

# Medicinal Chemistry

Undergraduate Handbook 2018



THE UNIVERSITY OF  
**AUCKLAND**  
Te Whare Wānanga o Tāmaki Makaurau  
NEW ZEALAND

**SCIENCE**

SCHOOL OF CHEMICAL SCIENCES

# Welcome to the School of Chemical Sciences

Medicinal Chemists design and develop drugs for the treatment of disease. A degree in Medicinal Chemistry will provide you with a strong foundation in chemistry as well as biology and pharmacology.

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Medicinal Chemistry is one of the most rapidly developing areas within the discipline of chemistry, both globally and locally. It is the study of the design, biochemical effects, regulatory and ethical aspects of drugs for the treatment of disease. The aim of this major is to produce graduates with an appropriate background in biology and pharmacology, built upon a strong chemistry foundation. The Medicinal Chemistry major at the University of Auckland is the only major of its kind in New Zealand.

While our School of Chemical Sciences also offers undergraduate qualifications in Chemistry and in Food Science and Nutrition, we also offer postgraduate qualifications in Chemistry, Food Science, Forensic Science, Medicinal Chemistry and Wine Science for those students who seek to continue their chemical education.

This handbook outlines the courses offered and provides information to assist you in planning your degree. We look forward to you joining us in this exciting field of research.

**DISTINGUISHED PROFESSOR MARGARET BRIMBLE**  
Director of Medicinal Chemistry



# Bachelor of Science in Medicinal Chemistry

The Medicinal Chemistry major provides students with training appropriate for entry into the pharmaceutical industry.

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## Preparation for school leavers

Preparatory chemistry online is designed to assist prospective first year chemistry students who have had some years away from formal study, or who do not have a strong background in chemistry.

[www.chemistry.auckland.ac.nz/preparatory](http://www.chemistry.auckland.ac.nz/preparatory)

## Why study Medicinal Chemistry?

The BSc and BSc(Hons) in Medicinal Chemistry are the first of their kind to be offered in New Zealand. The primary objective of Medicinal Chemistry is to design and discover new compounds that are suitable for use as new drugs. Not only does this include designing and synthesising new drugs and medicines, but also teaches students to understand how a substance operates in the body and its suitability for use as a drug.



# BSc degree planner – Medicinal Chemistry

## BSc

Year 1

BIOSCI 101	BIOSCI 106	BIOSCI 107	CHEM 110	CHEM 120	MEDSCI 142	YEAR I ELECTIVE	GEN ED
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Year 1 Elective:  
COMPSCI 111,  
STATS 101,  
PHYSICS 120, 160

Year 2

BIOSCI 201	BIOSCI 203	CHEM 230	CHEM 240	MEDSCI 204	MEDSCI 205	YEAR II ELECTIVE	GEN ED
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Year 2 Elective:  
BIOSCI 202, 204,  
CHEM 210, 220, 260,  
MEDSCI 202, 203

Year 3

CHEM 330	CHEM 390	CHEM 392	MEDSCI 303	YEAR III ELECTIVE	YEAR III ELECTIVE		
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Year 3 Elective:  
CHEM 320, 340, 350, 360,  
BIOSCI 349, 350, 351, 353-356,  
MEDSCI 206, 305, 306

Any Stage

1. Courses in a minimum of three subjects listed in the BSc Schedule.
2. At least 180 points (12 courses) must be above Stage I.
3. Up to 30 points (two courses) may be taken from outside the faculty.
4. 30 points (two courses) must be taken from the appropriate General Education Schedules for BSc students.
5. At least 75 points must be at Stage III, of which 60 points must be in the majoring subject.

It is the student's responsibility to check that the final programme complies with University Regulations.  
The Faculty of Science is the final authority on all BSc regulations.

To view regulations for majors, and course descriptions, see [www.calendar.auckland.ac.nz](http://www.calendar.auckland.ac.nz)  
BSc degree requires: 360 points (24 x 15 point courses). Each box represents one 15 point course.  
We recommend that students enrol in eight courses each year.

Degree Planners for double majors can be found at [www.science.auckland.ac.nz/course-planning](http://www.science.auckland.ac.nz/course-planning)

## Undergraduate Medicinal Chemistry Courses

### Stage I

BIOSCI 101	Essential Biology: From Genomes to Organisms
BIOSCI 106	Foundations of Biochemistry
BIOSCI 107	Biology for Biomedical Science: Cellular Processes and Development
CHEM 110	Chemistry of the Living World
CHEM 120	Chemistry of the Material World
MEDSCI 142	Biology for Biomedical Science: Organ Systems
<i>1.5 point elective:</i>	
COMPSCI 111	An Introduction to Practical Computing
STATS 101	Introduction to Statistics
PHYSICS 120	Advancing Physics 1
PHYSICS 160	Physics for the Life Sciences

### Stage II

BIOSCI 201	Cellular and Molecular Biology
BIOSCI 203	Biochemistry
CHEM 230	Molecules for Life: Synthesis and Reactivity
CHEM 240	Measurement and Analysis in Chemistry and Health Sciences
MEDSCI 204	Introduction to Pharmacology and Toxicology
MEDSCI 205	The Physiology of Human Organ Systems
<i>1.5 point elective:</i>	
BIOSCI 202	Genetics
BIOSCI 204	Principles of Microbiology
CHEM 210	Physical and Materials Chemistry
CHEM 220	Inorganic Compounds: Structure, Bonding and Reactivity
CHEM 260	Introduction to Green Chemistry
MEDSCI 202	Microbiology and Immunology
MEDSCI 203	Mechanisms of Disease

### Stage III

CHEM 330	Contemporary Organic Chemistry
CHEM 390	Medicinal Chemistry
CHEM 392	Issues in Drug Design and Development
MEDSCI 303	Principles of Pharmacology
<i>30 points electives:</i>	
CHEM 320	Design and Reactivity of Inorganic Compounds
CHEM 340	Advanced Analytical Chemistry
CHEM 350	Topics in Chemistry
CHEM 360	Contemporary Green Chemistry
BIOSCI 349	Biomedical Microbiology
BIOSCI 350	Protein Structure and Function
BIOSCI 351	Molecular Genetics
BIOSCI 353	Molecular and Cellular Regulation
BIOSCI 354	Gene Expression and Gene Transfer
BIOSCI 356	Developmental Biology and Cancer
MEDSCI 206	Introduction to Neuroscience
MEDSCI 305	Systematic Pharmacology
MEDSCI 306	Principles of Toxicology

For course descriptions and prerequisite information: [www.chemistry.auckland.ac.nz/courses](http://www.chemistry.auckland.ac.nz/courses)

Thinking about postgraduate study options? [www.chemistry.auckland.ac.nz/pg](http://www.chemistry.auckland.ac.nz/pg)

# Careers in Medicinal Chemistry

The three-year BSc major in Medicinal Chemistry and the one-year BSc(Hons) in Medicinal Chemistry are both designed to produce high quality graduates equipped with the multidisciplinary knowledge and skills relevant to a rapidly expanding pharmaceutical industry.

## Positions and roles:

Developing guidelines and reviewing new drug applications

Drug development, including drug formulation

Testing potential new bio-active compounds

## Employment opportunities available at:

Biomedical and pharmaceutical companies

Crown Research Institutes

Government authorities and agencies

Hospitals

Private research institutions

**Casey Park** is studying toward a Bachelor of Science majoring in Medical Chemistry.

*"I remember the exact moment when I decided to pursue Medicinal Chemistry. In year 12, I came to the University open day (Courses and Careers Day) and attended a lecture about Medicinal Chemistry by Distinguished Professor Margaret Brimble. She explained some of the amazing accomplishments she has made in the area, and how they have affected so many people's lives. I was deeply inspired by this and was determined to take Medicinal Chemistry. Also, I enjoyed both chemistry and biology at school, and Medicinal Chemistry is a combination of both. So, it was perfect for me!"*

*"Medicinal Chemistry is about designing, synthesising and discovering drugs by using fundamental knowledge from chemistry as well as other fields in science. I have gained an unbelievable amount of knowledge about not only chemistry, but also areas such as physiology and immunology, which I have realised I have a very deep interest in."*

*"This major helps you to figure out what you are genuinely passionate about by letting you explore a variety of different papers. It is very challenging, but what you gain from it makes everything worth it."*

*"I would like to go into research. I have been taking an immunology paper, which I am absolutely in love with. I'd like to be involved in designing and synthesising drugs that could cure various immunological diseases! I would love to take part in making innovations in the field of medicine that will enhance quality of life."*



# Helpful information

## Academic dates

[www.auckland.ac.nz/dates](http://www.auckland.ac.nz/dates)

## Academic Integrity Course

[www.auckland.ac.nz/academic-integrity](http://www.auckland.ac.nz/academic-integrity)

## Accommodation

[www.accommodation.auckland.ac.nz](http://www.accommodation.auckland.ac.nz)

## Buy coursebooks

[www.science.auckland.ac.nz/resource-centre](http://www.science.auckland.ac.nz/resource-centre)

## Career Development and Employment Services

[www.auckland.ac.nz/careers](http://www.auckland.ac.nz/careers)

## Course advice and degree planning in Science

[www.science.auckland.ac.nz/student-centre](http://www.science.auckland.ac.nz/student-centre)

## General education

[www.auckland.ac.nz/generaleducation](http://www.auckland.ac.nz/generaleducation)

## How to apply

[www.apply.auckland.ac.nz](http://www.apply.auckland.ac.nz)

## How to enrol

[www.auckland.ac.nz/enrolment](http://www.auckland.ac.nz/enrolment)

## International students

[www.international.auckland.ac.nz](http://www.international.auckland.ac.nz)

## Māori and Pacific students

[www.science.auckland.ac.nz/tuakana](http://www.science.auckland.ac.nz/tuakana)

## Need help?

[www.askauckland.ac.nz](http://www.askauckland.ac.nz)

## Rainbow Science Network for LGBTI students

[www.science.auckland.ac.nz/rainbowsience](http://www.science.auckland.ac.nz/rainbowsience)

## Scholarships and awards

[www.scholarships.auckland.ac.nz](http://www.scholarships.auckland.ac.nz)

## Support for students

[www.science.auckland.ac.nz/support](http://www.science.auckland.ac.nz/support)



**APPLICATIONS CLOSE ON  
8 DECEMBER**

**Questions about  
Medicinal Chemistry?  
[m.brimble@auckland.ac.nz](mailto:m.brimble@auckland.ac.nz)**

### Disclaimer

*Although every reasonable effort is made to ensure accuracy, the information in this document is provided as a general guide only for students and is subject to alteration. All students enrolling at the University of Auckland must consult its official document, the University of Auckland Calendar, to ensure that they are aware of and comply with all regulations, requirements and policies.*



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## Connect with us

Faculty of Science, The University of Auckland  
Private Bag 92019, Auckland 1142, New Zealand

Phone: 0800 61 62 63 | Email: [scifac@auckland.ac.nz](mailto:scifac@auckland.ac.nz)

Web: [www.chemistry.auckland.ac.nz](http://www.chemistry.auckland.ac.nz)



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