COMP3170

Computer Graphics

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

School of Computing

Contents

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General Information

Unit convenor and teaching staff
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Lecturer
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Credit points
10

Prerequisites
130cp at 1000 level or above including (MATH1010 or MATH1007) and COMP2000

Corequisites

Co-badged status

Unit description
This unit is the study of pictures, images and animations generated by computers, as well as tools used to produce these pictures. This unit introduces the mathematical foundations of computer graphics, examines how to model three-dimensional objects, introduces techniques for creating animations, and explores how realistic scenes are rendered. Practical work involves using a graphics library, such as OpenGL, under Unix or Windows platforms.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Industry, Innovation and Infrastructure

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: Understand the fundamentals of vector geometry and employ them in devising

algorithms to achieve a variety of graphic effects.

ULO2: Program 2D and 3D graphical applications using OpenGL embedded in a programming language (such as OpenGL in Java)

ULO3: Apply vector geometry to implement and combine 3D transformations including rotation, translation, scale and perspective.

ULO4: Program vertex and fragment shaders to implement effects such as lighting, texturing, shadows and reflections.

ULO5: Explain the core concepts behind advanced graphics techniques such as ray-casting and indirect lighting.

General Assessment Information

Assessment Task Release Dates

- Online quizzes – 9am Monday each week.

- Workshop exercises – 9am Monday each week.

- Graphics transformations – 9am Monday April 7

- 2D Interactive Graphics Program – 9am Monday March 24

- 3D Interactive Graphcis Program - 9am Monday May 5

Requirements to Pass this Unit

To pass this unit you must:

1. Achieve a total mark equal to or greater than 50%.

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, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration. For example, if the assignment is worth 8 marks (of the entire unit) and your submission is late by 19 hours (or 23 hours 59 minutes 59 seconds), 0.4 marks (5% of 8 marks) will be deducted. If your submission is late by 24 hours (or 47 hours 59 minutes 59 seconds), 0.8 marks (10% of 8 marks) will be deducted, and so on.

Assessments where Late Submissions will be accepted

- Online quizzes – NO, unless Special Consideration is Granted

- Workshop exercises – NO, unless Special Consideration is Granted

- Graphics transformations – YES, Standard Late Penalty applies

- 2D Interactive Graphics Program – YES, Standard Late Penalty applies

- 3D Interactive Graphcis Program - YES, Standard Late Penalty applies

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 http://connect.mq.edu.au/.

Assessment Tasks

Name	Weighting	Hurdle	Due
Online quizzes	10%	No	11:55pm Sunday each week
Workshop Exercises	10%	No	Weekly, during practical classes.
Graphics Transformations	25%	No	11:55pm, Sunday April 27
2D Interactive Graphics Program	25%	No	11:55pm Sunday April 13
3D Interactive Visualisation	30%	No	11:55pm, Sunday June 8

Online quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 8 hours
Due: **11:55pm Sunday each week**
Weighting: **10%**

Weekly online quizzes covering the lecture material.

On successful completion you will be able to:

- Understand the fundamentals of vector geometry and employ them in devising
  algorithms to achieve a variety of graphic effects.
- Apply vector geometry to implement and combine 3D transformations including rotation,

translation, scale and perspective.

- Program vertex and fragment shaders to implement effects such as lighting, texturing, shadows and reflections.

- Explain the core concepts behind advanced graphics techniques such as ray-casting and indirect lighting.

Workshop Exercises

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 0 hours
Due: **Weekly, during practical classes.**
Weighting: **10%**

Students will demonstrate their learning by engaging in weekly workshop exercises.

On successful completion you will be able to:

- Understand the fundamentals of vector geometry and employ them in devising algorithms to achieve a variety of graphic effects.

- Program 2D and 3D graphical applications using OpenGL embedded in a programming language (such as OpenGL in Java)

- Apply vector geometry to implement and combine 3D transformations including rotation, translation, scale and perspective.

- Program vertex and fragment shaders to implement effects such as lighting, texturing, shadows and reflections.

- Explain the core concepts behind advanced graphics techniques such as ray-casting and indirect lighting.

Graphics Transformations

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 15 hours
Due: **11:55pm, Sunday April 27**
Weighting: **25%**

Use mathematics and sketching to solve computer graphics problems involving 2D and 3D geometric transformations

On successful completion you will be able to:

- Understand the fundamentals of vector geometry and employ them in devising algorithms to achieve a variety of graphic effects.
- Apply vector geometry to implement and combine 3D transformations including rotation, translation, scale and perspective.

2D Interactive Graphics Program

Assessment Type [1]: Programming Task
Indicative Time on Task [2]: 26 hours
Due: **11:55pm Sunday April 13**
Weighting: **25%**

Develop an interactive graphics application using only 2D graphics. The application will be built using OpenGL.

On successful completion you will be able to:

- Program 2D and 3D graphical applications using OpenGL embedded in a programming language (such as OpenGL in Java)

3D Interactive Visualisation

Assessment Type [1]: Programming Task
Indicative Time on Task [2]: 26 hours
Due: **11:55pm, Sunday June 8**
Weighting: **30%**

Create an interactive 3D graphics application using OpenGL. Your program will display on the screen the 3D appearance of a scene.

On successful completion you will be able to:

- Understand the fundamentals of vector geometry and employ them in devising algorithms to achieve a variety of graphic effects.
- Program 2D and 3D graphical applications using OpenGL embedded in a programming language (such as OpenGL in Java)
- Apply vector geometry to implement and combine 3D transformations including rotation, translation, scale and perspective.

- Program vertex and fragment shaders to implement effects such as lighting, texturing, shadows and reflections.

[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

Week 1 Classes

- Lectures start in week 1.
- Practicals start in week 1.

Methods of Communication

We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn.

Unit Schedule

See the unit iLearn page.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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). 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) 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

No changes have been made from the 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.

Unit information based on version 2025.04 of the Handbook