



MATH3900

Geometry and Topology

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Mathematical and Physical Sciences

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Disclaimer

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General Information

Unit convenor and teaching staff

Unit Convenor

Frank Valckenborgh

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Contact via email

12WW 613

Numeracy Centre Thu 2-3pm, or by appointment via email

Lecturer

Xuan Duong

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Contact via email

12WW 729

By appointment via email

Credit points

10

Prerequisites

130cp including MATH2010

Corequisites

Co-badged status

Unit description

This unit is designed to widen geometric intuition and horizons by studying topics such as projective geometry, topology of surfaces, graph theory, map colouring, ruler-and-compass constructions, knot theory and isoperimetric problems.

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:

ULO1: Formulate and model practical and abstract problems in mathematical terms using methods from geometry and topology

ULO2: Apply concepts and techniques of geometry and topology to practical and

abstract problems

ULO3: Use axioms and definitions correctly within a mathematical argument

ULO4: Apply the mathematical notions of invariant and isomorphism in order to discriminate and classify geometric objects

General Assessment Information

Requirements to Pass this Unit

To pass this unit you need to achieve a total mark equal to or greater than 50% across all assessments.

Attendance and participation

We strongly encourage all students to actively participate in all learning activities. Regular engagement is crucial for your success in this unit, as these activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors, to assist in completing the unit assessments. Your active participation not only enhances your own learning experience but also contributes to a vibrant and dynamic learning environment for everyone.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, assignments, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration: <https://connect.mq.edu.au>.

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au>.

Written Assessments//Test: If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au>.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 2	15%	No	23/05/2025, 11:55pm
Final examination	55%	No	Examination period
Assignment 1	15%	No	04/04/2025, 11:55pm
Test	15%	No	08/05/2025, 3-5pm

Assignment 2

Assessment Type [1](#): Problem set

Indicative Time on Task [2](#): 8 hours

Due: **23/05/2025, 11:55pm**

Weighting: **15%**

The assignment will test the ability of students to solve mathematical problems using concepts and techniques learnt in the unit.

On successful completion you will be able to:

- Formulate and model practical and abstract problems in mathematical terms using methods from geometry and topology
- Apply concepts and techniques of geometry and topology to practical and abstract problems
- Use axioms and definitions correctly within a mathematical argument
- Apply the mathematical notions of invariant and isomorphism in order to discriminate and classify geometric objects

Final examination

Assessment Type [1](#): Examination

Indicative Time on Task [2](#): 15 hours

Due: **Examination period**

Weighting: **55%**

The exam will test the ability of students to utilise concepts and techniques learnt in the unit.

On successful completion you will be able to:

- Formulate and model practical and abstract problems in mathematical terms using methods from geometry and topology
- Apply concepts and techniques of geometry and topology to practical and abstract problems
- Use axioms and definitions correctly within a mathematical argument
- Apply the mathematical notions of invariant and isomorphism in order to discriminate and classify geometric objects

Assignment 1

Assessment Type ¹: Problem set

Indicative Time on Task ²: 8 hours

Due: **04/04/2025, 11:55pm**

Weighting: **15%**

The assignment will test the ability of students to solve mathematical problems using concepts and techniques learnt in the unit.

On successful completion you will be able to:

- Formulate and model practical and abstract problems in mathematical terms using methods from geometry and topology
- Apply concepts and techniques of geometry and topology to practical and abstract problems
- Use axioms and definitions correctly within a mathematical argument
- Apply the mathematical notions of invariant and isomorphism in order to discriminate and classify geometric objects

Test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 8 hours

Due: **08/05/2025, 3-5pm**

Weighting: **15%**

This will test the ability of students to solve mathematical problems using concepts and techniques learnt in the unit.

On successful completion you will be able to:

- Formulate and model practical and abstract problems in mathematical terms using methods from geometry and topology
 - Apply concepts and techniques of geometry and topology to practical and abstract problems
 - Use axioms and definitions correctly within a mathematical argument
 - Apply the mathematical notions of invariant and isomorphism in order to discriminate and classify geometric objects
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¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Classes

- Lectures (beginning in Week 1): There is one two-hour lecture each week.
- SGTA classes (beginning in Week 1): There is one two-hour SGTA each week.

The timetable for classes can be found on the University website at: <https://publish.mq.edu.au/>.

Enrolment can be managed using eStudent at: <https://students.mq.edu.au/support/technology/systems/estudent>.

Methods of Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to your lecturers from your university email address.

Unit Schedule

Week 1: Topology: Topological spaces

Week 2: Geometry: Euclidean geometry in the complex plane

Week 3: Topology: Surfaces and Surgery

Week 4: Geometry: Affine functions

Week 5: Topology: Graphs on Surfaces

Week 6: Geometry: Affine geometry

Week 7: Topology: Knots and Links

Week 8: Geometry: Projective geometry

Week 9: Topology: Finitely Generated Abelian Groups

Week 10: Geometry: Projective geometry

Week 11: Topology: The Alexander number and Alexander group of a Knot

Week 12: Geometry: Constructions in geometry and number fields

Week 13: Revisions

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). 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](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

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

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

Student Code of Conduct

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

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

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

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

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.

Changes from Previous Offering

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

Student feedback from the previous offering of this unit was very positive overall, with students pleased with the clarity around assessment requirements and the level of support from teaching staff. As such, no change to the delivery of the unit is planned, however we will continue to strive to improve the level of support and the level of student engagement.

Unit information based on version 2025.03 of the [Handbook](#)