



UOW
COLLEGE
AUSTRALIA

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PATHWAYS TO
UNIVERSITY OF
WOLLONGONG

Undergraduate Certificate in Science

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Course Outline

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Undergraduate Certificate in Science Course Outline

1 Course Description

The UOW College Australia (UOWCA) Undergraduate Certificate in Science provides students with a pathway into the study of sciences at the university level. Students are provided with a range of learning experiences and opportunities in discipline-based subjects including biology, chemistry, and earth sciences. Students are also provided with dedicated support tutorials to prepare them for success in their university studies.

The Undergraduate Certificate in Science provides pathways for entry into the UOWCA Diploma of Science with 24 points of credit.

Undergraduate Certificates are higher education qualifications of six months duration that may be used to articulate with existing qualifications at AQF levels 5, 6, or 7. They qualify individuals with knowledge and skills for further study, professional upskilling, employment and participation in lifelong learning.

2 Graduate Qualities

The Undergraduate Certificate in Science course is designed to assist students in developing the UOW College Australia Graduate Qualities. It helps students become:

- 1. Informed:** Have a basic knowledge of an area of study and understand its issues. Know how to apply this knowledge.
- 2. Independent Learners:** Begin to engage with new ideas and ways of thinking and critically analyse issues. Seek to extend knowledge through ongoing enquiry and active learning. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.
- 3. Problem Solvers:** Demonstrate introductory levels of creative, logical and critical thinking skills to respond effectively to problems. Be flexible and thorough.
- 4. Effective Communicators:** Articulate and convey ideas effectively using a range of media. Work collaboratively and engage with people in different settings.
- 5. Responsible:** Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity and act with integrity. Take responsibility for one's own learning and completion of assessment tasks.

3 Course Learning Outcomes

Graduates will be able to:

1. Demonstrate a broad and coherent body of knowledge required to upskill professionally.
2. Demonstrate knowledge and skills sufficient to sustain lifelong learning in higher education and vocational settings.
3. Apply knowledge in new or existing disciplines or professional areas.
4. Demonstrate an appropriate depth of integrated knowledge of the specialisation area.

4 Course Learning Outcomes Mapped to Graduate Qualities

The table below shows how the graduate qualities are integrated into the course learning outcomes:

Course Learning Outcomes/Graduate Qualities	1. Informed	2. Independent Learners	3. Problem Solvers	4. Effective Communicators	5. Responsible
1. Demonstrate a broad and coherent body of knowledge required to upskill professionally.	✓			✓	
2. Demonstrate knowledge and skills sufficient to sustain lifelong learning in higher education and vocational settings.	✓	✓			✓
3. Apply knowledge in new or existing disciplines or professional areas.	✓	✓	✓		
4. Demonstrate an appropriate depth of integrated knowledge of the specialisation area.	✓			✓	

5 Course Structure and Subjects

UOW Autumn Session			
Subject Code	Subject Name (UOW Equivalent Subject Code)	Credit Points	Hours a Week
DSCI106* or DSCI107#	Foundation Chemistry: Properties of Matter (CHEM104) or Chemistry 1A: Introductory Physical and General Chemistry (CHEM101)	6	7
DSCI108	Evolution, Biodiversity and Environment (BIOL104)	6	7
DSCI113	Introductory Geospatial Analysis (EESC105)	6	6
DSCI151^	General Mathematics 1A (MATH151)	6	7
Session Total		24	27
UOW Spring Session			
Subject Code	Subject Name (UOW Equivalent Subject Code)	Credit Points	Hours a Week
DMHS200^^	Living in a Molecular World (CHEM200)	6	4
DSCI105	Planet Earth (EESC101)	6	6
DMHS200^^ or DSCI110* or DSCI111#	Living in a Molecular World (CHEM200) or Foundation Chemistry: Reactions and Structures (CHEM105) or Chemistry 1B: Structure and Reactivity of Molecules for Life (CHEM102)	6	4 or 7 or 8
DSCI112	Molecules, Cells and Organisms (BIOL103)	6	6
DSCI116	Earth's Interconnected Spheres (EESC102)	6	6
Session Total		24	25-26

Course Rules

Students enrolled in the course on a part-time basis over 2 sessions must abide by all subject enrolment and pre-requisite requirements, as specified below.

#DSCI107 and DSCI111

- Students who have achieved a result of 65% or better in HSC Chemistry take DSCI107 and DSCI111. All students who have not achieved a result of 65% or better in HSC Chemistry take DSCI106 and DSCI110 (see below).
- DSCI107 is a pre requisite for DSCI111 (students must pass DSCI107 before they can enrol in DSCI111).

*DSCI106 and DSCI110

- DSCI106 is a pre requisite for DSCI110 (students must pass DSCI106 before they can enrol in DSCI110).

^^DHMS200

- Students enrolling in the Undergraduate Certificate in Spring who have not completed the pre requisite subjects (DSCI106 or DSCI107) which would enable them to enrol in DSCI110 or DSCI111 should complete DMHS200 Living in a Molecular World in order to qualify for the award of the Undergraduate Certificate in one session.

6 Subjects Mapped to Course Learning Outcomes

Subject/Course Learning Outcomes	1. Demonstrate a broad and coherent body of knowledge required to upskill professionally.	2. Demonstrate knowledge and skills sufficient to sustain lifelong learning in higher education and vocational settings.	3. Apply knowledge in new or existing disciplines or professional areas.	4. Demonstrate an appropriate depth of knowledge of the specialisation area.
DMHS200 Living in a Molecular World	✓	✓	✓	✓
DSCI105 Planet Earth	✓	✓	✓	✓
DSCI106 Foundation Chemistry: Properties of Matter	✓	✓	✓	✓
DSCI107 Chemistry 1A: Introductory Physical and General Chemistry	✓	✓	✓	✓
DSCI108 Evolution, Biodiversity and Environment	✓	✓	✓	✓
DSCI110 Foundation Chemistry: Reactions and Structures	✓	✓	✓	✓
DSCI111 Chemistry 1B: Structure and Reactivity of Molecules for Life	✓	✓	✓	✓
DSCI112 Molecules, Cells and Organisms	✓	✓	✓	✓
DSCI113 Introductory Geospatial Analysis	✓	✓	✓	✓
DSCI116 Earth's Interconnected Spheres	✓	✓	✓	✓
DSCI151 General Mathematics 1A	✓	✓	✓	✓

7 Progression Guidelines

Course Progression Requirements

1. To qualify for the award of the Undergraduate Certificate in Science, students must achieve a minimum result of 50% in any four subjects to achieve a total of 24 credit points, subject to the course rules.
2. Students who meet the requirements for the award of the Undergraduate Certificate can progress to the Diploma of Science with 24 points of credit.

8 Entry Requirements / Admissions Guidelines

Entry requirements for this course can be viewed online at:

<https://coursefinder.uow.edu.au/information/index.html?course=undergraduate-certificate-science-uow-college>

9 Assessment

Students are required to complete a number and variety of assessment tasks related to their streams of study.

Each subject has a subject outline that is issued to students. Subject outlines contain an overview of subject objectives, an assessment schedule, a list of learning resources and a weekly topic outline. Subject outlines also contain an explanation of assessment components.

All assessment tasks with a weighting of 10% or greater have marking criteria and an answer/marking guide.

All aspects of assessment are governed by the Assessment Guidelines, which can be viewed at: [Assessment & Examination Guidelines for Students](#) and [Assessment Guidelines](#).

10 Quality Assurance

The College applies formal quality assurance processes to its design of courses, subjects and their assessments. These processes include:

- Clear subject outlines that align with the objectives of the course and support consistent delivery of content;
- Mandatory inclusion of clear and appropriate marking criteria in assessment tasks;
- Moderation of marking of student assessment tasks, ensuring that the assessment criteria have been applied consistently and there is equity across individual markers;
- A regular schedule of audits on student assessment tasks using randomly-selected samples of student work; and
- The use of feedback from students and teachers to inform continuous improvement of curriculum, delivery, policies and procedures.

Details of the College's approach to quality assurance can be viewed at the following link: <https://www.uowcollege.edu.au/about/policies-procedures/index.html>.

11 Subject Descriptions

DMHS200 Living in a Molecular World

This subject will be delivered primarily via web-based content, and through participation of students in group assessment and laboratory activities. The purpose of the subject is to provide students with or without a background in science, with the opportunity to learn about the chemicals present in everyday products and engage with contemporary scientific and environmental issues. All laboratory work will be undertaken in state-of-the-art laboratories in the new Sciences Teaching Facility. Students undertaking DMHS200 will be supported in their learning activities by a comprehensive eLearning (Moodle) site. This will enable students to learn about how chemical compounds found in and around the home work, as well as about their impacts upon the environment and society. Students who complete DMHS200 will be better prepared to engage with contemporary scientific issues, such as the spread of multi-drug resistant bacteria, and use of performance enhancing supplements by athletes.

DSCI105 Planet Earth

How does the solid planet Earth function and of what does it consist? This subject provides an introduction to Earth science by considering topics such as geological time, the solar system, the interior of Earth, tectonics and structural geology, crystals, minerals, volcanoes and volcanic processes, and characteristics of igneous, sedimentary and metamorphic rocks.

DSCI106 Foundation Chemistry: Properties of Matter

This subject provides an introduction to core chemistry knowledge and skills as required for studies of biology and applied sciences. The subject develops the use of chemistry language, symbols and other representations, and the quantitative (numeracy, mathematical) skills required. The concepts include matter, introduction to atoms, ions and molecules, chemical nomenclature and quantities in chemistry; molecular scale concepts, electrons and the chemical bond, molecular shape, intermolecular forces; matter macroscale, the nature and properties of materials resulting from their molecular level character, with specific biological / polymeric / new materials-based examples. Concepts about changing matter follow, considering the energetics and rate of chemical change. The topics are presented in contemporary contexts exploring chemical phenomena and specifically designed for students without senior high school chemistry.

DSCI107 Chemistry IA: Introductory Physical and General Chemistry

This subject provides core chemical concepts, reinforcing and building on senior chemistry, and providing the basis of further studies in chemistry. Concepts include the fundamentals of quantity, mole and stoichiometric calculations, the properties and behaviour of matter on the molecular scale based on electron configuration, periodicity, chemical bonding and molecular shape. The subject continues with concepts concerning matter on the macroscale: gases, liquids, solids and solutions with properties determined by the molecular scale. Principles of thermodynamics,

equilibrium and kinetics are used to describe, interpret and understand chemical and physical change. The topics are presented in contemporary contexts, exploring chemical phenomena relevant to a suite of applied disciplines as well as chemistry.

DSCI108 Evolution, Biodiversity and Environment

This subject aims to provide students with a comprehensive introduction to whole organism biology, from species to populations, communities and ecosystems. Specifically, the subject explores the identity, anatomical and life-history characteristics of the main groups of organisms, their patterns of diversity across Earth, the processes of evolution and speciation, ecology and conservation biology. In addition, through a series of practical and tutorial classes, the subject equips students with an understanding of the scientific process, ways in which experiments are designed and implemented, the processes of data collection, analysis and hypothesis testing, and scientific writing.

DSCI110 Foundation Chemistry: Reactions and Structures

This subject follows on from essential chemical principles studied in DSCI106/CHEM104 and provides a suite of compound groups and reaction types across inorganic and organic chemistry, with application in contemporary contexts suited to the study of Biology and the applied sciences. The subject begins by applying the equilibrium concept in the context of dissolution / precipitation, acid base and redox reactions. The chemistry of transition metal complexes, especially as applied in biochemical and catalytic systems, is studied. The chemistry of nonmetals, P, N, and S is studied, highlighting biological environmental and industrial contexts. Organic chemistry is introduced via hydrocarbon structures and then functional groups and classes of reactions pertinent to biological systems are studied. The application of structure concepts and reaction types is used to understand the properties of natural and synthetic polymers. The topics are presented in contemporary contexts, exploring structures and reactions. This subject is specifically designed for students without senior high school chemistry.

DSCI111 Chemistry 1B: Structure and Reactivity of Molecules for Life

This subject follows on from DSCI107/CHEM101, using concepts and principles concerning the structure of matter and the nature of chemical change, applied first in aqueous reactions of acid base, and redox systems. A suite of inorganic compounds and reaction types including periodicity is then introduced, covering transition metal complexes and inorganic non-metals, of S, P, N relevant to biological and environmental systems. Organic chemistry is introduced with a detailed look at structure and isomerism, leading to a treatment of organic functional groups and reactions based on mechanistic descriptions of the reaction systems. The mechanistic approach considers reactivity and stability of chemical species and uses thermodynamic, kinetic and equilibrium considerations to describe and analyse reactions. The application of structure concepts and reaction types is used to understand the properties of natural and synthetic polymers.

DSCI112 Molecules, Cells and Organisms

This subject involves the study of molecules, cell and organisms fundamental to biology. It provides an introduction to the topic areas of cell biology, biochemistry, biotechnology, genetics, microbiology and immunology. During this subject, students will look closely at the links between structure and function in cells and important biological molecules, while investigating cellular division and mechanisms to control the cell cycle and prevent cancer. Students will hear about techniques in genetic engineering and breakthroughs in biotechnology. They will learn about different microorganisms and their role in human, animal and/or plant health and explore the physiology of the immune system. Through engagement in group research projects, students will develop skills in effective research and communication, teamwork, self-reflection and peer assessment while developing digital literacy skills in presenting their research through PowerPoint (or similar tools) and generation of an electronic portfolio.

DSCI113 Introductory Geospatial Analysis

This subject provides a comprehensive introduction to the theory and practice of Geographic Information Systems (GIS) and geospatial analysis, and aims to equip students with core skills that will enable solving simple geospatial problems. The subject comprises two parts. Part one follows a classical lecture/practical format, where students learn the foundations of geospatial analysis. Part two follows a problem-based approach, enabling students to apply the core geo-analytical skills to solving a simple real-world practical problem by working in groups and using industry-standard tools and technologies.

DSCI116 Earth's Interconnected Spheres

This subject examines the processes that occur within, and the interactions and feedbacks that occur between the various components – or spheres – of the Earth system. There is a focus on Earth's landforms as the product of tectonics, climate, and erosion; topics also include: the composition and behaviour of the atmosphere; global weather and climatic patterns; the character of the oceans and their interaction with the landmasses; and the role of humans in shaping the Earth system. Laboratory classes focus on developing and applying statistical data analysis, and field surveying and mapping skills to a variety of geographical contexts.

DSCI151 General Mathematics 1A

The purpose of this subject is for students to improve their mathematical skills. It introduces topics in algebra, functions, and trigonometric, graphing, data modelling and foundation calculus with a view to applications in Science.

12 Version Control Table

Version Control	Date Effective	Approved By	Amendment
1	18/12/2020	Vice-Chancellor	Initial release – 2021 delivery