# Bachelor of Science (Honours) (Dean's Scholar) (Chemistry) | 2020

Chemistry is the study of the molecular nature of all matter and its interactions. The relationship between molecular structures and their properties and reactivity give chemistry an essential, central position in science and technology. Chemistry is central to making new medicines, developing new materials and fuels as well as understanding biological processes at the molecular scale. It also plays a critical role in ensuring we have clean air and water through the study of environmental chemistry and the development of green chemical manufacturing processes.

At UOW you will study the fundamentals of Chemistry with an emphasis on molecular structure and activity across the areas of physical, analytical, medicinal, biological and synthetic chemistry in our state-of-the-art laboratories. The combination of practical laboratory skills and conceptual skills gained will give you transferable skills across a number of disciplines and career areas, including the pharmaceutical/biotech industry, management and public policy. The degree will provide you a deep understanding of chemical processes intrinsic to biological processes, atmospheric and environmental chemistry, and the structure and function of pharmaceuticals.

## Major Learning Outcomes

On successful completion of this major students will be able to:

1. Demonstrate extensive and coherent knowledge of the principles and concepts associated with chemistry.
2. Demonstrate technical and cognitive skills associated with chemistry by locating, analysing and synthesising information to generate solutions to complex questions and problems.
3. Exercise critical analysis of observations and data from primary and secondary sources.
4. Communicate knowledge and ideas clearly and coherently to others through a variety of media.
5. Apply chemical concepts to problems that extend beyond the discipline, identifying the relevance of chemistry to wider scientific endeavours.
6. Demonstrate a capacity for working independently as well as in a team environment in a science context
7. Uphold principles of safe work and ethical behaviour in both professional practice and wider society.
8. Apply knowledge of research principles and research skills in a variety of research contexts.

## Course Structure

To qualify for award of the degree, the Bachelor of Science (Honours) (Dean's Scholar) (Chemistry), a candidate must successfully complete at least 192 credit points in accordance with the table below.

### Year 1:

Note: When selecting 100-level subjects students should note the pre-requisites required for the 200-level subjects they wish to take.

| Subject Code | Subject name | Credit points | Session (s) |
|---|---|---|---|
| **AUTUMN Year 1** | | | |
| SCII101 | Global Challenges in Science | 6 | Autumn |
| MATH151 (if needed) | General Mathematics 1A* | 6 | Autumn |
| *MATH151 MUST be completed by all students who have not completed NSW HSC Mathematics or equivalent at Band 4 or higher. | | | |
| **Select One of the following two subjects:**<br>Note: Students who have achieved a mark of 65% or more in NSW HSC Chemistry (or equivalent) must select CHEM101 in Autumn and CHEM104 in Spring. | | | |
| CHEM101 | Chemistry 1A: Introductory Physical and General Chemistry | 6 | Autumn |
| CHEM104 | Foundation Chemistry: Properties of Matter | 6 | Autumn |
| **Plus 6 Credit points (students required to do MATH151) OR 12 Credit Points (if not required to do MATH151) of elective subjects from the General Elective Schedule, Science Schedule.** | | | |
| **SPRING Year 1** | | | |
| BIOL103 | Molecules, Cells and Organisms | 6 | Spring |
| **Select One of the following two subjects:** | | | |
| CHEM102 | Chemistry 1B: Structure and Reactivity of Molecules for Life | 6 | Spring |
| CHEM105 | Foundation chemistry: Reactions and Structures | 6 | Spring |
| Note: Students who have completed CHEM104 and CHEM105 must also complete CHEM106 in order to enrol in CHEM211, CHEM212 and CHEM213 | | | |

| Subject Code | Subject name | Credit points | Session (s) |
|---|---|---|---|
| CHEM106 | Foundation Chemistry: Properties and Reactivity of Matter | 6 | Summer |
| **Plus 6 Credit points if doing CHEM106 OR 12 Credit Points (if not required to do CHEM106) of elective subjects from the General Elective Schedule, Science Schedule or from the list of suggested subjects below:** | | | |
| BIOL104 | Evolution, Biodiversity and Environment | 6 | Autumn |
| BIOL105 | Functional Biology of Animals and Plants (see Biochemistry minor) | 6 | Autumn |
| EESC101 | Planet Earth (see Geosciences minor) | 6 | Autumn |
| MEDI100 | Human Structure and Function | 6 | Autumn |
| PHYS141 | Fundamentals of Physics A | 6 | Autumn |
| PHYS154 | Energy, Climate Change and Human Society | 6 | Autumn |
| MATH187 | Mathematics 1: Algebra and Differential Calculus | 6 | Autumn |
| MEDI112 | Introduction to Anatomy and Physiology 2 | 6 | Spring |
| PHYS142 | Fundamentals of Physics B | 6 | Spring |
| MATH188 | Mathematics 2: Series and Integral Calculus | 6 | Spring |
| PHYS155 | Introduction to Biomedical Physics | 6 | Spring |
| * Note: Students should meet the minimum mathematics requirement before enrolling in CHEM213 - Molecular Structure, Reactivity and Change and/or CHEM214 - Analytical and Environmental Chemistry II | | | |

## Year 2:

When selecting 200-level subjects students should note the pre-requisites required for the 300-level subjects they wish to take

| Subject Code | Subject name | Credit points | Session (s) |
|---|---|---|---|
| **AUTUMN Year 2** | | | |
| CHEM211 | Inorganic Chemistry 11 | 6 | Autumn |

| Subject Code | Subject name | Credit points | Session (s) |
|---|---|---|---|
| CHEM212 | Organic Chemistry 11 | 6 | Autumn |
| SCIP201 | Chemistry and Cell and Molecular Biology Research Internship | 6 | Autumn, Spring, Summer |
| **Plus 6 credit points of elective subjects from the General Elective Schedule, Science Schedule or from the list of suggested subjects below:** | | | |
| BIOL213 | Principles of Biochemistry | 6 | Autumn |
| CRLP200 | Career Ready Learning and Practice | 6 | Autumn, Spring, Summer |
| **SPRING Year 2** | | | |
| CHEM213 | Molecular Structure, Reactivity and Change | 6 | Spring |
| CHEM214 | Analytical and Environmental Chemistry | 6 | Spring |
| **Plus 12 credit points of elective subjects from the General Elective Schedule, Science Schedule or from the list of suggested subjects below:** | | | |
| BIOL214 | Biochemistry of Energy and Metabolism | 6 | Spring |
| CRLP200 | Career Ready Learning and Practice | 6 | Autumn, Spring, Summer |

## Year 3:

| Subject Code | Subject name | Credit points | Session (s) |
|---|---|---|---|
| **AUTUMN Year 3** | | | |
| CHEM324 | Chemical Analysis and Inference | 6 | Autumn |
| CHEM374 | Molecular Spectroscopy and Structure Elucidation | 6 | Autumn |
| **Plus 12 credit points of elective subjects from the General Elective Schedule, Science Schedule or from the list of suggested subjects below:** | | | |
| CHEM337 | Environmental Chemistry | 6 | Autumn |

| Subject Code | Subject name | Credit points | Session (s) |
|---|---|---|---|
| SCIP300 | Advanced Chemistry and Molecular Bioscience Project | 6 | Autumn |
| CHEM358 | Pharmacology | 6 | Autumn |
| **SPRING Year 3** | | | |
| CHEM370 | Modern Inorganic and Bio-inorganic Chemistry | 6 | Spring |
| CHEM360 | Organic Synthesis 111 | 6 | Spring |
| SCII302 | Science Interdisciplinary Project | 6 | Spring |
| **Plus 6 credit points of elective subjects from the General Elective Schedule, Science Schedule or from the list of suggested subjects below:** | | | |
| CHEM325 | Bioinformatics: Genome, Genes and Biomolecules | 6 | Spring |

### Year 4:

| Subject Code | Subject name | Credit points | Session (s) |
|---|---|---|---|
| **Select either the full time (48cp) or 48cp of the equivalent part-time subject (2x 24cp) option below:** | | | |
| CHEM401 | Chemistry Honours | 48 | Annual |
| CHEM407 | Chemistry Honours ( Part-time) | 24 | Annual |

## Minors

Students are encouraged to consider taking a *Minor study* as part of the BSc program. Inclusion of a *minor* in support of your *major* area of study allows you to broaden your view, knowledge and expertise while specialising in areas of interest.

Details on Minors can be found at https://documents.uow.edu.au/handbook/minors/H20008091.html

Options include (but not limited too): Earth and Environmental Science, Geoscience, Physical Geography, Archaeology, Biochemistry, Biodiversity, Ecology, Molecular Biology, Geology and Marine Biology.

A selection of research internships or project-based subjects may also be available to high-achieving students wishing to complement their coursework with research projects. Entry into these subjects requires approval from the Head of School.

## Entry Requirements and Credit Arrangements

Information on academic and English language requirements, as well as eligibility for credit for prior learning, is available from the Course Finder.

## Professional Recognition/Accreditation

Completion of this major qualifies graduates for membership of the Royal Australian Chemical Institute.

## Other Information:

For further information please email: smah-students@uow.edu.au