



# MATH106

## A View of Mathematics

S2 Day 2018

*Dept of Mathematics*

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#### **Disclaimer**

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

Unit convenor and teaching staff

Unit Convenor

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Monday, 12 Midday

Frank Schoenig

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Credit points

3

Prerequisites

Admission to BED(ECE)(0-12) or BEd(Prim) or BEd(Sec) or BEd(TESOL) or BTeach(0-5) or BTeach(ECS) or BABEd(Prim) or BA-PsychBEd(Prim) or BADipEd or BA-PsychDipEd or GDipEd

Corequisites

Co-badged status

Unit description

This unit is principally designed for students intending to teach in primary schools. It emphasises the use of imagination and logical thinking in developing mathematical approaches to solve a wide variety of interesting problems. In addition, the material is selected in a way that encourages students to appreciate the importance of mathematics as part of our cultural heritage. The material in this unit is accessible to students who have studied little mathematics at secondary level.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.

Develop an appreciation for the underlying mathematics found in everyday scenes and occurrences.

Application of mathematical principles and mathematical thinking in developing mathematical approaches to solve practical and abstract problems.

Ability to formulate and model practical and abstract problems in mathematical terms using the methods taught in Math106

Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning at the level appropriate for Math106

Appropriate interpretation of information communicated in mathematical form

Appropriate presentation of information, reasoning and conclusions in both written and spoken form to their peers and their teachers.

Ability to work effectively, responsibly and safely in an individual or team context.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Tutorial Participation</u>	20%	Yes	Weekly
<u>Assignments</u>	60%	No	Week 6, 10, 14
<u>Mastery tests</u>	20%	No	By End of Semester

### Tutorial Participation

Due: **Weekly**

Weighting: **20%**

**This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

There will be 13 weekly quizzes that will be completed prior to attending the weekly tutorial. These will be based on preparatory material for the tutorials. The completion of the quiz prior to the tutorial and participation in the tutorial will be used to calculate a tutorial participation mark. The best 8 of these will be used to calculate the tutorial participation mark that will contribute to a students grade.

**Hurdle:** attendance and participation in at least 8 tutorials is required in order to pass the unit.

On successful completion you will be able to:

- Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.
- Develop an appreciation for the underlying mathematics found in everyday scenes and

occurrences.

- Application of mathematical principles and mathematical thinking in developing mathematical approaches to solve practical and abstract problems.
- Ability to formulate and model practical and abstract problems in mathematical terms using the methods taught in Math106
- Appropriate interpretation of information communicated in mathematical form
- Ability to work effectively, responsibly and safely in an individual or team context.

## Assignments

Due: **Week 6, 10, 14**

Weighting: **60%**

There will be three assignments based on the material taught in the unit and on additional research that the students will be required to undertake. The assignments will require students to demonstrate understanding of the unit material, the ability to apply that knowledge, the ability to analyse and also to use some creativity.

On successful completion you will be able to:

- Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.
- Develop an appreciation for the underlying mathematics found in everyday scenes and occurrences.
- Application of mathematical principles and mathematical thinking in developing mathematical approaches to solve practical and abstract problems.
- Ability to formulate and model practical and abstract problems in mathematical terms using the methods taught in Math106
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning at the level appropriate for Math106
- Appropriate interpretation of information communicated in mathematical form
- Appropriate presentation of information, reasoning and conclusions in both written and spoken form to their peers and their teachers.
- Ability to work effectively, responsibly and safely in an individual or team context.

## Mastery tests

Due: **By End of Semester**

Weighting: **20%**

There will be three online mastery tests. These tests will be considered passed if a required standard of understanding is demonstrated. The tests will be able to be taken as many times as

a student needs in order to attain mastery. The tests will be designed in a way that ensures students are practiced at doing the Literacy and Numeracy Test for Initial Teachers.

On successful completion you will be able to:

- Application of mathematical principles and mathematical thinking in developing mathematical approaches to solve practical and abstract problems.
- Ability to formulate and model practical and abstract problems in mathematical terms using the methods taught in Math106
- Appropriate interpretation of information communicated in mathematical form

## Delivery and Resources

### Classes

**Lectures:** you should attend one hour of lectures each week.

**Tutorials:** you should attend one two hour tutorial each week.

### Required and Recommended Texts and/or Materials

The required text for this unit is the smart book option of Mathematics for Elementary Teachers: A Conceptual Approach Bennett, Burton, Nelson and Ediger, 10th edition.

The text is also available as an ebook or as a hardback, but we will be utilizing the smart book resources. Past students have found this textbook very useful and have also said they believe they will continue to use it as they begin their teaching careers.

In addition the following are some good modern websites with material for “Mathematical Outreach”. Some of the material is suitable for primary level, other secondary; but all is good for general interest in mathematics and its varied uses:

- [Math Amaze](#).
- Maths in and out of the zoo, a talk for all ages. ([Powerpoint slides](#))
- [NRICH](#), online magazine.
- [+plus](#), online magazine.
- [Motivate](#), enrichment resources.

There are other resources which may be of use in your later Primary teaching. The Mathematics Department in no way endorses these products, but merely informs you of their existence.

- [Maths Practice](#)
- [PrimaryGames](#)

### Numeracy Centre

The Numeracy Centre (Room E7B G.088) offers free drop in help to students enrolled in first year courses with a math component. This help is available for students who are studying

MATH106. See the Centre's website for further information <http://www.maths.mq.edu.au/numeracy.html>

### Technology Used and Required

Students are expected to have access to an internet enabled computer with a web browser and Adobe Reader software. Several areas of the university provide wireless access for portable computers. There are computers for student use in the Library and the labs at 17 Wally's Walk.

**Difficulties with your home computer or internet connection do not constitute a reasonable excuse for lateness of, or failure to submit, assessment tasks.**

### Student Support

If you are experiencing personal, financial, or other difficulties, there are a variety of place to obtain help.

There is Campus Well Being. See [here](#).

Another option is "Student Connect", who are located in MUSE, 18 Wally's Walk. They are on level 2.

Also, the Faculty of Science and Engineering have Student Support Officers to provide assistance. They can be contacted at [sci.studentsupport@mq.edu.au](mailto:sci.studentsupport@mq.edu.au). The Science Centre itself is on the ground floor of 14SCO (formerly E7B). It's opposite the lifts.

## Unit Schedule

Week	Topic (NSW Syllabus Content Strand)	On Campus	Task Due
1	Problem Solving (Working Mathematically)		Quiz 1
2	Number Systems (Number and Algebra)		Quiz 2
3	Working with Numbers (Number and Algebra)		Quiz 3
4	Properties of Whole Numbers (Number and Algebra)	Saturday, 10 - 5, end of week 4, Covering tutorials 1 - 5	Quiz 4
5	Properties of Whole Numbers (Number and Algebra)		Quiz 5

6	Working with numbers between the whole numbers (Number and Algebra)		Quiz 6 Assignment 1
7	Creating and Interpreting Graphs (Statistics and Probability)		Quiz 7
Mid Semester			
8	Probability and Counting (Statistics and Probability)	Saturday, 10 - 5, end of week 8 Covering tutorials 6 - 9	Quiz 8
9	Probability and Counting (Statistics and Probability)		Quiz 9
10	Geometric Figures (Measurement and Geometry)		Quiz 10 Assignment 2
11	Geometric Figures (Measurement and Geometry)		Quiz 11
12	Geometric Figures (Measurement and Geometry)	Saturday, 10 - 5, end of week 12 Covering tutorials 10 - 13	Quiz 12
13	Measurement (Measurement and Geometry)		Quiz 13 Assignment 3 due Week 14

## Learning and Teaching Activities

### Tutorial Preparation

In this activity students will engage with online learning activities that develop some understanding of the material that will be covered and further developed in the tutorials

### Tutorials

During the two hour tutorials, students will engage in activities that further develop their

conceptual understanding of the material that is being covered. The tutorials will be student focused with students engaging in collaborative group work in order to explore mathematical ideas and further develop their understanding of the content of the unit.

## Lectures

Each week a one hour lecture will follow the tutorials and will be used to consolidate students conceptual understanding of the topics being covered.

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

## Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](https://ask.mq.edu.au).



## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

### Learning outcomes

- Application of mathematical principles and mathematical thinking in developing mathematical approaches to solve practical and abstract problems.
- Ability to formulate and model practical and abstract problems in mathematical terms using the methods taught in Math106
- Appropriate presentation of information, reasoning and conclusions in both written and

spoken form to their peers and their teachers.

## **Assessment task**

- Assignments

## **Learning and teaching activity**

- During the two hour tutorials, students will engage in activities that further develop their conceptual understanding of the material that is being covered. The tutorials will be student focused with students engaging in collaborative group work in order to explore mathematical ideas and further develop their understanding of the content of the unit.
- Each week a one hour lecture will follow the tutorials and will be used to consolidate students conceptual understanding of the topics being covered.

## **Capable of Professional and Personal Judgement and Initiative**

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

## **Learning outcomes**

- Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning at the level appropriate for Math106
- Ability to work effectively, responsibly and safely in an individual or team context.

## **Assessment task**

- Assignments

## **Discipline Specific Knowledge and Skills**

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

## Learning outcomes

- Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.
- Develop an appreciation for the underlying mathematics found in everyday scenes and occurrences.
- Application of mathematical principles and mathematical thinking in developing mathematical approaches to solve practical and abstract problems.
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- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning at the level appropriate for Math106
- Appropriate interpretation of information communicated in mathematical form
- Appropriate presentation of information, reasoning and conclusions in both written and spoken form to their peers and their teachers.

## Assessment tasks

- Tutorial Participation
- Assignments
- Mastery tests

## Learning and teaching activities

- In this activity students will engage with online learning activities that develop some understanding of the material that will be covered and further developed in the tutorials
- During the two hour tutorials, students will engage in activities that further develop their conceptual understanding of the material that is being covered. The tutorials will be student focused with students engaging in collaborative group work in order to explore mathematical ideas and further develop their understanding of the content of the unit.
- Each week a one hour lecture will follow the tutorials and will be used to consolidate students conceptual understanding of the topics being covered.

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

## Learning outcomes

- Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.
- Develop an appreciation for the underlying mathematics found in everyday scenes and occurrences.
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- Each week a one hour lecture will follow the tutorials and will be used to consolidate students conceptual understanding of the topics being covered.

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

## Learning outcomes

- Understanding of the breadth of the discipline, its role in other fields, its value in

education in general and its importance as part of our cultural heritage.

- Application of mathematical principles and mathematical thinking in developing mathematical approaches to solve practical and abstract problems.
- Ability to formulate and model practical and abstract problems in mathematical terms using the methods taught in Math106
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## **Assessment tasks**

- Tutorial Participation
- Assignments
- Mastery tests

## **Learning and teaching activities**

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## **Effective Communication**

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

## **Learning outcomes**

- Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning at the level appropriate for Math106
- Appropriate interpretation of information communicated in mathematical form
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- Ability to work effectively, responsibly and safely in an individual or team context.

## Assessment task

- Assignments

## Learning and teaching activity

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- Each week a one hour lecture will follow the tutorials and will be used to consolidate students conceptual understanding of the topics being covered.

## Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

## Learning outcomes

- Understanding of the breadth of the discipline, its role in other fields, its value in education in general and its importance as part of our cultural heritage.
- Ability to work effectively, responsibly and safely in an individual or team context.

## Assessment task

- Assignments

## Learning and teaching activity

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- Each week a one hour lecture will follow the tutorials and will be used to consolidate

students conceptual understanding of the topics being covered.

## Changes since First Published

Date	Description
18/07/ 2018	The tutorial participation is a hurdle, and this information was not accurately described in the previous version.