



# MATH106

## A View of Mathematics

S2 Day 2013

*Mathematics*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Other Staff

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Credit points

3

Prerequisites

Admission to BEd(ECE) or BEd(Prim) or BEd(Sec) or BEd(TESOL) or BTeach(BS) or BTeach(0-5) or BTeach(ECS) or BABEd(Prim) or BA DipEd or BA-Psych DipEd or GDipEd or GDipEarlyChildhood

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:

Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.

Understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences

Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning

Ability to formulate and model practical and abstract problems in mathematical and/or statistical terms using a variety of methods

Application of mathematical and/or statistical principles, concepts, techniques and technology to solve practical and abstract problems.

Appropriate interpretation of information communicated in mathematical and/or statistical form

Appropriate presentation of information, reasoning and conclusions in a variety of modes, to diverse audiences (expert and non-expert).

Ethical application of mathematical and statistical approaches to solving problems

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

## Assessment Tasks

Name	Weighting	Due
<a href="#"><u>Six assignments</u></a>	36%	Week 3, 5, 8, 9, 11, 13
<a href="#"><u>Two web-based quizzes</u></a>	0%	Week 3
<a href="#"><u>One Test</u></a>	14%	Week 7
<a href="#"><u>Final examination</u></a>	50%	University Examination Period

### Six assignments

Due: **Week 3, 5, 8, 9, 11, 13**

Weighting: **36%**

On successful completion you will be able to:

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
- Understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning
- Ability to formulate and model practical and abstract problems in mathematical and/or

statistical terms using a variety of methods

- Application of mathematical and/or statistical principles, concepts, techniques and technology to solve practical and abstract problems.
- Appropriate interpretation of information communicated in mathematical and/or statistical form
- Appropriate presentation of information, reasoning and conclusions in a variety of modes, to diverse audiences (expert and non-expert).
- Ethical application of mathematical and statistical approaches to solving problems
- Ability to work effectively, responsibly and safely in an individual or team context.

## Two web-based quizzes

Due: **Week 3**

Weighting: **0%**

Worth 0%, but nevertheless compulsory

On successful completion you will be able to:

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning
- Appropriate interpretation of information communicated in mathematical and/or statistical form

## One Test

Due: **Week 7**

Weighting: **14%**

On successful completion you will be able to:

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
- Understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning
- Ability to formulate and model practical and abstract problems in mathematical and/or statistical terms using a variety of methods
- Application of mathematical and/or statistical principles, concepts, techniques and

technology to solve practical and abstract problems.

- Appropriate interpretation of information communicated in mathematical and/or statistical form
- Appropriate presentation of information, reasoning and conclusions in a variety of modes, to diverse audiences (expert and non-expert).

## Final examination

Due: **University Examination Period**

Weighting: **50%**

On successful completion you will be able to:

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning
- Ability to formulate and model practical and abstract problems in mathematical and/or statistical terms using a variety of methods
- Application of mathematical and/or statistical principles, concepts, techniques and technology to solve practical and abstract problems.
- Appropriate interpretation of information communicated in mathematical and/or statistical form
- Appropriate presentation of information, reasoning and conclusions in a variety of modes, to diverse audiences (expert and non-expert).
- Ethical application of mathematical and statistical approaches to solving problems

## Delivery and Resources

### Classes

**Lectures:** you should attend three hours of each lectures each week.

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

**Optional Workshop:** There is an optional workshop run by the Numeracy Centre each week commencing Week 2

### Required and Recommended Texts and/or Materials

There is no textbook suitable for this unit. However there are many general books on mathematics and many of these can be found on library shelves. Some of them will contain material at an appropriate level and cover the material taught in this course and others will treat the material at a more advanced level.

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](#).
- [Posters and Mazes](#).
- Maths in and out of the zoo, a talk for all ages. ([Powerpoint slides](#))
- Presenting exciting maths to children and young people ([Powerpoint slides](#))
- [NRICH](#), online magazine.
- [+plus](#), online magazine.
- [Motivate](#), enrichment resources.

Magazines such as the following contain much relevant material:

- [The Mathematical Gazette](#)
- [Mathematics Magazine](#)
- [The Mathematics Teacher](#)
- [The College Mathematics Journal](#)
- [Reflections](#)
- [Parabola](#)

There will also be some references made to reading material which will be made available during the unit via the website.

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.

- [Math Amaze Zing!](#)
- [Primary School Mathematics](#)
- [Maths Practice](#)
- [PrimaryGames](#)

## Numeracy Centre

The Numeracy Centre 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 in the [Numeracy Centre](#) (C5A 255).

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

There have been no changes to this unit since the last offering.

## Unit Schedule

WEEK	THURS. 12:00	THUR. 14:00	FRI. 14:00	TASK DUE
1	Carolyn K. : Number systems Historical Aspects of Mathematics	Carolyn K. : Number systems Historical Aspects of Mathematics	Carolyn K. : Number systems Historical Aspects of Mathematics	
2	Carolyn K. : Number systems Historical Aspects of Mathematics	Carolyn K. : Number systems Historical Aspects of Mathematics	Carolyn K. : Number systems Historical Aspects of Mathematics	
3	Frank V. : Elements of Graph Theory	Frank V. : Elements of Graph Theory	Frank V. : Elements of Graph Theory	<a href="#">Assignment 1, Quizzes 1&amp;2</a>
4	Frank V. : Elements of Graph Theory	Frank V. : Elements of Graph Theory	Frank V. : Elements of Graph Theory	
5	Carolyn K. : Visual Mathematics — Latin squares, Number puzzles	Carolyn K. : Visual Mathematics — Latin squares, Number puzzles	Carolyn K. : Visual Mathematics — Latin squares, Number puzzles	Assignment 2
6	Carolyn K. : Visual Mathematics — Latin squares, Number puzzles	Carolyn K. : Visual Mathematics — Latin squares, Number puzzles	Carolyn K. : Visual Mathematics — Latin squares, Number puzzles	
7	Frank V. : Visual Mathematics — Symmetry Tiling, Platonic & Archimedean solids	Frank V. : Visual Mathematics — Symmetry Tiling, Platonic & Archimedean solids	Frank V. : Visual Mathematics — Symmetry Tiling, Platonic & Archimedean solids	<a href="#">Test</a> - on campus
<b>MID-SEMESTER BREAK</b>			<a href="#">ON-CAMPUS SESSION (externals only)</a>	Test - externals
<b>8</b>	Frank V. : Visual Mathematics — Symmetry Tiling, Platonic & Archimedean solids	Frank V. : Visual Mathematics — Symmetry Tiling, Platonic & Archimedean solids	Frank V. : Visual Mathematics — Symmetry Tiling, Platonic & Archimedean solids	Assignment 3
<b>9</b>	Carolyn K. : Counting methods & Probability	Carolyn K. : Counting methods & Probability	Carolyn K. : Counting methods & Probability	Assignment 4

10	Carolyn K. : Counting methods & Probability	Carolyn K. : Counting methods & Probability	Carolyn K. : Counting methods & Probability	
11	Frank V. : Congruences and Hexadecimal Arithmetic	Frank V. : Congruences and Hexadecimal Arithmetic	Frank V. : Congruences and Hexadecimal Arithmetic	Assignment 5
12	Frank V. : Congruences and Hexadecimal Arithmetic	Frank V. : Congruences and Hexadecimal Arithmetic	Frank V. : Congruences and Hexadecimal Arithmetic	
13	Revision	Revision	Revision	Assignment 6
<b>STUDY DAYS BEFORE EXAMS</b>			on-campus session (optional, open to all)	
		EXAM		

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy [http://www.mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://www.mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy <http://www.mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://www.mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://www.mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy [http://mq.edu.au/policy/docs/grievance\\_management/policy.html](http://mq.edu.au/policy/docs/grievance_management/policy.html)

Special Consideration Policy [http://www.mq.edu.au/policy/docs/special\\_consideration/policy.html](http://www.mq.edu.au/policy/docs/special_consideration/policy.html)

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

## Student Support

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at: <http://students.mq.edu.au/support/>

### UniWISE provides:

- Online learning resources and academic skills workshops [http://www.students.mq.edu.au/support/learning\\_skills/](http://www.students.mq.edu.au/support/learning_skills/)
- Personal assistance with your learning & study related questions.



- The Learning Help Desk is located in the Library foyer (level 2).
- Online and on-campus orientation events run by Mentors@Macquarie.

## 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

Details of these services can be accessed at <http://www.student.mq.edu.au/ses/>.

## IT Help

If you wish to receive IT help, we would be glad to assist you at <http://informatics.mq.edu.au/help/>.

When using the university's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students and it outlines what can be done.

## Graduate Capabilities

### 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, and the way other fields contribute to the development of the mathematical sciences
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning

#### Assessment task

- Six 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**

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
- Understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning

### **Assessment tasks**

- Six assignments
- Two web-based quizzes
- One Test
- Final examination

## **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**

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
- Understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning

### **Assessment tasks**

- Six assignments
- Two web-based quizzes
- One Test
- Final examination

## 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

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
- Understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning

### Assessment tasks

- Six assignments
- Two web-based quizzes
- One Test
- Final examination

## 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 outcome

- Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.

### Assessment tasks

- Six assignments
- Final examination

## 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, and the way other fields contribute to the development of the mathematical sciences
- Ability to construct logical, clearly presented and justified mathematical arguments incorporating deductive reasoning

## **Assessment tasks**

- Six assignments
- One Test
- Final examination

## **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:

## **Assessment task**

- Six assignments

## **Extra requirements**

In order to obtain a passing grade in this unit, students are required to demonstrate their mastery of the required basic skills and techniques by passing both on-line quizzes. Students who do not meet this requirement will have their grade capped at F 49.