FIT1034
Principles of computer graphics

Unit Guide

Semester 2, 2011

Last updated: 22 Aug 2011

Table of Contents

FIT1034 Principles of computer graphics - Semester 2, 2011

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

Contact hours: See the unit website for consultation details

Tutors

Caulfield

Matthew Butler

Contact hours: See the unit website for consultation details

Elliott Wilson

FIT1034 Principles of computer graphics - Semester 2, 2011

Contact hours: See the unit website for consultation details

Academic Overview

Learning Objectives

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%

Assessment Task	Value	Due Date
Lab Portfolio Submission 1	5%	Friday, 19 August 12pm
Lab Portfolio Submission 2	10%	Friday, 16 September 12pm
Lab Portfolio Submission 3 (inc. Code Portfolio)	15%	Friday 21 October 12pm
Unit Test	10%	Wednesday 21 September 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
- 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

If you wish to view how previous students rated this unit, please go to
https://emuapps.monash.edu.au/unitevaluations/index.jsp

Recommended Resources

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 and the Cartesian Coordinate System (Ch. 1 & 2)	
2	Multiple Coordinate Spaces and an Intro to Vectors (Ch. 3 & 4)	
3	Vector Operations (Ch. 5)	
4	Vectors in Practice (Ch. 6)	Lab Portfolio Submission 1 (Vectors) due: Friday 19th August 12pm
5	An Introduction to Matrices (Ch. 7)	
6	Matrices and Linear Transformations (Ch. 8)	
7	Further Operations on Matrices (Ch. 9)	
8	Orientation and Angular Displacement (Ch. 10)	Lab Portfolio Submission 2 (Matrices) due: Friday 16th September 12pm
9	Transformations in Practice (Ch. 11)	Unit Test (covering weeks 1-7): Wednesday 21 September 4pm
10	Geometric Primitives and Tests (Ch. 12 & 13)	
11	3D Math for Graphics part 1 (Ch. 14 & 15)	
12	3D Math for Graphics part 2 (Ch. 16 & 17) and Revision	Lab Portfolio Submission 3 (Game Math) and Code Portfolio due: Friday 21st October 12pm
	SWOT VAC	No formal assessment is undertaken SWOT VAC
	Examination period	LINK to Assessment Policy: http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html

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

Assessment Requirements

Assessment Policy

To pass a unit which includes an examination as part of the assessment a student must obtain:

- 40% or more in the unit's examination, and
- 40% or more in the unit's total non-examination assessment, and
- an overall unit mark of 50% or more.

If a student does not achieve 40% or more in the unit examination or the unit non-examination total assessment, and the total mark for the unit is greater than 50% then a mark of no greater than 49-N will be recorded for the unit

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 2-3.
  Weighting:
  5%
  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 in the second set of portfolio pieces.

  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, 19 August 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

tasks for each week.

This submission contains the weekly folio tasks for weeks 5-7.

Weighting:
10%

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 final portfolio submission.

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, 16 September 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 8-11.

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.

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 21 October 12pm

- **Assessment task 4**

Title:
Unit Test

Description:
An in-class unit test will be held covering content from weeks 1-7. 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:
Wednesday 21 September 4pm

Examinations

- **Examination 1**

Weighting:
60%

Length:
3 hours

Type (open/closed book):
Closed book

Electronic devices allowed in the exam:
A scientific calculator (without graphing capability) will be allowed for this examination.

Remarks:
As this is the first offering of the unit a sample exam will be made available a month before the examination. 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).

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-po
- 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 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. Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis

- Website: http://adm.monash.edu/sss/equity-diversity/disability-liaison/index.html;
- Telephone: 03 9905 5704 to book an appointment with a DLO;
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus.

Unit Text

This unit has a formal textbook: "3D Math Primer for Graphics and Game Development" by Dunn and Parberry. The unit structure and content will follow this book closely. While this text 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 in digital form through Amazon.com