PROGRAM PLAN

BACHELOR OF MATHEMATICS/BACHELOR OF SCIENCE

PROGRAM OPTION:
Pathway B – 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 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 1	SEMESTER 1				
	SEMESTER 2	B MATH PROGRAMMING DIRECTED COURSE DIRECTED	SCIENCE MAJOR MAJOR	SCIENCE MAJOR MAJOR	SCIENCE MAJOR MAJOR
YEAR 2	SEMESTER 1	MATH1210 Mathematical Discovery 1 CORE ---- *OR* ---- MATH1110 Mathematics for Engineering, Science and Technology 1 CORE	SCIE1001 Professional Scientific Thinking CORE	SCIE1002 Multidisciplinary Laboratories CORE	SCIENCE MAJOR MAJOR
	SEMESTER 2	MATH1220 Mathematical Discovery 2 CORE ---- *OR* ---- MATH1120 Mathematics for Engineering, Science and Technology 2 CORE	MATH1800 Mathematical Modelling CORE	STAT2010 Fundamentals of Statistics 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	ELECTIVE* 1000/2000/3000 Level ELECTIVE ---- *OR* ---- MATH2340 Linearity and Continuity CORE
	SEMESTER 2	MATH2320 Linear Algebra 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 – Psychology

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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 – 120 units (see Pathway B for Major sequences for individual requirements).
- Electives - 10 units for Standard pathway students or zero 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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B SCIENCE MAJORS

ANIMAL BIOLOGY MAJOR

COMPULSORY COURSES
Complete 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
BIOL2020: Animal Physiology and Development
BIOL2050: Molecular Genetics
BIOL2090: Microbial Biology
BIOL3001: Advanced Lab Skills in Biological Sciences
BIOL3020: Reproductive Physiology and Development
BIOL3090: Molecular Biology
BIOL3100: Microbiology

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 – 2000 level
Complete 20 units from:

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

DIRECTED COURSES – 3000 level
Complete 30 units from:

ENVS3009: Advanced Water Science and Resource Management
ENVS3400: 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.**

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
CHEM3570: Spectroscopic Characterisation of Compounds
CHEM3580: Polymers and Colloids

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B 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
CHEM2610: Environmental Chemistry I
GEOS2050: River Basin Processes
GEOS2161: Spatial Science
CHEM3110: Instrumental Chemical Analysis
ENVS3004: Ecotoxicology
ENVS3007: Environmental Remediation

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
GEOS2170: Optical Mineralogy
GEOS2190: Structural Geology
GEOS2200: Earth's Sedimentary Rocks and Environments
GEOS3110: Igneous Petrology and Crustal Evolution
GEOS3160: Energy Resources
GEOS3170: Resource and Exploration Geology
GEOS3330: Tectonics

DIRECTED COURSES – 2000 level
Complete 10 units from:

GEOS2050: River Basin Processes
GEOS2060: Soil Properties and Processes
GEOS2161: Spatial Science

DIRECTED COURSES – 3000 level
Complete 10 units from:

ENVS3007: Environmental Remediation
GEOS3220: Coastal Environments and Processes
GEOS3250: Advanced Spatial Science
GEOS3280: Global Change and the Rise of Modern Environments

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 Basis Processes
GEOS2080: Earth Science Field Course
SOCS2400: Applied Social Research

DIRECTED COURSES – 3000 level
Complete 50 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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B 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:

ENVS3005: Animal Behaviour
ENVS3009: Advanced Water Science and Resource Management
ENVS3400: Advanced Research Project
MARI3410: Coral Reef Biology, Ecology and Sustainability
ECON3006: Environmental Economics

*** 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 Cell Development
BIOL3001: Advanced Lab Skills in Biological Sciences
BIOL3100: Microbiology
BIOL3310: Plant Cell and Molecular Biology
BIOL3330: Plant Development and Physiology

PSYCHOLOGY MAJOR

COMPULSORY COURSES
Complete all the following compulsory courses:

PSYC1010: Psychology Introduction 1
PSYC1020: Psychology Introduction 2
PSYC2300: Cognitive Psychology
PSYC2400: Biological Psychology
STAT2000: Applied Statistics and Research Methods
STAT2010: Fundamentals of Statistics
STAT2020: Predictive Analytics
PSYC3000: Advanced Research Methods and Stats in Psych
PSYC3001: Advanced Psychological Measurement
PSYC3200: Foundations of Applied Neuropsychology
PSYC3301: Advanced Perception and Learning in Psychology
PSYC3700: Advanced Developmental Psychology and Developmental Psychopathology

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B SCIENCE MAJOR

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
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:

ENVS3009: Advanced Water Science & Resource Management
GEOS3160: Energy Resources
GEOS3280: Global Change and the Rise of Modern Environments

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DIRECTED MATH PROGRAMMING COURSE

DIRECTED COURSES
Complete 10 units from:

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

MATHEMATICS MAJORS

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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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