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## General Information

Unit convenor and teaching staff
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Unit Convenor
Frank Valckenborgh
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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 [http://students.mq.edu.au/student_admin/enrolmentguide/academicdates/](http://students.mq.edu.au/student_admin/enrolmentguide/academicdates/)

## Learning Outcomes

1. Knowledge of the principles and concepts of a broad range of areas in mathematical sciences with depth in at least one area.
2. 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

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

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

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

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

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

8. Ethical application of mathematical and statistical approaches to solving problems

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

**Assessment Tasks**

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six assignments</td>
<td>36%</td>
<td>Week 3, 5, 8, 9, 11, 13</td>
</tr>
<tr>
<td>Two web-based quizzes</td>
<td>0%</td>
<td>Week 3</td>
</tr>
<tr>
<td>One Test</td>
<td>14%</td>
<td>Week 7</td>
</tr>
<tr>
<td>Final examination</td>
<td>50%</td>
<td>University Examination Period</td>
</tr>
</tbody>
</table>

**Six assignments**

Due: **Week 3, 5, 8, 9, 11, 13**  
Weighting: **36%**

This Assessment Task relates to the following 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
• 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

This Assessment Task relates to the following Learning Outcomes:
• 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%

This Assessment Task relates to the following 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
• 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%

This Assessment Task relates to the following Learning Outcomes:
• 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](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

<table>
<thead>
<tr>
<th>WEEK</th>
<th>THURS. 12:00</th>
<th>THUR. 14:00</th>
<th>FRI. 14:00</th>
<th>TASK DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carolyn K. : Number systems Historical Aspects of Mathematics</td>
<td>Carolyn K. : Number systems Historical Aspects of Mathematics</td>
<td>Carolyn K. : Number systems Historical Aspects of Mathematics</td>
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<tr>
<td>2</td>
<td>Carolyn K. : Number systems Historical Aspects of Mathematics</td>
<td>Carolyn K. : Number systems Historical Aspects of Mathematics</td>
<td>Carolyn K. : Number systems Historical Aspects of Mathematics</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Frank V. : Elements of Graph Theory</td>
<td>Frank V. : Elements of Graph Theory</td>
<td>Frank V. : Elements of Graph Theory</td>
<td><strong>Assignment 1, Quizzes 1&amp;2</strong></td>
</tr>
<tr>
<td>4</td>
<td>Frank V. : Elements of Graph Theory</td>
<td>Frank V. : Elements of Graph Theory</td>
<td>Frank V. : Elements of Graph Theory</td>
<td></td>
</tr>
<tr>
<td>Week</td>
<td>Assignment</td>
<td>Text description</td>
<td></td>
<td></td>
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<tr>
<td>------</td>
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</tr>
<tr>
<td>7</td>
<td>Test - on campus</td>
<td>Frank V. : Visual Mathematics — Symmetry Tiling, Platonic &amp; Archimedean solids</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MID-SEMESTER BREAK</td>
<td>Frank V. : Visual Mathematics — Symmetry Tiling, Platonic &amp; Archimedean solids</td>
<td></td>
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<tr>
<td>8</td>
<td>Assignment 3</td>
<td>Frank V. : Visual Mathematics — Symmetry Tiling, Platonic &amp; Archimedean solids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Assignment 4</td>
<td>Carolyn K. : Counting methods &amp; Probability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Assignment 5</td>
<td>Carolyn K. : Counting methods &amp; Probability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Assignment 5</td>
<td>Carolyn K. : Counting methods &amp; Probability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Assignment 6</td>
<td>Carolyn K. : Counting methods &amp; Probability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Revision</td>
<td>Revision</td>
<td></td>
<td></td>
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</tbody>
</table>

http://unitguides.mq.edu.au/unit_offerings/8071/unit_guide/print
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:


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/](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 Enquiry Service

Details of these services can be accessed at [http://www.student.mq.edu.au/ses/](http://www.student.mq.edu.au/ses/).

Equity 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.
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

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

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

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
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http://unitguides.mq.edu.au/unit_offerings/8071/unit_guide/print
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

**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

**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.