Introduction to Computer Graphics - Course Outline
COMP 308: 2015 Trimester 2

This document sets out the workload and assessment requirements for COMP 308. 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.

Prescription

Introduction to graphics programming. Graphics APIs, in particular OpenGL. Graphics processing pipeline (geometry processing, viewing, projection, transformation, illumination, texture mapping). Display hardware. Graphics cards. Image formats. Colour theory. NWEN 241 recommended.

Objectives

By the end of the course, students should be able to:
1. understand the 3D graphics pipeline from 3D geometry input to final rendering images (BE 3(a); BSc COMP 4);
2. understand and utilize a standard graphics API (e.g. OpenGL) for implementing real-time 3D graphics applications (BE 3(f); BSc COMP 1);
3. understand basic concepts of important graphics algorithms and be able to construct programs that use the algorithms to solve problems (BE 3(a), 3(b), 3(f); BSc COMP 1, 2, 3, 4).

The course focuses mostly on 3D Computer Graphics algorithms; it is not a course on creative content creation and manipulation. We will explore how final images are produced once a 3D model has been created or acquired. Topics include: the graphics pipeline, transformations, coordinated systems, hierarchical modeling, rigid/non-rigid body animation, viewing, lighting, illumination, textures, and other computer graphics algorithms.

The course is based on the belief that Computer Graphics is best learned by doing. Implementing programs is a significant component of the course because many of the subtleties and difficulties encountered in Computer Graphics only become apparent when one actually tries to write programs and show the results on the display. The programming assignments and project serve to both increase your understanding of the relevant concepts and techniques, and also to give you confidence in being able to apply the techniques to real applications.

The lectures will assume that students understand basic linear algebra and have sufficient programming skill.

Textbook

There is no set textbook for COMP 308, but the following books contain most of the relevant materials covered from the course and are on reserve in VUW library:
- Dave Shreiner, Bill The Khronos OpenGL ARB Working Group, "OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 3.0 and 3.1, 7th Edition". (online version is available at the safari books online, one paper copy is closed reserve, and the older versions are also available)
- Tomas Akenine-Moller, Eric Haines, Naty Hoffman, "Real-Time Rendering, 3rd Edition". (3-day loan, and the older versions are also available)
- James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, "Computer Graphics: Principles and Practice in C, 2nd Edition". (closed reserve)
- Alan Watt, "3D Computer Graphics, 2nd and 3rd Edition". (closed reserve)

Lectures, Tutorials, Laboratories, and Practical work

COMP 308 is a trimester 2 course. The trimester starts on 13th July. The examination period at the end of the course is 23 October - 14 November,

Lectures for COMP 308 are Tuesday, Wednesday, and Friday, 9:00 - 9:50am in Hugh Mackenzie (Kelburn), LT001 (Wednesday), and LT103(Tuesday, Friday).

The Friday lecture time may be used for tutorials and guest lectures. Details will be announced during lectures.

Help desks will be provided for assisting with the assignments and projects. The details will be announced in lectures.

Assignments and Projects

Computer graphics is best learned by doing and showing the results. There will be three programming assignments, and two programming projects. Work for marking should be submitted electronically using the ECS Submission System. The final project consists of both individual and group tasks. The details of the assignments and projects will be provided in the lectures.

Workload

In order to maintain satisfactory progress in COMP 308, you should plan to spend an average of at least *10* hours per week (including 1 week of mid-trimester break) on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures and tutorials: 3 hours
- Readings: 2 hours
- Assignments: 5 hours

School of Engineering and Computer Science

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

Staff

The course coordinator and lecturer for COMP 308 is Taehyun Rhee. The contact details are:

Taehyun Rhee:
- Cotton 330
- +64 4 463 5233 x7088
- taehyun.rhee@ecs.vuw.ac.nz

The tutors for COMP 308 are Joshua Scott, Chris Dean, Wanduo Ma, and Andrew Chalmers:

Joshua Scott:

* scottjosh@ecs.vuw.ac.nz

Chris Dean:

* deanchri@ecs.vuw.ac.nz

Wanduo (Kurt) Ma:

* mawand@ecs.vuw.ac.nz

Andrew Chalmers:

* chalmeandr@ecs.vuw.ac.nz

The class representative: TBA in the lecture.

Announcements and Communication

The main means of communication outside of lectures will be the COMP 308 web area at http://ecs.victoria.ac.nz/Courses/COMP308_2014T2/. There you will find, among other things, this document, the lecture schedule and assignment handouts and course feedback, and the COMP 308 Forum. The forum is a web-based bulletin board system. Questions, answers, and comments can be posted to the forum. We highly recommend using it for discussion. Tutors and the staff will read and occasionally respond to the posts.

Assessment

Your grade for COMP 308 will be determined based on the following assessment weightings:

Item	due	weight
Assignment 1	week3	5%
Assignment 2	week5	15%
Assignment 3	week10	15%
Mid-term Project	week8	20%
Final Project Proposal	week7	10%
Final Project	presentation (week12), report (in the exam period)	35%

The final project will be group work in groups of 2~4 students. The number of group member depends on the total number of enrolled students and the project topic. A part of the final project proposal and final project will be done and marked as group. Therefore, we strongly encourage student discussion. Well-collaborated and integrated project will receive more marks. However, most of the assessment will be based on individual contributions. The group marks will be limited to a part of the final project proposal (5%), the integrated system (5%), and presentation (5%) of the final project; the other part of the final project proposal (5%) and final project (25%) will be assessed individually.

All the assignments and projects contribute to learning objectives 1,2, and 3.

Practical Work

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

The policy on late submission is as follows:

- Each assignment 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 any assignment or assignments during the course (except the final project proposal and 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 assignments 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. You can work on any other platforms, but programs that do not compile and run on the ECS Linux system will not be marked. Since computer graphics is all about showing results on the screen, assignments and 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

Achieve at least 40% of mid-term project and final project, and an average of 40% of the assignments.

Passing COMP 308

To pass COMP 308, a student must satisfy mandatory requirements and gain at least a **C-** grade overall.

Withdrawal

The last date for withdrawal from COMP 308 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-

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