Three-Dimensional Modelling for Computer Graphics - Course Outline

COMP 409: 2015 Trimester 2

This document sets out the workload and assessment requirements for COMP 409. It also provides contact information for staff involved in the course. If the contents of this document are altered during the course, you will be advised of the change by an announcement in lectures and/or on the course web site. A printed copy of this document is held in the School Office.

Objectives

By the end of the course, students should be able to:

1. understand the characteristics and trade-offs of various geometric representations. (BE 3(a); BSc COMP 4);
2. program simple modelling operations using a common graphics framework such as Maya. (BE 3(a), 3(b), 3(f); BSc COMP 1, 2, 3, 4).
3. understand several general approaches to geometry processing including some familiarity with underlying mathematical concepts. (BE 3(a); BSc COMP 4);

The course requires that students have previous experience in graphics programming.

This course introduces the algorithmic and mathematical foundations of three-dimensional modelling. It is not a course on content creation. Topics include representations such as polygons, splines, implicit surfaces, point models, particle systems, and volumetric models, concepts such as parameterisation, curvature, and discrete differential geometry, and algorithmic approaches such as gradient domain processing, spectral processing, and example-based deformation.

The course approach is based on the belief that Computer Graphics is best learned by doing. In the assignments, the students will write simple programs that implement important modelling algorithms.

Students will also do short presentations of important algorithms and research papers. These presentations will be 10-15 minutes. The selected papers will be selected or approved by the coordinator.

Textbook

* There is no set textbook for COMP 409. * The book *Polygon Mesh Processing* by Botsch et al. is helpful for mathematical topics. * This book is on reserve at the VUW library. * The book *Maya Python for Games and Film* by Mechtley and Trowbridge is helpful for Maya API programming. * This book is available in the library in ebook form.

ACM SIGGRAPH has a number of relevant courses, such as these:

- Discrete Differential Geometry: An Applied Introduction
- Mesh editing based on discrete Laplace and Poisson Models
- Spectral mesh processing
- Scattered data interpolation and approximation for computer graphics

Lectures, Tutorials, Laboratories, and Practical work

A schedule of lecture topics, readings, and assignment due dates is available online.

Trimester schedule: Course page

Assignments, Project, and Presentations

Computer graphics is best learned by doing and showing the results. The assignments require computer graphics programming. Work for marking should be submitted electronically using the ECS Submission System. The details of the assignments and projects will be provided in the lectures. The assignments and projects will due at 11:59pm on the indicated date.

- Assignment 1 *progress viewing*: 6 August
- Assignment 1: 20 August
- Assignment 2 *part 1*: 8 October
- Assignment 2 *part 2*: 21 October (late handins during exam period will be accepted)
- Test: 22 October

It is expected that you will do about five presentations during the trimester (this number may need to be adjusted slightly depending on the number of students in the course). For the presentations, where possible show an intuitive or visual explanation of the concepts, and describe how the idea would be implemented in a program. The presentation should include excerpts from these sources, and may (*but need not*) include new text or illustrations. As a guideline, 10 slides may be sufficient. The slides must be handed in following the presentaiton.

For the research paper presentations, the students should explain the problem that is being addressed, and briefly indicate how the chosen approach addresses that problem and improves over previous approaches. The research paper presentations should be 10-15 minutes in length.

Workload

In order to maintain satisfactory progress in COMP 409, you should plan to spend an average of at least 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Reading and Presentations: 3 hours
- Lectures: 3 hours
- Assignments and Project: 4 hours

School of Engineering and Computer Science

The School office is located on level three of the Cotton Building (Cotton 358).

The notice board for COMP 409 is located on the second floor of the Cotton Building.

Staff

The course organiser for COMP 409 is Zohar Levi. His contact details are:

- *Zohar Levi*
- Cotton 338
- +64 4 463 5233 x 7045
- zohar.levi@ecs.vuw.ac.nz

Announcements and Communication

The main means of communication outside of lectures will be the COMP 409 web area at http://ecs.victoria.ac.nz/Courses/COMP409_2015T2/. There you will find, among other things, this document, the lecture schedule, assignment handouts and course feedback, and the COMP 409 Forum. The forum is a web-based bulletin board system. Questions and comments can be posted to the forum, and staff will read these posts and frequently respond to them.

Assessment

Your grade for COMP 409will be determined based on the following assessment weightings:

Item	Weight
Assignment 1	35%
Assignment 2	35%
Test	20%
Presentations	10%

Practical Work

The assignments involve a moderate amount of programming as needed to produce a computational illustration of a particular concept. As a guideline, these programs may be fewer than 1000 lines, and can be implemented in either Python/Numpy or C++.

All the materials for the projects should be submitted electronically using the ECS Submission System. Other methods (e.g. email) are not accepted. Marked projects will be available at lectures, or from the School Office (Cotton 358). All projects must be submitted on time.

Students will hand in the presentation in Powerpoint or .pdf format on the day of the presentation.

The policy on late submission is as follows:

- The Presentations must be delivered on time to receive credit. The Assignments and Final Project should be submitted on time, however, you can apply "Late days" as described below.

- Each assignment or project that is late (ie, submitted on the submission system after the deadline) will be penalised by 20 marks if it is up to 24 hours late, and penalised by 40 marks if it is between 24 hours and 48 hours late. Any work submitted more than 48 hours after the deadline **will receive 0 marks.**
- Each student will have 3 "late days" which you may choose to use for the Assignments or Project. There will be no penalty applied for these late days. You do not need to apply for these - any late days you have left will be automatically applied to projects that you submit late.
- The late days are intended to cover minor illnesses or other personal reasons for being late. You should only ask for extensions in the case of more significant or longer lasting problems (and you may need documentation). Do not waste "late days" on procrastination!

All submitted code must be compiled and run on the ECS Linux system or on a Mac. You can work on any other platforms, but programs that do not compile and run on the ECS Linux system or Mac will not be marked. Since computer graphics is all about showing results on the screen, projects are marked based primarily on the final output on the display.

Plagiarism

Working Together and Plagiarism

We encourage you to discuss the principles of the course and assignments with other students, to help and seek help with programming details, problems involving the lab machines. However, any work you hand in must be your own work.

The School policy on Plagiarism (claiming other people's work as your own) is available from the course home page. Please read it. We will penalise anyone we find plagiarising, whether from students currently doing the course, or from other sources. Students who knowingly allow other students to copy their work may also be penalised. If you have had help from someone else (other than a tutor), it is always safe to state the help that you got. For example, if you had help from someone else in writing a component of your code, it is not plagiarism as long as you state (eg, as a comment in the code) who helped you in writing the method.

Mandatory Requirements

Both the practical work and an understanding of the concepts and principles of modelling are essential to the course. Therefore, all the course tasks are mandatory.

Passing COMP 409

To pass COMP 409, a student must satisfy mandatory requirements and gain at least a **C-** grade overall.

Withdrawal

The last date for withdrawal from COMP 409 with entitlement to a refund of tuition fees is Friday 24 July 2015. The last date for withdrawal without being regarded as having failed the course is Friday 25 September 2015 -- though later withdrawals may be approved by the Dean in special circumstances.

Rules & Policies

Find key dates, explanations of grades and other useful information at http://www.victoria.ac.nz/home/study.

Find out about academic progress and restricted enrolment at http://www.victoria.ac.nz/home/study/academic-progress.

The University's statutes and policies are available at http://www.victoria.ac.nz/home/about/policy, except qualification statutes, which are available via the Calendar webpage at http://www.victoria.ac.nz/home/study/calendar (See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at http://www.victoria.ac.nz/home/about/avcacademic

All students are expected to be familiar with the following regulations and policies, which are available from the school web site:

Grievances
Student and Staff Conduct
Meeting the Needs of Students with Disabilities
Student Support
Academic Integrity and Plagiarism
Dates and Deadlines including Withdrawal dates
School Laboratory Hours and Rules
Printing Allocations
Expectations of Students in ECS courses

The School of Engineering and Computer Science strives to anticipate all problems associated with its courses, laboratories and equipment. We hope you will find that your courses meet your expectations of a quality learning experience.

If you think we have overlooked something or would like to make a suggestion feel free to talk to your course organiser or lecturer.

Course Outline as PDF