



MATH109

Sex, Chaos and other Mathematical Pleasures

S1 Day 2017

Dept of Mathematics

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General Information

Unit convenor and teaching staff

Convenor

Dr Ross Moore

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Contact via 9850 8955

12 Wally's Walk, 7th floor

most days

Credit points

3

Prerequisites

Corequisites

Co-badged status

Unit description

Sex and mathematics? It's not just numbers and probabilities! Life is full of patterns and mathematics is uniquely suited to their discovery and explanation. In the context of sex, mathematics has uncovered a treasure trove of sometimes unexpected but rich patterns and relationships. Mathematics is the study of patterns: their discovery, interconnection and implications. This unit takes a broad approach to understand the power of modern mathematical thinking in human activities. As well as sex and mathematical biology, we cover diverse topics such as the 'butterfly effect' and chaos theory, climate modelling, art and perspective, fractals, cryptography and codes, paradoxes and infinity, and complex decision making in health and other areas of public life. Even your mobile phone is a mathematical wonder!

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:

Demonstrate an understanding of role of mathematics and its breadth of application, of the way it contributes the development in other fields of study and to society.

Present mathematical ideas, information, reasoning and conclusions in forms tailored to

the needs of non-specialist audiences.

Work effectively, responsibly and safely in individual and team contexts.

Demonstrate an understanding of ethical issues that may arise in the applications of mathematics.

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|--|-----------|--------|---------------|
| Tutorial participation | 25% | No | weeks 3 to 12 |
| Major presentation | 30% | No | weeks 3 to 12 |
| Minor essay | 15% | No | week 6 |
| Major Essay | 30% | No | week 13 |

Tutorial participation

Due: **weeks 3 to 12**

Weighting: **25%**

Complete the preliminary reading and the discussion questions to be considered before each tutorial. Marks based on attendance, participation and adequate completion of questions.

On successful completion you will be able to:

- Demonstrate an understanding of role of mathematics and its breadth of application, of the way it contributes the development in other fields of study and to society.
- Work effectively, responsibly and safely in individual and team contexts.
- Demonstrate an understanding of ethical issues that may arise in the applications of mathematics.

Major presentation

Due: **weeks 3 to 12**

Weighting: **30%**

Oral and visual presentation of a topic related to the lecture material on mathematical thinking or modelling and its impact, approximately 30 minutes including discussion and questions, supported by an individual written component.

At the beginning of semester, in each tutorial group teams of four will organised. One team will present each week. The schedule of presentation will be organised in the first week.

Individual submission will include a brief overview of the oral/visual presentation accompanied by a detailed written account of the student's contribution to this presentation. The total marks

available for each group will be determined by the quality of the presentation. The allocation of these marks amongst the members of the group will be determined having regard to an assessment of their contribution to the joint work as evidenced by the individual written components.

The 30 available marks are allocated as follows. (a) The written submission (9 marks): The written submission should outline in some detail the content of your presentation and include references as necessary. Where this overlaps with the contributions from other members of your presenting team, it is appropriate to note and attribute credit in your written submission. Submit the written material to your tutor at the beginning of the tutorial.

(b) The actual presentation (16 marks) : 8 marks for content and 8 marks for clarity, style, coherence and answering questions or comments from the tutorial audience; how you present your talk - using power point slides or other medium - is assessed for its clarity, style and coherence, so the quality of your power point slides is important.

(c) Peer assessment: up to 5 marks based on feedback from the tutorial group. The tutor will collect feedback from other members of the tutorial on their perception of the quality of your presentation.

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- Demonstrate an understanding of ethical issues that may arise in the applications of mathematics.

Minor essay

Due: **week 6**

Weighting: **15%**

800 word essay plus references. The intention is to provide early feedback.

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- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.

Major Essay

Due: **week 13**

Weighting: **30%**

2000 words plus references, on a topic concerning mathematical thinking or modelling and its impact.

On successful completion you will be able to:

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- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.
- Demonstrate an understanding of ethical issues that may arise in the applications of mathematics.

Delivery and Resources

Delivery: Day, Internal.

Classes: Students are strongly encouraged to attend the lectures each week.

Tutorials: You should attend one tutorial each week. Tutorial classes are compulsory. Students have to attend the tutorial class in which they are enrolled. Any variation to this has to be approved by the convenor.

Technologies used and required: this unit will use *iLearn*. Students need regular access to a reliable internet connection.

Unit Schedule

Please consult the Unit outline in the Study guide on the unit website.

Learning and Teaching Activities

Lectures

There will be a one hour lecture each week in weeks 1 to 11. Each lecture will introduce a theme and the related concepts will be explained and illustrated.

Tutorial classes

Tutorials are held weekly and require preparatory reading of some text specified by the lecturer and a contribution to the discussion based upon a question or questions provided prior to the tutorial by the relevant lecturer. The theme of the discussion will be based on the topic introduced the previous week (see the unit schedule). You should download the tutorial sheet and prepare before attending your tutorial class. It will specify the preliminary reading and the discussion questions to be considered. The tutorials are assessed (25%) by tutors, with marks based upon attendance and appropriate participation in the discussion. In addition, in each tutorial, a group (usually of three or four) will prepare a contribution on the same theme on the basis of some more detailed guidance by the relevant lecturer. An oral and visual presentation of

a topic related to the lecture material on mathematical thinking or modelling and its impact is required, of approximately 30 minutes including discussion and questions, supported by an individual written component. Individual submission will include a brief overview of the oral/visual presentation accompanied by a detailed account of the student's contribution to this presentation. The total marks available for each group will be determined by the quality of the presentation. The allocation of these marks amongst the members of the group will be determined having regard to an assessment of their contribution to the joint work as evidenced by the individual written components. The group presentation exercise will count for 30% of your assessment. The first tutorial will be held in week one and is devoted to organisational matters (no preparation is required). In particular the tutorial class will be divided into 10 groups and assigned a topic for each group's presentation exercise. The timing of each group's presentation will follow the weekly schedule of the unit outline. Please note that there is no tutorial in weeks 2 or 13. Tutorials are compulsory. Students who do not attend at least 8 tutorials in weeks 3 to 12 will have their grade capped at F 49.

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://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

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

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

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

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) 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

IT Help

For help with University computer systems and technology, visit 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

- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.
- Work effectively, responsibly and safely in individual and team contexts.

Assessment tasks

- Tutorial participation

- Major presentation
- Minor essay
- Major Essay

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

- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.
- Work effectively, responsibly and safely in individual and team contexts.

Assessment tasks

- Tutorial participation
- Major presentation
- Minor essay
- Major Essay

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

- Demonstrate an understanding of role of mathematics and its breadth of application, of the way it contributes the development in other fields of study and to society.

Assessment tasks

- Tutorial participation
- Major presentation
- Minor essay
- Major Essay

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 outcome

- Demonstrate an understanding of role of mathematics and its breadth of application, of the way it contributes the development in other fields of study and to society.

Assessment tasks

- Tutorial participation
- Major presentation
- Minor essay
- Major Essay

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 outcome

- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.

Assessment tasks

- Major presentation
- Minor essay
- Major Essay

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 outcome

- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.

Assessment tasks

- Major presentation
- Minor essay
- Major Essay

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

- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.
- Work effectively, responsibly and safely in individual and team contexts.

Assessment tasks

- Tutorial participation
- Major presentation
- Minor essay
- Major Essay

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 outcome

- Demonstrate an understanding of ethical issues that may arise in the applications of mathematics.

Assessment tasks

- Tutorial participation
- Major presentation
- Major Essay

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Demonstrate an understanding of role of mathematics and its breadth of application, of the way it contributes the development in other fields of study and to society.
- Present mathematical ideas, information, reasoning and conclusions in forms tailored to the needs of non-specialist audiences.

Assessment tasks

- Tutorial participation
- Major presentation
- Minor essay
- Major Essay