

# PROGRAM PLAN

## BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

**PROGRAM OPTION:**  
Pathway A – 80 Unit Science Major

**START DATE:**  
Semester 2, 2019-2020

**LOCATION:**  
Callaghan

This Program Plan is an enrolment guide to ensure you are on track to graduate. If at any time you wish to vary from this program plan seek advice from your Program Advisor to ensure you remain on track.

 [PROGRAM HANDBOOK](#)  
 [COURSE HANDBOOK](#)

**NAME:**  
**STUDENT NO.:**

**COURSE STATUS KEY**  
**C** = Completed  
**En** = Enrolled  
**NS** = Not Started

YEAR	SEMESTER	COURSE	STATUS	COURSE	STATUS	COURSE	STATUS
YEAR 1	SEMESTER 1						
	SEMESTER 2	<b>B MATH PROGRAMMING DIRECTED COURSE</b>	DIRECTED	<b>SCIENCE MAJOR</b>	MAJOR	<b>ELECTIVE*</b> 1000/2000/3000 Level	ELECTIVE
YEAR 2	SEMESTER 1	<b>MATH1210</b> Mathematical Discovery 1 CORE --- OR --- <b>MATH1110</b> Mathematics for Engineering, Science and Technology 1 CORE	CORE	<b>SCIE1001</b> Professional Scientific Thinking CORE	CORE	<b>SCIE1002</b> Multidisciplinary Laboratories CORE	<b>SCIENCE MAJOR</b> MAJOR
	SEMESTER 2	<b>MATH1220</b> Mathematical Discovery 2 CORE --- OR --- <b>MATH1120</b> Mathematics for Engineering, Science and Technology 2 CORE	CORE	<b>MATH1800</b> Mathematical Modelling CORE	CORE	<b>STAT2010</b> Fundamentals of Statistics CORE	<b>SCIENCE MAJOR</b> MAJOR
YEAR 3	SEMESTER 1	<b>MATH2310</b> Calculus of Science and Engineering CORE	CORE	<b>SCIE2001</b> Professional Employment Skills CORE	CORE	<b>MATH MAJOR</b> 2000 level MAJOR	<b>ELECTIVE*</b> 1000/2000/3000 Level ELECTIVE --- OR --- <b>MATH2340</b> Linearity and Continuity CORE
	SEMESTER 2	<b>MATH2320</b> Linear Algebra CORE	CORE	<b>SCIE2002</b> Interdisciplinary Challenges CORE	CORE	<b>MATH MAJOR</b> 2000 level MAJOR	<b>SCIENCE MAJOR</b> MAJOR
YEAR 4	SEMESTER 1	<b>SCIE3001A</b> Transdisciplinary Capstone: Planning and Implementing CORE	CORE	<b>MATH MAJOR</b> 3000 level MAJOR	MAJOR	<b>SCIENCE MAJOR</b> MAJOR	<b>ELECTIVE*</b> 2000/3000 Level ELECTIVE
	SEMESTER 2	<b>SCIE3001B</b> Transdisciplinary Capstone: Implementing and Communicating CORE	CORE	<b>MATH MAJOR</b> 3000 level MAJOR	MAJOR	<b>SCIENCE MAJOR</b> MAJOR	<b>SCIENCE MAJOR</b> MAJOR
YEAR 5	SEMESTER 1	<b>MATH MAJOR</b> 3000 level MAJOR	MAJOR	<b>MATH MAJOR</b> 3000 level MAJOR	MAJOR	<b>SCIENCE MAJOR</b> MAJOR	<b>ELECTIVE*</b> 2000/3000 Level ELECTIVE
	SEMESTER 2						

**Science Majors available in Pathway A:** Biology – Chemistry of Advanced Materials – Environmental and Analytical Chemistry – Medicinal and Organic Chemistry Earth Sciences – Biodiversity and Conservation – Marine and Coastal Science – Sustainable Resource Management– Geography

**\*Elective Options include:** Science Elective Pathways or any unrestricted courses offered within the university.

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To be eligible to graduate make sure you have completed 240 units (10 units = 1 course unless otherwise specified) which meet the following criteria:

- Core courses – 100 units.
- A 10 unit Bachelor of Mathematics programming directed course.
- Mathematics Major – 80 units, with a minimum of 40 units at 3000 level. 20 units of core will count toward the Mathematics Major.
- Standard Pathway - 20 units. Students who have obtained a Band 4 in HSC NSW Extension 1, or have completed NSW HSC Extension 2, or equivalent should complete the Standard Pathway. For further information please see [Enrolling in Maths](#) OR
- Alternate Pathway - 30 units. Students who have obtained a Band 5 in NSW HSC Mathematics, or have completed NSW HSC Extension 1, or equivalent should complete the Alternate Pathway. For further information, please see [Enrolling in Maths](#).
- Science Major – 80 units (see Pathway A for Major sequences for individual requirements).
- Electives - 50 units for Standard pathway students or 40 units for Alternate Pathway students. Electives can be chosen from Science Elective Pathways or any unrestricted courses offered within the university. Refer to the Science Elective Pathway Documents located on the [Program Handbook](#) or visit the [Course Handbook](#) to see a list of available Electives.
- Students must not exceed 120 units at 1000 level in this program.
- The duration of this program is 4 year full-time (40 units per semester) or part-time equivalent.
- The maximum time to complete this program is 10 years.



Some courses have assumed knowledge and/or requisites, please refer to the individual [Course Handbook](#). Please refer to the [Program Handbook](#) for specific information on program structure. If you are intending varying from this program plan please seek advice from your [Program Advisor](#).

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## BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

### SCIENCE MAJORS

#### BIOLOGY MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

**BIOL1001: Molecules, Cells and Organisms**  
**BIOL1002: Organisms to Ecosystems**

##### DIRECTED COURSES – 2000 LEVEL

Complete 30 units from:

**BIOL2020: Animal Physiology and Development**  
**BIOL2050: Molecular Genetics**  
**BIOL2090: Microbial Biology**  
**BIOL2220: Plant Cell Development**

##### DIRECTED COURSES – 3000 LEVEL

Complete 30 units from:

**BIOL3020: Reproductive Physiology and Development**  
**BIOL3090: Molecular Biology**  
**BIOL3100: Microbiology**  
**BIOL3330: Plant Development and Physiology**

#### CHEMISTRY OF ADVANCED MATERIALS MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

**CHEM1010: Introductory Chemistry I**  
**CHEM1020: Introductory Chemistry II**  
**CHEM2110: Analytical Chemistry**  
**CHEM2210: Inorganic Chemistry**  
**CHEM2410: Physical Chemistry**  
**CHEM3410: Energy and Structure**

##### DIRECTED COURSES – 3000 LEVEL

Complete 20 units from:

**CHEM3110: Instrumental Chemical Analysis**  
**CHEM3210: Metal Complexation, Structure and Reactivity**  
**CHEM3560: Materials Chemistry: Solids and Semiconductors**  
**CHEM3580: Polymers and Colloids**

#### ENVIRONMENTAL AND ANALYTICAL CHEMISTRY MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

**CHEM1010: Introductory Chemistry I**  
**CHEM1020: Introductory Chemistry II**  
**CHEM2110: Analytical Chemistry**  
**CHEM2610: Environmental Chemistry I**

##### DIRECTED COURSES – 2000 LEVEL

Complete 10 units from:

**CHEM2201: Analytical and Medicinal Chemistry**  
**GEOS2060: Soil Properties and Processes**

##### DIRECTED COURSES – 3000 LEVEL

Complete 30 units from:

**CHEM3110: Instrumental Chemical Analysis**  
**CHEM3570: Spectroscopic Characterisation of Compounds**  
**ENVS3004: Ecotoxicology**  
**ENVS3007: Environmental Remediation**

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## BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

### SCIENCE MAJORS

#### MEDICINAL AND ORGANIC CHEMISTRY MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

CHEM1010: Introductory Chemistry I  
CHEM1020: Introductory Chemistry II  
CHEM2210: Inorganic Chemistry  
CHEM2310: Organic Chemistry  
CHEM3310: Molecular Organic Synthesis  
CHEM3550: Medicinal and Biological Chemistry

##### DIRECTED COURSES – 2000 LEVEL

Complete 10 units from:

CHEM2110: Analytical Chemistry  
CHEM2201: Analytical and Medicinal Chemistry

##### DIRECTED COURSES – 3000 LEVEL

Complete 10 units from:

CHEM3110: Instrumental Chemical Analysis  
CHEM3580: Polymers and Colloids

#### EARTH SCIENCES MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

GEOS1040: Earth's Dynamic Systems  
GEOS1050: Earth Processes and Products

##### DIRECTED COURSES – 2000 LEVEL

Complete 30 units from:

GEOS2050: River Basin Processes  
GEOS2060: Soil Properties and Processes  
GEOS2080: Earth Science Field Course  
GEOS2161: Spatial Science  
GEOS2170: Optical Mineralogy  
GEOS2190: Structural Geology  
GEOS2200: Earth's Sedimentary Rocks & Environments

##### DIRECTED COURSES – 2000 LEVEL

Complete 30 units from:

ENVS3007: Environmental Remediation  
GEOS3110: Igneous Petrology and Crustal Evolution  
GEOS3160: Energy Resources  
GEOS3170: Resource and Exploration Geology  
GEOS3220: Coastal Environments and Processes  
GEOS3250: Advanced Spatial Science  
GEOS3280: Global Change and the Rise of Modern Environments  
GEOS3330: Tectonics  
GEOS3340: Climate Change and Resource Management

#### BIODIVERSITY AND CONSERVATION MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

ENVS1001: Environmental Science Concepts & Methods  
ENVS1003: Environmental Values and Ethics  
ENVS3003: Conservation Biology  
ENVS3004: Ecotoxicology  
ENVS3005: Animal Behaviour

##### DIRECTED COURSES – 2000 LEVEL

Complete 20 units from:

ENVS2004: Ecology  
ENVS2005: Management of Australian Flora  
ENVS2006: Ecology and Management of Wildlife

##### DIRECTED COURSES – 3000 LEVEL

Complete 10 units from:

ENVS3009: Advanced Water Science and Resource Management  
ENVS3004: Advanced Research Project  
MARI3320: Ecological Methodology  
SRMT3060: Restoration Ecology

\* Note: Students who commenced prior to 2020 please refer to the transition arrangements for this major on the [Program Handbook](#).

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### SCIENCE MAJORS

#### MARINE AND COASTAL SCIENCE MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

MARI1000: Our Oceans  
MARI2300: Marine Biology  
MARI2500: Coastal and Marine Ecosystem Services \*  
MARI3300: Integrated Coastal Ecosystems  
MARI3320: Ecological Methodology

##### DIRECTED COURSES – 1000 LEVEL

Complete 10 units from:

ENVS1001: Environmental Science Concepts & Methods  
ENVS1003: Environmental Values and Ethics

##### DIRECTED COURSES – 3000 LEVEL

Complete 20 units from:

ENVS3005: Animal Behaviour  
MARI3410: Coral Reef Biology, Ecology and Sustainability  
ENVS3400: Advanced Research Project  
ENVS3009: Advanced Water Science and Resource Management

\* Note: Students who commenced prior to 2020 please refer to the transition arrangements for this major on the [Program Handbook](#).

#### SUSTAINABLE RESOURCE MANAGEMENT MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

ENVS1001: Environmental Science Concepts & Methods  
ENVS1003: Environmental Values and Ethics  
ENVS2009: Catchment and Water Resource Management  
ENVS3001: Integrated Impact Assessment  
ENVS3003: Conservation Biology  
SRMT3040: Community Resource Management  
SRMT3060: Restoration Ecology

##### DIRECTED COURSES

Complete 10 units from:

ENVS2005: Management of Australian Flora  
ENVS2006: Ecology and Management of Wildlife

#### GEOGRAPHY MAJOR

##### COMPULSORY COURSES

Complete the following compulsory courses:

GEOG1020: Introduction to Human Geography  
GEOS1040: Earth's Dynamic Systems  
GEOS2161: Spatial Science  
GEOS3250: Advanced Spatial Science

##### DIRECTED COURSES – 2000 LEVEL

Complete 10 units from:

ENVS2002: Environmental Legislation & Planning  
ENVS2008: The Sustainable Society  
GEOG2080: Cities and Regions  
GEOG2130: Geographies of Development  
GEOS2050: River Basin Processes  
GEOS2080: Earth Science Field Course  
SOCS2400: Applied Social Research

##### DIRECTED COURSES – 3000 LEVEL

Complete 30 units from:

ENVS3001: Integrated Impact Assessment  
ENVS3006: Sustainability: Theory and Practice  
ENVS3007: Environmental Remediation  
GEOG3090: Society and Space  
GEOG3240: Globalisation: Cities, Economies  
GEOG3300: Rethinking Development  
GEOG3330: Work Integrated Learning in Development Studies and Human Geography  
GEOS3220: Coastal Environments and Processes  
GEOS3280: Global Change and the Rise of Modern Environments  
GEOS3340: Climate Change and Resource Management

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## MATHEMATICS MAJORS

### DIRECTED MATH PROGRAMMING COURSE

#### DIRECTED COURSES

Complete 10 units from:

**ENGG1003:** Introduction to Procedural Programming  
**INFT1004:** Introduction to Programming  
**SENG1110:** Object Oriented Programming

### APPLIED MATHEMATICS MAJOR

#### COMPULSORY COURSES

Complete the following compulsory courses:

**MATH2330:** Analysis  
**MATH2800:** Ordinary Differential Equations

#### DIRECTED COURSES – 3000 LEVEL

Complete 40 units from:

**MATH3210:** Directed Studies in Mathematics  
**MATH3242:** Complex Analysis  
**MATH3700:** Partial Differential Equations  
**MATH3800:** Optimisation  
**MATH3820:** Numerical Methods  
**MATH3840:** Optimisation in Business and Industry  
**MATH3850:** Industrial Project

### PURE MATHEMATICS MAJOR

#### COMPULSORY COURSES

Complete the following compulsory course:

**MATH2330:** Analysis

#### DIRECTED COURSES – 2000 LEVEL

Complete 10 units from:

**MATH2600:** Introduction to Modern Mathematical Computation  
**MATH2800:** Ordinary Differential Equations

#### DIRECTED COURSES – 3000 LEVEL

Complete 40 units from:

**MATH3010:** Logic and Set Theory  
**MATH3120:** Algebra  
**MATH3170:** Number Theory  
**MATH3180:** Topology  
**MATH3205:** Fourier Analysis  
**MATH3210:** Directed Studies in Mathematics  
**MATH3242:** Complex Analysis  
**MATH3510:** Combinatorics and Graph Theory  
**MATH3700:** Partial Differential Equations  
**MATH3820:** Numerical Methods

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## BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

### STATISTICS MAJOR

#### COMPULSORY COURSES

Complete the following compulsory courses:

**STAT2000: Applied Statistics and Research Methods**  
**STAT2020: Predictive Analytics**  
**STAT3010: Statistical Inference**

#### DIRECTED COURSES

Complete 30 units from:

**STAT3030: Generalised Linear Models**  
**STAT3040: Time Series Analysis**  
**STAT3100: Systems Thinking for an Integrated Workforce**  
**STAT3120: Applied Bayesian Methods**  
**STAT3170: Surveys and Experiments**

### STUDIES IN MATHEMATICS AND STATISTICS MAJOR

#### COMPULSORY COURSES

Complete 20 units, including at least one of MATH2330 or STAT2000 from:

**MATH2330: Analysis**  
**MATH2600: Introduction to Modern Mathematical Computation**  
**MATH2800: Ordinary Differential Equations**  
**STAT2000: Applied Statistics and Research Methods**  
**STAT2020: Predictive Analytics**

#### DIRECTED COURSES

Complete 40 units from:

**MATH3120: Algebra**  
**MATH3170: Number Theory**  
**MATH3180: Topology**  
**MATH3205: Fourier Analysis**  
**MATH3210: Directed Studies in Mathematics**  
**MATH3242: Complex Analysis**  
**MATH3400: Research Topics in Mathematics**  
**MATH3510: Combinatorics and Graph Theory**  
**MATH3700: Partial Differential Equations**  
**MATH3800: Optimisation**  
**MATH3820: Numerical Methods**  
**MATH3840: Optimisation in Business and Industry**  
**MATH3850: Industrial Project**  
**STAT3010: Statistical Inference**  
**STAT3030: Generalised Linear Models**  
**STAT3040: Time Series Analysis**  
**STAT3100: Systems Thinking for an Integrated Workforce**  
**STAT3120: Applied Bayesian Methods**  
**STAT3170: Surveys and Experiments**  
**STAT3990: Topics in Statistics**