



**MONASH** University  
Information Technology

**FIT1034**  
**Principles of computer graphics**

**Unit Guide**

**Semester 2, 2012**

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

*Last updated: 08 Jul 2012*

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# **FIT1034 Principles of computer graphics - Semester 2, 2012**

This unit will introduce students to the underlying principles of computer graphics in games. Relevant mathematics will be covered, with focus on vectors and matrices. This theory will be placed into the games context and put into practice in a game engine environment. This will provide a foundation for the manipulation of graphics and content in future games programming classes and development.

## **Mode of Delivery**

Caulfield (Day)

## **Contact Hours**

2hrs lectures/wk, 2 hrs tutorials/wk

## **Workload**

Students will be expected to spend a total of 12 hours per week during semester on this unit.

This will include:

Lectures: 2 hours per week

Tutorial/Lab Sessions: 2 hours per week

and up to an additional 8 hours in some weeks for completing lab and project work, private study and revision.

## **Chief Examiner**

Dr Matthew Butler

## **Campus Lecturer**

### **Caulfield**

**Matthew Butler**

Consultation hours: See the unit website for consultation details

## **Tutors**

### **Caulfield**

**Matthew Butler**

Consultation hours: See the unit website for consultation details

**Elliott Wilson**

FIT1034 Principles of computer graphics - Semester 2, 2012

Consultation hours: See the unit website for consultation details

# Academic Overview

## Outcomes

At the completion of this unit students will be able to:

- understand the need for mathematical foundations in the manipulation of computer graphics and game objects;
- understand coordinate spaces within computer game worlds;
- demonstrate an understanding of vectors and their relevant operations;
- demonstrate an understanding of matrices and their relevant operations and transforms;
- demonstrate an understanding of how vectors and matrices are used for orientation and angular displacement in 3D spaces;
- demonstrate an understanding of how these mathematical principles are used in object movement and collision detection;
- demonstrate the ability to implement these principles practically in game programming.

## Graduate Attributes

Monash prepares its graduates to be:

1. responsible and effective global citizens who:

- a. engage in an internationalised world
- b. exhibit cross-cultural competence
- c. demonstrate ethical values

critical and creative scholars who:

- a. produce innovative solutions to problems
- b. apply research skills to a range of challenges
- c. communicate perceptively and effectively

## Assessment Summary

Examination (3 hours): 60%; In-semester assessment: 40%

<b>Assessment Task</b>	<b>Value</b>	<b>Due Date</b>
Lab Portfolio Submission 1	5%	Friday, 17 August 2012, 12pm
Lab Portfolio Submission 2	10%	Friday, 7 September 2012, 12pm
Lab Portfolio Submission 3 (inc. Code Portfolio)	15%	Friday, 12 October 2012, 12pm
Unit Test	10%	Thursday, 13 September 2012, 4pm
Examination 1	60%	To be advised

## Teaching Approach

### Lecture and tutorials or problem classes

This teaching and learning approach provides facilitated learning, practical exploration and peer learning. While classes will be run in Computer Laboratories to facilitate practical application in a game environment, concepts will also be discussed and worked through in a collaborative group context.

## Feedback

### Our feedback to You

Types of feedback you can expect to receive in this unit are:

- Informal feedback on progress in labs/tutes
- Graded assignments with comments
- Test results and feedback
- Solutions to tutes, labs and assignments

### Your feedback to Us

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through SETU, Student Evaluation of Teacher and Unit. The University's student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash's educational strategy, and on student evaluations, see:

<http://www.monash.edu.au/about/monash-directions/directions.html>

<http://www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html>

## Previous Student Evaluations of this unit

Previous feedback has highlighted that one of the main strengths of the unit is that it is a good blend of theoretical concept and also coding examples. This will be continued and improved through more examples this semester. Students have also indicated that the portfolio nature of the assessment items, as well as the semester test all worked well. As a consequence the nature of assessment will remain the same.

Students feedback also informed some improvements to the unit. More examples were suggested and will be included in the teaching materials. A suggestion to improve wording of some portfolio questions was made so will be taken into account when preparing new assessment items. It was also suggested that all assessment submission be electronic, which will be the case this semester.

If you wish to view how previous students rated this unit, please go to

<https://emuapps.monash.edu.au/unitevaluations/index.jsp>

## **Prescribed text(s)**

Limited copies of prescribed texts are available for you to borrow in the library.

Dunn and Parberry. (2002). *3D Math Primer for Graphics and Game Development*. (1st) Wordware.

## **Recommended Resources**

While the text listed is not mandatory and required resources will be made available on the unit website, this text will prove a valuable resource for your study. The text will be available in print form through the Caulfield Bookshop, and is also available at a reduced price in digital form through Amazon.com

Microsoft Visual Studio 2010 and the Microsoft XNA Game Studio development environments will be used in the laboratory classes to place the theoretical game math principles we cover into their appropriate practical context. While it is not essential that students have these development tools, they can help in unit revision. These tools are available free of charge via the Faculty of IT MSDNAA webpage: <http://www.infotech.monash.edu.au/itsupport/msdnaa.html>

## **Examination material or equipment**

Please refer to the unit website for more information regarding the final examination.

## Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Unit Overview, the Cartesian Coordinate System and Multiple Coordinate Spaces (Ch. 1 - 3)	
2	An Intro to Vectors and Vector Operations (Ch. 4 & 5)	
3	Vectors in Practice (Ch. 6)	
4	An Introduction to Matrices (Ch. 7)	Lab Portfolio Submission 1 (Vectors) due Friday, 17 August 2012, 12pm
5	Matrices and Linear Transformations (Ch. 8)	
6	Further Operations on Matrices (Ch. 9)	
7	Orientation and Angular Displacement (Ch. 10)	Lab Portfolio Submission 2 (Matrices) due Friday, 7 September 2012, 12pm
8	Unit Test - Vectors and Matrices	Unit Test (covering Weeks 1-6) Thursday, 13 September 2012, 4pm
9	Transformations in Practice (Ch. 11)	
10	Movement and Collisions (Ch. 12 & 13)	
11	Cameras and Case Study (Ch. 15)	Lab Portfolio Submission 3 (Game Math) and Code Portfolio due Friday, 12 October 2012, 12pm
12	Revision	
	SWOT VAC	No formal assessment is undertaken in SWOT VAC
	Examination period	LINK to Assessment Policy: <a href="http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html">http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html</a>

\*Unit Schedule details will be maintained and communicated to you via your MUSO (Blackboard or Moodle) learning system.



# Assessment Requirements

## Assessment Policy

Faculty Policy - Unit Assessment Hurdles

(<http://www.infotech.monash.edu.au/resources/staff/edgov/policies/assessment-examinations/unit-assessment-hu>)

Academic Integrity - Please see the Demystifying Citing and Referencing tutorial at

<http://lib.monash.edu/tutorials/citing/>

## Assessment Tasks

### Participation

#### • Assessment task 1

**Title:**

Lab Portfolio Submission 1

**Description:**

This task comprises the first submission of your laboratory portfolio.

Students will be required to compile a portfolio of major laboratory tasks for submission for assessment. Details of each portfolio component are clearly indicated in the laboratory tasks for each week.

This submission contains the weekly folio tasks for weeks 1-3.

**Weighting:**

5%

**Criteria for assessment:**

Specific criteria for assessment will be provided on the unit website. However the portfolio work will be judged on the following broad criteria:

- ◆ Being able to recognise when to use particular mathematical functions, and choosing the correct approach
- ◆ Correctness of process through demonstration of workings
- ◆ Correctness of the end result

Late assignments will incur a 5% penalty per late day (including weekends), and may be submitted up to a maximum of 7 days late. After this time submissions will not be accepted without prior arrangement with the unit leader.

**Due date:**

Friday, 17 August 2012, 12pm

#### • Assessment task 2

**Title:**

Lab Portfolio Submission 2

**Description:**

This task comprises the second submission of your laboratory portfolio.

Students will be required to compile a portfolio of major laboratory tasks for submission for assessment. Details of each portfolio component are clearly indicated in the laboratory

## Assessment Requirements

tasks for each week.

This submission contains the weekly folio tasks for weeks 4-6.

**Weighting:**

10%

**Criteria for assessment:**

Specific criteria for assessment will be provided on the unit website. However the portfolio work will be judged on the following broad criteria:

- ◆ Being able to recognise when to use particular mathematical functions, and choosing the correct approach
- ◆ Correctness of process through demonstration of workings
- ◆ Correctness of the end result

Late assignments will incur a 5% penalty per late day (including weekends), and may be submitted up to a maximum of 7 days late. After this time submissions will not be accepted without prior arrangement with the unit leader.

**Due date:**

Friday, 7 September 2012, 12pm

• **Assessment task 3**

**Title:**

Lab Portfolio Submission 3 (inc. Code Portfolio)

**Description:**

This Assignment Task comprises two components:

The first part is your third and final submission of your laboratory portfolio. Students will be required to compile a portfolio of major laboratory tasks for submission for assessment. Details of each portfolio component are clearly indicated in the laboratory tasks for each week.

This submission contains the weekly folio tasks for weeks 7-10.

The second component of this assessment item is submission of your coding portfolio exercises. These exercises will be detailed on the unit website and apply the math principles covered in a game development environment.

**Weighting:**

15%

**Criteria for assessment:**

Specific criteria for assessment will be provided on the unit website. Feedback will be provided on your progress to facilitate for improvements for your exam preparation. However the portfolio work will be judged on the following broad criteria:

- ◆ Being able to recognise when to use particular mathematical functions, and choosing the correct approach
- ◆ Correctness of process through demonstration of workings
- ◆ Correctness of the end result
- ◆ Being able to correctly apply the mathematical concepts to game code scenarios
- ◆ Creating functionally correct code

Late assignments will incur a 5% penalty per late day (including weekends), and may be submitted up to a maximum of 7 days late. After this time submissions will not be accepted without prior arrangement with the unit leader.

## Assessment Requirements

**Due date:**

Friday, 12 October 2012, 12pm

**• Assessment task 4****Title:**

Unit Test

**Description:**

An in-class unit test will be held covering content from weeks 1-6. This test will only be of 1 hour duration however will be essential in gauging your understanding of fundamental vectors and matrices concepts.

**Weighting:**

10%

**Criteria for assessment:**

Specific detail will be provided on the unit website. Feedback will be provided on your progress to facilitate for improvements for your exam preparation.

The test will be conducted in class. Students will not be permitted to sit the test at another time without formal Special Consideration forms submitted and approved by the chief examiner.

**Due date:**

Thursday, 13 September 2012, 4pm

## Examinations

**• Examination 1****Weighting:**

60%

**Length:**

3 hours

**Type (open/closed book):**

Closed book

**Electronic devices allowed in the exam:**

A calculator will be allowed for this examination.

**Remarks:**

A sample exam will be made available a month before the examination. Previous exam is also available through the Library Exams Database. Full exam revision will be covered in Week 12.

## Assignment submission

It is a University requirement

(<http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html>) for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at <http://www.infotech.monash.edu.au/resources/student/forms/>. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an online quiz).

## **Online submission**

If Electronic Submission has been approved for your unit, please submit your work via the VLE site for this unit, which you can access via links in the my.monash portal.

## **Extensions and penalties**

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process:

<http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html>.

## **Returning assignments**

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

## **Resubmission of assignments**

Students may not resubmit assignments after the due date has passed.

## Other Information

### Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at:

<http://policy.monash.edu.au/policy-bank/academic/education/index.html>

Key educational policies include:

- Plagiarism  
(<http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-policy.html>)
- Assessment  
(<http://www.policy.monash.edu/policy-bank/academic/education/assessment/assessment-in-coursework-p>)
- Special Consideration  
(<http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.h>)
- Grading Scale  
(<http://www.policy.monash.edu/policy-bank/academic/education/assessment/grading-scale-policy.html>)
- Discipline: Student Policy  
(<http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-discipline-policy.html>)
- Academic Calendar and Semesters (<http://www.monash.edu.au/students/key-dates/>);
- Orientation and Transition (<http://www.infotech.monash.edu.au/resources/student/orientation/>);  
and
- Academic and Administrative Complaints and Grievances Policy  
(<http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy>)
- Codes of Practice for Teaching and Learning  
(<http://www.policy.monash.edu.au/policy-bank/academic/education/conduct/suppdocs/code-of-practice-tea>)

### Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at [www.monash.edu.au/students](http://www.monash.edu.au/students). For Sunway see <http://www.monash.edu.my/Student-services>, and for South Africa see <http://www.monash.ac.za/current/>

The Monash University Library provides a range of services and resources that enable you to save time and be more effective in your learning and research. Go to <http://www.lib.monash.edu.au> or the library tab in my.monash portal for more information. At Sunway, visit the Library and Learning Commons at <http://www.lib.monash.edu.my/>. At South Africa visit <http://www.lib.monash.ac.za/>.

Academic support services may be available for students who have a disability or medical condition. Registration with the Disability Liaison Unit is required. Further information is available as follows:

- Website: <http://monash.edu/equity-diversity/disability/index.html>;
- Email: [dlu@monash.edu](mailto:dlu@monash.edu)
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Sunway Campus
- Telephone: 03 9905 5704, or contact the Student Advisor, Student Community Services at 03 55146018 at Sunway