

Pharmacy and Pharmaceutical Sciences



Pharmatopia is a hi-tech teaching tool that lets students develop and test tablets, each with different ingredients and qualities, in a virtual environment.

What makes Pharmacy and Pharmaceutical Sciences at Monash special?

- **Employment opportunities:** 99.4 per cent of pharmacy graduates get jobs within four months of graduating.*
- **Research success:** Monash researchers make important contributions that bring real change to people's lives across the globe, including drug development to combat influenza, malaria and cancer.
- **Links with industry:** The faculty is a major player in the Australian health care, pharmaceutical and biomedical community.
- **Attractive salaries:** Community pharmacists average \$61,000 in the first year after registration.**
- **Excellent location:** The faculty is just a few minutes from Melbourne's city centre and easily accessible by public transport.

*Gradfiles, Graduate Careers Australia, December 2007

** Community and Hospital Pharmacists' Remuneration Survey Report, The Association of Professional Engineers, Scientists and Managers, Australia, 2007

Research tools

- A dedicated pharmaceutical science library – arguably the most comprehensive in Australia
- State-of-the-art teaching facilities, including two virtual practice environments
- Lectures are available via podcast
- Fully equipped laboratory spaces
- The Monash Institute of Pharmaceutical Sciences and the Centre for Medicine Use and Safety are also located at the Parkville campus which facilitates research driven teaching.

Professional recognition

Depending on the course you choose, professional recognition may include:

- Pharmacy Board of Victoria
- Royal Australian Chemical Institute
- Institute of Chartered Accountants in Australia
- Australasian Institute of Banking and Finance

Pharmatopia

Monash's Faculty of Pharmacy and Pharmaceutical Sciences is leading the way in worldwide teaching innovation with the development of a virtual hi-tech teaching tool that is being enthusiastically adopted by leading pharmacy schools around the globe.

Monash has developed an interactive virtual tabletting laboratory on Pharmatopia, the faculty's island in the internet-based virtual world, Second Life (pictured left).

The laboratory gives students an opportunity to develop and test tablets, each with different ingredients and qualities, in a virtual environment.

Australian pharmacists are not required to manufacture commercial tablets, but they do need to know about tablet ingredients and how inactive ingredients, such as those that control a medication's ability to dissolve, affect the properties and quality of the final product so they can properly advise consumers.

Lecturer Dr Ian Larson said the virtual environment provides a new learning experience to students.

"In Pharmatopia's virtual lab students can learn by doing rather than by listening and observing a lecturer," Dr Larson said.

"The future possibilities for this type of teaching are almost limitless."

Index

Bachelor of Pharmacy page 110

Bachelor of Pharmaceutical Science page 111

Bachelor of Pharmacy and Bachelor of Commerce page 110

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Student profile

Tra-My Nguyen

Bachelor of Pharmacy

"Chemistry and biology were my favourite subjects at high school so I really wanted to study a science-based course.

Pharmacy was attractive because I knew I'd have the chance to interact with people, and to work in the health care profession.

I'm involved in a few clubs on campus, I'm the treasurer for the Victorian Pharmacy Students' Association (VPSA), an organisation that provides a link between pharmacy students and the pharmacy profession. I'm also a committee member of Remedy, a student club that focuses on international health and pharmacy issues in the developing world.

One of the most appealing things about pharmacy is that it offers heaps of different career options. Retail, hospital, industry, research or academia – my goal is to become a drug expert and work overseas."



What's the difference between a pharmacist and a pharmaceutical scientist?

A **pharmaceutical scientist** is an expert in the science related to the development of drugs – how drugs work, how safe and effective pharmaceuticals are taken to market, their impact on the body and their effect on the treatment of disease.

A **pharmacist** dispenses medicines, provides advice and manages a patient's medication requirements.

The Bachelor of Pharmaceutical Science qualifies graduates to work in the pharmaceutical science field. If you want to be a pharmacist, you must complete a Bachelor of Pharmacy.

Bachelor of Pharmacy

Pharmacists are actively involved in patient care, either in hospitals or in the community, and work to ensure patient treatment therapies are optimised. They are health professionals who combine their comprehensive dispensing skills and knowledge with the ability to inform and educate patients so that medication is used in a safe and effective way. This Monash degree is accredited by the Pharmacy Board of Victoria and covers the science, technology and practice that underpins pharmacy as a profession. Students undertake professional experience placements in hospitals, community pharmacies and rural areas during their third and fourth years of study. Students may apply to complete one placement overseas in countries such as the US, UK and Singapore.

The Bachelor of Pharmacy is also offered at Monash's Sunway campus in Malaysia. For information on entry requirements and course details visit www.monash.edu.my.

Course Outline

The degree consists of four study areas:

Enabling knowledge base: Includes physical, organic and medicinal chemistry, physiology, biochemistry, microbiology, molecular biology and immunology.

Drug delivery: Deals with the formulation of medicines, pharmacokinetics (what happens to medicine in the body) and the different dose-forms used in therapeutics.

Integrated therapeutics: Covers the major disease states, their epidemiology, pathophysiology, diagnosis, the chemistry and pharmacology of medicines used to treat these conditions, and the clinical and practice aspects of treating patients.

Pharmacy practice: Explores the role of the pharmacist, professionalism, dispensing, health and the individual, as well as health care in society.

Students also study pharmacoepidemiology, the psychosocial aspects of medicine treatment, communication skills, patient counselling, and legal aspects of practice.

The course structure is detailed below.

Units within study stream								
First year	■	■	■	■	■	■	■	■
Second year	■	■	■	■	■	■	■	■
Third year	■	■	■	■	■	■	■	■
Fourth year	■	■	■	■	■	■	■	■

Units of study

■	Enabling knowledge base
■	Drug delivery
■	Pharmacy practice
■	Integrated therapeutics
■	Elective

Career Outlook

Australia is experiencing a shortage of registered pharmacists, especially in rural areas, so graduates are in great demand. Around 99 per cent of graduate pharmacists achieve full-time employment within four months of graduation. Pharmacy is among the highest paying graduate employment areas, with community pharmacists in their first year of registration earning an average wage of \$61,000.

The Pharmacy Board of Victoria requires each graduate to undertake one year of supervised internship training followed by a registration examination before they can become a practising pharmacist.

Other career opportunities exist in research and development, education and academia, sales and industry consulting.

Course Details

Four years full-time

Parkville and Sunway campuses

2009 clearly-in ENTER: Parkville: Range of criteria
Sunway: 90.00

VCE prerequisites: Units 3 and 4 – a study score of at least 35 in English (ESL) or 30 in any other English, and a study score of at least 30 in chemistry and mathematical methods (either).

2009 CSP fee: \$4974

2009 Tuition fee: RM 38,000

2009 IB score: Parkville: Range of criteria
Sunway: 36

IB prerequisites: Standard level: Minimum mark of 5 in English, chemistry and mathematics standard level. Higher level: Minimum mark of 4 in English, chemistry and mathematics higher level.

Bachelor of Pharmacy/Bachelor of Commerce

Many pharmacists own and operate a pharmacy, so a broad grounding in the principles of management, finance and marketing offers graduates an advantage.

This double-degree allows pharmacy students to add valuable business skills to their qualifications.

Course Outline

Students study the two degrees consecutively, beginning with four years of full-time study of the Bachelor of Pharmacy and then two years of the Bachelor of Commerce.

For details of the Bachelor of Pharmacy see left.

For information on major study options available within the Bachelor of Commerce see page 48.

Career Outlook

Graduates manage or own a pharmacy, or work in management in a hospital or in industry. Opportunities also exist in pharmaceutical sales, medication management, marketing, accounting, management, consulting and industrial pharmacy.

Course Details

Six years full-time. The commerce degree can be undertaken part-time.

Clayton and Parkville campuses

2009 clearly-in ENTER score: Range of criteria

VCE prerequisites: Units 3 and 4 – a study score of at least 35 in English (ESL) or 30 in any other English, and a study score of at least 30 in chemistry and mathematical methods (either).

2009 CSP fee: \$4974

2009 IB score: Range of criteria

IB prerequisites: Standard level: Minimum mark of 5 in English, chemistry and mathematics standard level. Higher level: Minimum mark of 4 in English, chemistry and mathematics higher level.

All applicants for the Bachelor of Pharmacy (Parkville) or Bachelor of Pharmacy/Commerce, (except international students) must complete the Undergraduate Medicine and Health Sciences Admission Test (UMAT).

The UMAT is held once a year in July. For further information, please consult www.acer.edu.au/umat.

Bachelor of Pharmaceutical Science

Pharmaceutical science plays a vital role in improving human health by translating advances in biomedical research into medicines.

A pharmaceutical scientist is trained to select new targets for drug therapy and translate these targets into reliable, accessible and effective treatments for patients.

This Monash degree is hands-on science. Students learn the process of making and developing drugs, consumer products such as cosmetics, paints and food.

Students have a further opportunity to gain real-world skills through either a research project or an industrial experience placement – depending on their choice of major.

Course Outline

The Bachelor of Pharmaceutical Science has two majors – formulation science and medicinal chemistry. During the first year of the course students gain an understanding of each area before selecting their major in second year.

Formulation science: Students learn how to formulate, design and evaluate products such as pharmaceuticals, cosmetics, foods, consumer and agricultural chemicals, veterinary products, paints and inks.

Students take part in a four-week industrial project that involves working in the laboratories of a pharmaceutical, cosmetic, food, agricultural or consumer chemical company.

Medicinal chemistry: Medicinal chemistry is at the intersection of biology and chemistry. It is specialised chemistry that deals with how drugs work, how they are designed and how they are made.

Students undertake a research project that provides experience with the core aspects of drug technology.

Areas of Study

The course is based around the following areas of study:

Analytical methods – Biochemistry – Biopharmaceutics – Biotechnology – Chemistry – Computational chemistry – Drug analysis and design – Drug discovery and development – Drug formulation and delivery – Formulation chemistry – Lead identification – Medicinal chemistry – Pharmaceutical biology – Physiology and pharmacology – Product development – Spectroscopy – Synthetic chemistry – Toxicology.

Career Outlook

Graduates will find employment opportunities in the pharmaceutical industry. Opportunities also exist in associated industries such as food, agriculture, chemical and cosmetics. Specific career roles include drug analyst, industry consultant, development chemist, medicinal chemist, patent attorney, academic, and clinical trial researcher.

Course Details

Three years full-time

Parkville campus

2009 clearly-in ENTER score: 85.05

VCE prerequisites: Units 3 and 4 – a study score of at least 35 in English (ESL) or 30 in any other English, and a study score of at least 30 in chemistry and mathematical methods (either).

2009 CSP fee: \$4567

2009 IB score: 31

IB prerequisites: Standard level: minimum mark of 5 in English, chemistry and mathematics standard level. Higher level: minimum mark of 4 in English, chemistry and mathematics higher level.



Student profile

Rohan Volpe

Bachelor of Pharmaceutical Science
(majoring in medicinal chemistry)

"I chose to study this course and major in medicinal chemistry because I want an extremely thorough chemistry education. The course is focused and my major is tailored to a career in the pharmaceutical industry. When I graduate I hope to work in the development of new drugs to treat diseases and make a contribution to the health and well-being of as many people as possible."

Units of study

First year	■	■	■	■	■	■	■	■	■
Second year	■	■	■	■	■	■	■	■	■
Third year	■	■	■	■	■	■	■	■	■

Units of Study

■	Common units
■	Specialisation units – Students can choose to specialise in medicinal chemistry or formulation science
■	Elective units