

PROGRAM PLAN

BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

PROGRAM OPTION:
120 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 Academic 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	COURSE	COURSE	COURSE
YEAR 1	SEMESTER 1				
	SEMESTER 2	B MATH PROGRAMMING DIRECTED COURSE ENGG1003 or INFT1004 or SENG1110 DIRECTED	SCIENCE MAJOR MAJOR	SCIENCE MAJOR MAJOR	SCIENCE MAJOR MAJOR
YEAR 2	SEMESTER 1	MATH1110* Mathematics for Engineering, Science and Technology 1 <i>(MATH1210 no longer offered)</i> CORE	SCIE1001 Professional Scientific Thinking CORE	SCIE1002 Multidisciplinary Laboratories CORE	SCIENCE MAJOR MAJOR
	SEMESTER 2	MATH1120* Mathematics for Engineering, Science and Technology 2 <i>(MATH1220 no longer offered)</i> CORE	MATH1800 Mathematical Modelling CORE	STAT1300 Fundamentals of Statistics <i>(replaces STAT2010 Fundamentals of Statistics)</i> CORE	SCIENCE MAJOR MAJOR
YEAR 3	SEMESTER 1	MATH2310 Calculus of Science and Engineering CORE	SCIE2001 Professional Employment Skills CORE	MATH MAJOR 2000 level MAJOR	MATH2340* Linearity and Continuity 1 <i>(if you have completed both MATH1210 and MATH1220 you will complete an elective instead of MATH2340)</i> CORE
	SEMESTER 2	MATH2350 Linearity and Continuity 2 <i>(replaces MATH2320 Linear Algebra)</i> CORE	SCIE2002 Interdisciplinary Challenges CORE	MATH MAJOR 2000 level MAJOR	SCIENCE MAJOR MAJOR
YEAR 4	SEMESTER 1	SCIE3001A Transdisciplinary Capstone: Planning and Implementing CORE	MATH MAJOR 3000 level MAJOR	SCIENCE MAJOR MAJOR	SCIENCE MAJOR MAJOR
	SEMESTER 2	SCIE3001B Transdisciplinary Capstone: Implementing and Communicating CORE	MATH MAJOR 3000 level MAJOR	SCIENCE MAJOR MAJOR	SCIENCE MAJOR MAJOR
YEAR 5	SEMESTER 1	MATH MAJOR 3000 level MAJOR	MATH MAJOR 3000 level MAJOR	SCIENCE MAJOR MAJOR	SCIENCE MAJOR MAJOR
	SEMESTER 2				

Science Majors available in Pathway B: Animal Biology – Plant Biology – Chemistry – Water, Climate and Soils – Geology – Biodiversity, Conservation and Ecological Sciences – Environmental Remediation – Marine, Coastal and Ecological Sciences – Integrated Geography

Note: The Psychology Major has been reduced to 80 units - please refer to the Semester 1 2019 - 2020 80 unit major program plan.

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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 – 130 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.
- Science Major – 120 units (see Pathway B for Major sequences for individual requirements).
- 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.

** The Standard and Alternate Pathways have now been removed from the program. If you have completed both MATH1210 and MATH1220 you will complete an elective instead of MATH2340, you will complete a total of 60 units of core courses and 50 units of electives. Please refer to the transition documents for further information.*



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 [Academic Program Advisor](#).

PROGRAM PLAN

BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

SCIENCE MAJORS

ANIMAL BIOLOGY MAJOR

COMPULSORY COURSES

Complete all the following compulsory courses:

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

DIRECTED LIST A

Complete 60 units from:

BIOL2001: Molecular Lab Skills for Biological Sciences
BIOL2002: Lab Skills in Biological Systems
BIOL2010: Biochemistry
BIOL2020: Animal Physiology and Development (no longer offered)
BIOL2050: Molecular Genetics
BIOL2090: Microbial Biology
ENVS2004: Ecology
ENVS2006: Ecology and Management of Wildlife

DIRECTED LIST B

Complete 40 units, prioritising BIOL codes as allowed by your enrolment structure:

BIOL3001: Advanced Lab Skills in Biological Sciences
BIOL3020: Animal Physiology, Reproduction & Development
BIOL3090: Molecular Biology
BIOL3100: Microbiology
ENVS2009: Catchment and Water Resource Management
ENVS3002: Environmental Management Perspectives
ENVS3003: Conservation Biology
ENVS6525: Sustainability and Ecosystem Health
SCIE3500: Research Integrated Learning

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

BIODIVERSITY, CONSERVATION & ECOLOGICAL SCIENCES MAJOR

COMPULSORY COURSES

Complete all the following compulsory courses:

ENVS1001: Environmental Science Concepts and Methods
ENVS1003: Environmental Values and Ethics
MARI1000: Our Oceans
ENVS2009: Catchment and Water Resource Management
ENVS3003: Conservation Biology
ENVS3004: Ecotoxicology
ENVS3005: Animal Behaviour

DIRECTED COURSES – 1000 level

Complete 10 units from:

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

DIRECTED COURSES – 3000 level

Complete 40 units from:

ECON3006: Environmental Economics
ENVS3005: Animal Behaviour
ENVS3009: Advanced Water Science and Resource Management (Callaghan offering only)
ENVS3400: Advanced Research Project (no longer offered)
MARI3410: Coral Reef Biology, Ecology and Sustainability

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

CHEMISTRY MAJOR

COMPULSORY COURSES

Complete the following compulsory courses:

CHEM1010: Introductory Chemistry I
CHEM1020: Introductory Chemistry II
CHEM2110: Analytical Chemistry
CHEM2210: Inorganic Chemistry
CHEM2310: Organic Chemistry
CHEM2410: Physical Chemistry

DIRECTED COURSES – 3000 level

Complete 60 units from:

CHEM3110: Instrumental Chemical Analysis
CHEM3210: Nanostructured Materials
CHEM3310: Molecular Organic Synthesis
CHEM3410: Energy and Structure
CHEM3550: Medicinal and Biological Chemistry
CHEM3560: Materials Chemistry: Solids and Semiconductors (no longer offered)
CEHM3570: Spectroscopic Characterisation of Compounds
CHEM3580: Polymers and Colloids

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SCIENCE MAJORS

ENVIRONMENTAL REMEDIATION MAJOR

COMPULSORY COURSES

Complete all the following compulsory courses:

CHEM1010: Introductory Chemistry I
CHEM1020: Introductory Chemistry II
GEOS1040: Earth's Dynamic Systems
GEOS1050: Earth Processes and Products
CHEM2110: Analytical Chemistry
GEOS2050: River Basin Processes
GEOS2161: Spatial Science
CHEM3110: Instrumental Chemical Analysis
ENVS3004: Ecotoxicology
ENVS3007: Environmental Remediation

DIRECTED COURSES – 2000 level

Complete 10 units from:

CHEM2210: Inorganic Chemistry
CHEM2310: Organic Chemistry
CHEM2610: Environmental Chemistry I (no longer offered)

DIRECTED COURSES – 3000 level

Complete 10 units from:

GEOS3250: Advanced Spatial Science
GEOS3340: Climate Change and Resource Management

GEOLOGY MAJOR

COMPULSORY COURSES

Complete all the following compulsory courses:

GEOS1040: Earth's Dynamic Systems
GEOS1050: Earth Processes and Products
GEOS2080: Earth Science Field Course

DIRECTED COURSES – 2000 level

Complete 40 units from:

ENVS2009: Catchment and Water Resource Management
GEOS2050: River Basin Processes
GEOS2060: Soil Properties and Processes
GEOS2161: Spatial Science
GEOS2170: Optical Mineralogy (no longer offered)
GEOS2190: Structural Geology (no longer offered)
GEOS2200: Earth's Sedimentary Rocks and Environments (no longer offered)
SCIE2223: Weather and Waves

DIRECTED COURSES – 3000 level

Complete 50 units from:

ECON3006: Environmental Economics
ENVS3007: Environmental Remediation
ENVS3001: Environmental Impact Assessment
ENVS3009: Advanced Water Science and Resource Management
GEOS3110: Igneous Petrology and Crustal Evolution (no longer offered)
GEOS3160: Energy Resources (no longer offered)
GEOS3170: Resource and Exploration Geology (no longer offered)
GEOS3220: Coastal Environments and Processes
GEOS3250: Advanced Spatial Science
GEOS3280: Global Change and the Rise of Modern Environments
GEOS3330: Tectonics

INTEGRATED GEOGRAPHY MAJOR

COMPULSORY COURSES

Complete all 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 30 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 50 units from:

ENVS3001: Integrated Impact Assessment
ENVS3006: Surviving the Anthropocene
ENVS3007: Environmental Remediation
ENVS3008: Organisational Placement
GEOG3090: Society and Space
GEOG3240: Globalisation: Cities, Economies (no longer offered)
GEOG3300: Rethinking Development
GEOG3330: Work Integrated Learning in Development Studies and Human Geography (no longer offered)
GEOS3220: Coastal Environments and Processes
GEOS3280: Global Change and the Rise of Modern Environments
GEOS3340: Climate Change and Resource Management
SCIE3500: Research Integrated Learning

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SCIENCE MAJORS

MARINE, COASTAL AND ECOLOGICAL SCIENCES MAJOR

COMPULSORY COURSES

Complete all the following compulsory courses:

MARI1000: Our Oceans
ENVS2009: Catchment and Water Resource Management
MARI2300: Marine Biology
MARI2500: Coastal and Marine Ecosystems Services *
ENVS3004: Ecotoxicology
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 40 units from:

ECON3006: Environmental Economics
ENVS3005: Animal Behaviour
ENVS3009: Advanced Water Science and Resource Management (Callaghan offering only)
ENVS3400: Advanced Research Project (no longer offered)
MARI3410: Coral Reef Biology, Ecology and Sustainability
SCIE3500: Research Integrated Learning

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

PLANT BIOLOGY MAJOR

COMPULSORY COURSES

Complete all the following compulsory courses:

BIOL1001: Molecules, Cells and Organisms
BIOL1002: Organisms to Ecosystems
BIOL2001: Molecular Lab Skills for Biological Sciences
BIOL2002: Lab Skills in Biological Systems
BIOL2010: Biochemistry
BIOL2050: Molecular Genetics
BIOL2090: Microbial Biology
BIOL2220: Plant Adaptation to Climate Change
BIOL3001: Advanced Lab Skills in Biological Sciences
BIOL3100: Microbiology
*BIOL3310: Plant Cell and Molecular Biology (no longer offered)
*BIOL3330: Plant Development and Physiology (no longer offered)

* Please choose from the following if you have not completed BIOL3110 and/or BIOL3330:

ENVS2005: Management of Australian Flora
ENVS3002: Environmental Management Perspectives
ENVS3004: Ecotoxicology

WATER, CLIMATE AND SOILS MAJOR

COMPULSORY COURSES

Complete all the following compulsory courses:

GEOS1040: Earth's Dynamic Systems
GEOS1050: Earth Processes and Products
GEOS2050: River Basin Processes
GEOS2060: Soil Properties and Processes
GEOS2080: Earth Science Field Course
GEOS2161: Spatial Science
ENVS3007: Environmental Remediation
GEOS3220: Coastal Environments and Processes
GEOS3250: Advanced Spatial Science
GEOS3340: Climate Change and Resource Management

DIRECTED COURSES – 2000 level

Complete 10 units from:

CHEM2610: Environmental Chemistry I (no longer offered)
ENVS2002: Environmental Legislation and Planning
ENVS2008: The Sustainable Society
ENVS2009: Catchment and Water Resource Management
GEOG2080: Cities & Regions
GEOG2130: Geographies of Development

DIRECTED COURSES – 3000 level

Complete 10 units from:

ENVS3001: Environmental Impact Assessment
ENVS3009: Advanced Water Science & Resource Management
GEOS3160: Energy Resources (no longer offered)
GEOS3280: Global Change and the Rise of Modern Environments

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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

DIRECTED COURSES – 2000 LEVEL

Complete 20 units from:

MATH2242: Complex Analysis (replaces MATH3242, you cannot enrol if you have completed MATH3242)
MATH2330: Analysis (no longer offered)
MATH2350: Linearity and continuity 2 (if you have completed both MATH2320 and MATH2330 you cannot enrol in MATH2350)
MATH2800: Ordinary Differential Equations

DIRECTED COURSES – 3000 LEVEL

Complete 40 units from:

MATH3120: Algebra
MATH3170: Number Theory
MATH3205: Fourier Analysis
MATH3210: Directed Studies in Mathematics (no longer offered)
MATH3242: Complex Analysis (replaced by MATH2242, cannot enrol in both)
MATH3700: Partial Differential Equations
MATH3800: Optimisation (no longer offered)
MATH3820: Numerical Methods
MATH3840: Optimisation in Business and Industry (no longer offered)
MATH3850: Industrial Project (no longer offered)
STAT3030: Generalised Linear Models
STAT3040: Time Series Analysis
STAT3100: Systems Thinking for an Integrated Workforce
STAT3120: Applied Bayesian Methods (no longer offered)
STAT3170: Surveys and Experiments (no longer offered)
STAT3800: Deterministic and Stochastic Optimisation

PURE MATHEMATICS MAJOR

DIRECTED COURSES – 2000 LEVEL

Complete 20 units from:

MATH2242: Complex Analysis (replaces MATH3242, you cannot enrol if you have completed MATH3242)
MATH2330: Analysis (no longer offered)
MATH2350: Linearity and continuity 2 (if you have completed both MATH2320 and MATH2330 you cannot enrol in MATH2350)
MATH2600: Introduction to Modern Mathematical Computation (course no longer offered)
MATH2800: Ordinary Differential Equations

DIRECTED COURSES – 3000 LEVEL

Complete 40 units from:

MATH3010: Logic and Set Theory (no longer offered)
MATH3120: Algebra
MATH3170: Number Theory
MATH3180: Topology (no longer offered)
MATH3205: Fourier Analysis
MATH3210: Directed Studies in Mathematics (no longer offered)
MATH3242: Complex Analysis (replaced by MATH2242, cannot enrol in both)
MATH3510: Combinatorics and Graph Theory (no longer offered)
MATH3700: Partial Differential Equations
MATH3820: Numerical Methods
STAT3030: Generalised Linear Models
STAT3040: Time Series Analysis
STAT3100: Systems Thinking for an Integrated Workforce
STAT3120: Applied Bayesian Methods (no longer offered)
STAT3170: Surveys and Experiments (no longer offered)
STAT3800: Deterministic and Stochastic Optimisation

PROGRAM PLAN

BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

MATHEMATICS MAJORS

STUDIES IN MATHEMATICS AND STATISTICS MAJOR

DIRECTED COURSES

Complete 20 units, including at least one of MATH2330 or MATH2350 or STAT2000 from:

MATH2330: Analysis *(no longer offered)*

MATH2350: Linearity and continuity 2 *(if you have completed both MATH2320 and MATH2330 you cannot enrol in MATH2350)*

MATH2600: Introduction to Modern Mathematical Computation *(no longer offered)*

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 *(no longer offered)*

MATH3205: Fourier Analysis

MATH3210: Directed Studies in Mathematics *(no longer offered)*

MATH3242: Complex Analysis *(no longer offered)*

MATH3400: Research Topics in Mathematics *(no longer offered)*

MATH3510: Combinatorics and Graph Theory *(no longer offered)*

MATH3700: Partial Differential Equations

MATH3800: Optimisation *(no longer offered)*

MATH3820: Numerical Methods

MATH3840: Optimisation in Business and Industry *(no longer offered)*

MATH3850: Industrial Project *(no longer offered)*

STAT3010: Statistical Inference *(no longer offered)*

STAT3030: Generalised Linear Models

STAT3040: Time Series Analysis

STAT3100: Systems Thinking for an Integrated Workforce

STAT3120: Applied Bayesian Methods *(no longer offered)*

STAT3170: Surveys and Experiments *(no longer offered)*

STAT3800: Deterministic and Stochastic Optimisation

STAT3990: Topics in Statistics *(no longer offered)*

STATISTICS MAJOR

COMPULSORY COURSES

Complete the following compulsory courses:

STAT2000: Applied Statistics and Research Methods

STAT2020: Predictive Analytics

STAT3010: Statistical Inference *(no longer offered – if you have not completed STAT3010, you need to complete STAT2300)*

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 *(no longer offered)*

STAT3170: Surveys and Experiments *(no longer offered)*

STAT3800: Deterministic and Stochastic Optimisation