.</p>
<b>Entry Requirements:</b>	An undergraduate degree in a relevant discipline. Entry is also subject to the availability of an appropriate research topic and supervisor.
<b>Core Participation Requirements:</b>	<p>&lt;p&gt;For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry.&lt;/p&gt; &lt;p&gt;It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: &lt;a href="http://services.unimelb.edu.au/disability"&gt;http://services.unimelb.edu.au/disability&lt;/a&gt;&lt;/p&gt;</p>
<b>Further Study:</b>	Students who successfully complete this course with an H2A (75%) average are eligible to apply for M.Phil - Science and PhD-Science candidature.
<b>Links to further information:</b>	<a href="http://graduate.science.unimelb.edu.au">http://graduate.science.unimelb.edu.au</a>