

# Bachelor of Mathematical Sciences (BMaSc)

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## Program Code

BMASC

## Program Minimum Units

72

## Standard Duration

3 Years

## Program Faculty

Faculty of Engineering, Computer and Math Sciences

## AQF Level

07

## Academic Year

2017

These Program Rules should be read in conjunction with the University's policies (<http://www.adelaide.edu.au/policies>).

## Overview

This program is designed for those seeking a high level of mathematical and statistical training. The program provides a foundation in mathematics and statistics. Students also have the option of majoring in pure mathematics, applied mathematics or statistics. Applied mathematics courses cover topics that aim to achieve a balance between mathematical theories and practical applications of mathematics in the world around us. Pure mathematics courses are fundamental to applied mathematics, statistics, computer science, mathematical physics and many other areas of application and they also offer valuable training in rigour and logical thinking. Statistics courses provide the training to enable graduates to solve real-world problems by appropriately collecting, analysing and modelling data.

The Bachelor of Mathematical Sciences is an AQF Level 7 qualification with a standard full-time duration of 3 years.

## Academic Program Rules for Bachelor of Mathematical Sciences (BMaSc)

There shall be a Bachelor of Mathematical Sciences (BMaSc).

## Qualification Requirements

### Academic Program

To qualify for the degree of Mathematical Sciences, the student must complete satisfactorily a program of study consisting of the following requirements with a combined total of not less than 72 units, comprising:

1. Level I courses to the value of at least 18 units
2. Level II courses to the value of at least 21 units
3. Level III courses to the value of at least 24 units, with Mathematical Sciences courses to the value of at least 18 units. Note the course MATHS 3015 Communication Skills III is not

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considered a Mathematical Sciences course for the purpose of this clause.

4. A major to the value of 24 units may be taken in one of the following:
  - Applied Mathematics
  - Pure Mathematics
  - Statistics
5. A double major to the value of 24 units may be taken in one of the following:
  - Applied Mathematics and Pure Mathematics
  - Applied Mathematics and Statistics
  - Pure Mathematics and Applied Mathematics
  - Pure Mathematics and Statistics
  - Statistics and Applied Mathematics
  - Statistics and Pure Mathematics

### Courses Not Permitted

The following courses cannot be presented as electives:

ECON 1008 Business & Economic Statistics I  
ECON 1010 Introduction to Mathematical Economics (Advanced) 1  
ECON 2503 Intermediate Mathematical Economics II  
ECON 2504 Intermediate Econometrics II

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To satisfy the requirements for Bachelor of Mathematical Sciences students must complete courses to the value of 72 units.

#### Core

All of the following courses must be completed:

COMP SCI 1012 [Scientific Computing](#) (3 units)  
MATHS 1008 [Mathematics for Information Technology I](#) (3 units)  
MATHS 1011 [Mathematics IA](#) (3 units)  
MATHS 1012 [Mathematics IB](#) (3 units)  
MATHS 2100 [Real Analysis II](#) (3 units)  
MATHS 2101 [Multivariable & Complex Calculus II](#) (3 units)  
MATHS 2102 [Differential Equations II](#) (3 units)  
MATHS 2103 [Probability & Statistics II](#) (3 units)  
MATHS 3015 [Communication Skills III](#) (3 units)  
STATS 1005 [Statistical Analysis & Modelling 1](#) (3 units)

#### Electives

Electives to the value of 42 units including:

Level I Electives from any discipline (3 units)  
Level I, II or III Electives from any discipline (9 units)  
Level II Electives from any discipline (9 units)  
Level III Electives from any discipline (3 units)  
Level III Applied Mathematics, Pure Mathematics or Statistics Electives (18 units)

Electives may be chosen from courses offered by the School of Mathematical Sciences, School of Computer Sciences or any other undergraduate courses offered by the University that are available to the student.

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APP MTH 2105 [Optimisation and Operations Research II](#) (3 units)  
APP MTH 3001 [Applied Probability III](#) (3 units)  
APP MTH 3002 [Fluid Mechanics III](#) (3 units)  
APP MTH 3014 [Optimisation III](#) (3 units)  
APP MTH 3016 [Random Processes III](#) (3 units)  
APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)  
APP MTH 3021 [Modelling with Ordinary Differential Equations III](#) (3 units)  
APP MTH 3022 [Optimal Functions and Nanomechanics III](#) (3 units)  
APP MTH 3023 [Partial Differential Equations and Waves III](#) (3 units)

### Mathematical Sciences Courses

MATHS 2104 [Numerical Methods II](#) (3 units)  
MATHS 3012 [Financial Modelling: Tools & Techniques III](#) (3 units)

### Pure Mathematics Courses

PURE MTH 2106 [Algebra II](#) (3 units)  
PURE MTH 3002 [Topology and Analysis III](#) (3 units)  
PURE MTH 3003 [Number Theory III](#) (3 units)  
PURE MTH 3007 [Groups and Rings III](#) (3 units)  
PURE MTH 3009 [Integration and Analysis III](#) (3 units)  
PURE MTH 3018 [Coding & Cryptology III](#) (3 units)  
PURE MTH 3019 [Complex Analysis III](#) (3 units)  
PURE MTH 3021 [Logic & Computability](#) (3 units)  
PURE MTH 3022 [Geometry of Surfaces III](#) (3 units)  
PURE MTH 3023 [Fields and Modules III](#) (3 units)  
PURE MTH 3024 [Finite Geometry III](#) (3 units)

### Statistics Courses

STATS 2107 [Statistical Modelling and Inference II](#) (3 units)  
STATS 3001 [Statistical Modelling III](#) (3 units)  
STATS 3003 [Sampling Theory and Practice III](#) (3 units)  
STATS 3005 [Time Series III](#) (3 units)  
STATS 3006 [Mathematical Statistics III](#) (3 units)  
STATS 3008 [Biostatistics III](#) (3 units)

## Applied Mathematics Major

To satisfy the requirements for Applied Mathematics Major students must complete courses to the value of 24 units.

Courses to the value of at least 12 units from the following:

APP MTH 3001 [Applied Probability III](#) (3 units)  
APP MTH 3002 [Fluid Mechanics III](#) (3 units)  
APP MTH 3014 [Optimisation III](#) (3 units)  
APP MTH 3016 [Random Processes III](#) (3 units)  
APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)  
APP MTH 3021 [Modelling with Ordinary Differential Equations III](#) (3 units)  
APP MTH 3022 [Optimal Functions and Nanomechanics III](#) (3 units)  
APP MTH 3023 [Partial Differential Equations and Waves III](#) (3 units)

**and**

Mathematical Sciences courses to the value of 12 units.

## Pure Mathematics Major

To satisfy the requirements for Pure Mathematics Major students must complete courses to the value of 24 units.

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Courses to the value of at least 12 units from the following:

- PURE MTH 3002 [Topology and Analysis III](#) (3 units)
- PURE MTH 3003 Number Theory III (3 units)
- PURE MTH 3007 [Groups and Rings III](#) (3 units)
- PURE MTH 3009 [Integration and Analysis III](#) (3 units)
- PURE MTH 3018 Coding & Cryptology III (3 units)
- PURE MTH 3019 [Complex Analysis III](#) (3 units)
- PURE MTH 3021 Logic & Computability (3 units)
- PURE MTH 3022 [Geometry of Surfaces III](#) (3 units)
- PURE MTH 3023 [Fields and Modules III](#) (3 units)
- PURE MTH 3024 Finite Geometry III (3 units)

**and**

Mathematical Sciences courses to the value of 12 units.

### Statistics Major

To satisfy the requirements for Statistics Major students must complete courses to the value of 24 units.

All of the following courses must be completed:

- STATS 3001 [Statistical Modelling III](#) (3 units)
- STATS 3006 [Mathematical Statistics III](#) (3 units)

**and**

Courses to the value of at least 6 units from the following:

- STATS 3003 [Sampling Theory and Practice III](#) (3 units)
- STATS 3005 [Time Series III](#) (3 units)
- STATS 3008 Biostatistics III (3 units)
- APP MTH 3001 [Applied Probability III](#) (3 units)
- APP MTH 3016 [Random Processes III](#) (3 units)
- APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)

**and**

Mathematical Sciences courses to the value of 12 units.

### Applied Mathematics and Pure Mathematics Double Major

To satisfy the requirements for Applied Mathematics and Pure Mathematics Double Major students must complete courses to the value of 24 units.

Courses to the value of at least 12 units from the following:

- APP MTH 3001 [Applied Probability III](#) (3 units)
- APP MTH 3002 [Fluid Mechanics III](#) (3 units)
- APP MTH 3014 [Optimisation III](#) (3 units)
- APP MTH 3016 [Random Processes III](#) (3 units)
- APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)
- APP MTH 3021 [Modelling with Ordinary Differential Equations III](#) (3 units)
- APP MTH 3022 [Optimal Functions and Nanomechanics III](#) (3 units)
- APP MTH 3023 [Partial Differential Equations and Waves III](#) (3 units)

**plus**

Courses to the value of at least 9 units from the following:

- PURE MTH 3002 [Topology and Analysis III](#) (3 units)
- PURE MTH 3003 Number Theory III (3 units)

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PURE MTH 3007 [Groups and Rings III](#) (3 units)  
PURE MTH 3009 [Integration and Analysis III](#) (3 units)  
PURE MTH 3018 Coding & Cryptology III (3 units)  
PURE MTH 3019 [Complex Analysis III](#) (3 units)  
PURE MTH 3021 Logic & Computability (3 units)  
PURE MTH 3022 [Geometry of Surfaces III](#) (3 units)  
PURE MTH 3023 [Fields and Modules III](#) (3 units)  
PURE MTH 3024 Finite Geometry III (3 units)

**and**

Mathematical Sciences courses to the value of 3 units.

### Applied Mathematics and Statistics Double Major

To satisfy the requirements for Applied Mathematics and Statistics Double Major students must complete courses to the value of 24 units.

Courses to the value of at least 12 units from the following:

APP MTH 3001 [Applied Probability III](#) (3 units)  
APP MTH 3002 [Fluid Mechanics III](#) (3 units)  
APP MTH 3014 [Optimisation III](#) (3 units)  
APP MTH 3016 [Random Processes III](#) (3 units)  
APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)  
APP MTH 3021 [Modelling with Ordinary Differential Equations III](#) (3 units)  
APP MTH 3022 [Optimal Functions and Nanomechanics III](#) (3 units)  
APP MTH 3023 [Partial Differential Equations and Waves III](#) (3 units)

**plus**

All of the following courses must be completed:

STATS 3001 [Statistical Modelling III](#) (3 units)  
STATS 3006 [Mathematical Statistics III](#) (3 units)

**and**

Courses to the value of at least 3 units from the following:

APP MTH 3001 [Applied Probability III](#) (3 units)  
APP MTH 3016 [Random Processes III](#) (3 units)  
APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)  
STATS 3003 [Sampling Theory and Practice III](#) (3 units)  
STATS 3005 [Time Series III](#) (3 units)  
STATS 3008 Biostatistics III (3 units)

**and**

Mathematical Sciences courses to the value of 3 units.

Note the following courses may only be presented towards a major in Statistics or a major in Applied Mathematics but not both:

APP MTH 3001 Applied Probability III  
APP MTH 3016 Random Processes III  
APP MTH 3020 Stochastic Decision Theory III

### Pure Mathematics and Applied Mathematics Double Major

To satisfy the requirements for Pure Mathematics and Applied Mathematics Double Major students must complete courses to the value of 24 units.

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Courses to the value of at least 12 units from the following:

- PURE MTH 3002 [Topology and Analysis III](#) (3 units)
- PURE MTH 3003 Number Theory III (3 units)
- PURE MTH 3007 [Groups and Rings III](#) (3 units)
- PURE MTH 3009 [Integration and Analysis III](#) (3 units)
- PURE MTH 3018 Coding & Cryptology III (3 units)
- PURE MTH 3019 [Complex Analysis III](#) (3 units)
- PURE MTH 3021 Logic & Computability (3 units)
- PURE MTH 3022 [Geometry of Surfaces III](#) (3 units)
- PURE MTH 3023 [Fields and Modules III](#) (3 units)
- PURE MTH 3024 Finite Geometry III (3 units)

**plus**

Courses to the value of at least 9 units from the following:

- APP MTH 3001 [Applied Probability III](#) (3 units)
- APP MTH 3002 [Fluid Mechanics III](#) (3 units)
- APP MTH 3014 [Optimisation III](#) (3 units)
- APP MTH 3016 [Random Processes III](#) (3 units)
- APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)
- APP MTH 3021 [Modelling with Ordinary Differential Equations III](#) (3 units)
- APP MTH 3022 [Optimal Functions and Nanomechanics III](#) (3 units)
- APP MTH 3023 [Partial Differential Equations and Waves III](#) (3 units)

**and**

Mathematical Sciences courses to the value of 3 units.

### Pure Mathematics and Statistics Double Major

To satisfy the requirements for Pure Mathematics and Statistics Double Major students must complete courses to the value of 24 units.

Courses to the value of at least 12 units from the following:

- PURE MTH 3002 [Topology and Analysis III](#) (3 units)
- PURE MTH 3003 Number Theory III (3 units)
- PURE MTH 3007 [Groups and Rings III](#) (3 units)
- PURE MTH 3009 [Integration and Analysis III](#) (3 units)
- PURE MTH 3018 Coding & Cryptology III (3 units)
- PURE MTH 3019 [Complex Analysis III](#) (3 units)
- PURE MTH 3021 Logic & Computability (3 units)
- PURE MTH 3022 [Geometry of Surfaces III](#) (3 units)
- PURE MTH 3023 [Fields and Modules III](#) (3 units)
- PURE MTH 3024 Finite Geometry III (3 units)

**plus**

All of the following courses must be completed:

- STATS 3001 [Statistical Modelling III](#) (3 units)
- STATS 3006 [Mathematical Statistics III](#) (3 units)

**and**

Courses to the value of at least 3 units from the following:

- APP MTH 3001 [Applied Probability III](#) (3 units)
- APP MTH 3016 [Random Processes III](#) (3 units)
- APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)
- STATS 3003 [Sampling Theory and Practice III](#) (3 units)

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STATS 3005 [Time Series III](#) (3 units)

STATS 3008 Biostatistics III (3 units)

**and**

Mathematical Sciences courses to the value of 3 units.

### Statistics and Applied Mathematics Double Major

To satisfy the requirements for Statistics and Applied Mathematics Double Major students must complete courses to the value of 24 units.

All of the following courses must be completed:

STATS 3001 [Statistical Modelling III](#) (3 units)

STATS 3006 [Mathematical Statistics III](#) (3 units)

**and**

Courses to the value of at least 6 units from the following:

APP MTH 3001 [Applied Probability III](#) (3 units)

APP MTH 3016 [Random Processes III](#) (3 units)

APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)

STATS 3003 [Sampling Theory and Practice III](#) (3 units)

STATS 3005 [Time Series III](#) (3 units)

STATS 3008 Biostatistics III (3 units)

**plus**

Courses to the value of at least 9 units from the following:

APP MTH 3001 [Applied Probability III](#) (3 units)

APP MTH 3002 [Fluid Mechanics III](#) (3 units)

APP MTH 3014 [Optimisation III](#) (3 units)

APP MTH 3016 [Random Processes III](#) (3 units)

APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)

APP MTH 3021 [Modelling with Ordinary Differential Equations III](#) (3 units)

APP MTH 3022 [Optimal Functions and Nanomechanics III](#) (3 units)

APP MTH 3023 [Partial Differential Equations and Waves III](#) (3 units)

**and**

Mathematical Sciences courses to the value of 3 units.

Note the following courses may only be presented towards a major in Statistics or a major in Applied Mathematics but not both:

APP MTH 3001 Applied Probability III

APP MTH 3016 Random Processes III

APP MTH 3020 Stochastic Decision Theory III

### Statistics and Pure Mathematics Double Major

To satisfy the requirements for Statistics and Pure Mathematics Double Major students must complete courses to the value of 24 units.

All of the following courses must be completed:

STATS 3001 [Statistical Modelling III](#) (3 units)

STATS 3006 [Mathematical Statistics III](#) (3 units)

**and**

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Courses to the value of at least 6 units from the following:

APP MTH 3001 [Applied Probability III](#) (3 units)  
APP MTH 3016 [Random Processes III](#) (3 units)  
APP MTH 3020 [Stochastic Decision Theory III](#) (3 units)  
STATS 3003 [Sampling Theory and Practice III](#) (3 units)  
STATS 3005 [Time Series III](#) (3 units)  
STATS 3008 Biostatistics III (3 units)

**plus**

Courses to the value of at least 9 units from the following:

PURE MTH 3002 [Topology and Analysis III](#) (3 units)  
PURE MTH 3003 Number Theory III (3 units)  
PURE MTH 3007 [Groups and Rings III](#) (3 units)  
PURE MTH 3009 [Integration and Analysis III](#) (3 units)  
PURE MTH 3018 Coding & Cryptology III (3 units)  
PURE MTH 3019 [Complex Analysis III](#) (3 units)  
PURE MTH 3021 Logic & Computability (3 units)  
PURE MTH 3022 [Geometry of Surfaces III](#) (3 units)  
PURE MTH 3023 [Fields and Modules III](#) (3 units)  
PURE MTH 3024 Finite Geometry III (3 units)

**and**

Mathematical Sciences courses to the value of 3 units.

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