Course Outline

Contents

- Course Details
- Course Summary
- Assumed Knowledge
- Student Learning Outcomes
- Teaching Strategies
- Teaching Rationale
- Student Conduct
- Assessment
- Course Schedule
- Resources for Students
- Course Evaluation and Development

Course Details

Course Code	COMP3421
Course Title	Computer Graphics
Convenor	Marc Chee (/users/z2253242)
Admin	Matt Turner (/users/z5232933)
Classes	**Lectures :** Monday 4-6pm, Wednesday 10am-12pm (AEST - Sydney) **Tutorials:** 1 hour a week, check the Timetable for all classes (/COMP3421/21T3/timetable)
Course Discord	This course has an official Discord for contacting course staff and conversations: https://discord.gg/QcuVuPwqR4 (https://discord.gg/QcuVuPwqR4)
Units of Credit	6
Course Website	https://webcms3.cse.unsw.edu.au/COMP3421/21T3/ (https://webcms3.cse.unsw.edu.au/COMP3421/21T3/)
Handbook Entry	http://www.handbook.unsw.edu.au/undergraduate/courses/current/COMP3421.html (http://www.handbook.unsw.edu.au/undergraduate/courses/current/COMP3421.html)
Student Reps	stureps@cse.unsw.edu.au Email the stureps if you have any issues with the course. They will pass these anonymously to the relevant people to get the issues resolved.

Course Summary

Computer Graphics is involved with the creation of virtual imagery using computers. Primarily used in Games and Film, Computer Graphics is a very large field in Computer Science, so this course will be an introduction to some of the historical techniques which make up the basis for a great deal of the techniques that are being used in modern Games and and Films.

Students will be working with primarily Realtime Graphics programming in this course.

Assumed Knowledge

Before commencing this course, students should:

- Have a good grasp of Programming in C
- Have a basic knowledge of Linear Algebra and Trigonometry
- Have a passing knowledge of Object Oriented Techniques

These are assumed to have been acquired in the courses ...

Student Learning Outcomes

After completing this course, students will:

1. Understand the techniques that go into rendering

    1. Models and Geometry
    2. Simulation of Lighting in Graphics
2. Have been introduced to coding with C++ and OpenGL
3. Have created a virtual scene with:
    1. Simple 3D objects
    2. Simulated Lighting
    3. Possibly some post processing effects and animation

Teaching Strategies

- **Lectures** talk from a theoritical and conceptual perspective. Students will acquire a passion for the idea of Graphics as well as an understanding of the techniques that make things look realistic or artistic.
- **Tutorials** provide concrete coding experience to implement the ideas shown in lectures.
- **Homework** gives students a chance to extend their knowledge beyond the otherwise short tutorials.
- **Assignments** allow students to put their learning into practice and show that they have understood the concepts in the course.

Teaching Rationale

This course is taught with the fundamental idea that students are here because they're interested in Games and/or Film and want to know how these things are made. We're going to be constantly referencing turning points in these industry and part of the learning in the course will involve playing and watching these things to understand their importance.

This is most apparent in Lectures, which will be referencing important games and films and the idea of "reading lists" of important media. The focus in practice will be on how things are made and to try to get students as close to this as possible (in Tutorials) while also acknowledging that this is a massive field that we can only barely introduce in 9 weeks of teaching.

Student Conduct

The **Student Code of Conduct** (Information (https://student.unsw.edu.au/conduct) , Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer (mailto:ethics-officer@cse.unsw.edu.au) , Grievance Officer (mailto:grievance-officer@cse.unsw.edu.au) , or one of the student representatives.

Plagiarism is defined as (https://student.unsw.edu.au/plagiarism) using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity (https://student.unsw.edu.au/plagiarism)
- UNSW Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism (https://student.unsw.edu.au/plagiarism)

The pages below describe the policies and procedures in more detail:

- Student Code Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)
- Student Misconduct Procedure (https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)
- Plagiarism Policy Statement (https://www.gs.unsw.edu.au/policy/documents/plagiarismpolicy.pdf)
- Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/policies/essential-advice-for-cse-students)

Assessment

Item	Topics	Due	Marks
Assignment 1	Getting set up. Putting together a Dev environment for C++/OpenGL and showing the capabiility to use the basic techniques for rendering objects.	Week 3	20%
Assignment 2	Historical Graphics. The ability to use simple models with multiple texture types. Lighting using multiple sources, diffuse and specular lighting.	Week 9	40%
Assignment 3	Show me what you got (also considered a 2 week take-home exam). Show off all the skills you have learnt or explored during the course. Can include all work from previous assignments.	Exam period	40%

Course Schedule

Week	Lectures	Tutes	Assignments
1	What is Colour? Human Eyes and what they do. History of Graphics. Introduction to the Course. How do Computers do Graphics? Pixels, Rendering and OpenGL. Graphics Cards and Shaders.	Welcome. Setting up OpenGL. Graphics Hello World	Assignment 1 Released
2	2D Graphics. Sprites and Textures Matrix Maths and Transforms	Sprite Rendering. 2D textured quad. Matrices/Transforms in 2D	-
3	Moving into 3D. 3D objects, meshes Geometry, complex objects and hierarchy. 3D Transforms	3D Objects. 3D Matrices and Geometry (Projection/Clipping)	Assignment 1 due
4	Cameras. Coordinate Systems (Model/View/Projection) Frustums, Culling and the Z buffer.	Hierarchy. Dynamic Camera.	-
5	3D Modelling. Overview of the art pipeline. Curves and Splines. Parametric Maths	Model Import. Animation.	Assignment 2 Released
6	Flexibility Week (no official content) Possibly streams of important games and movies	-	-
7	Lighting. Real World vs Computers Ambient Light and Materials Direction of light (using vectors and normals) Diffuse Lighting Reflection of light	Materials, Basic Directional Diffuse Lighting	-
8	Lighting. Specular Lighting Point Lights Specular Maps Efficiency in Lighting A look at the future (lighting we can't cover in this course)	Specular Lighting, Point Lights Specular Maps	
9	Reflections. Cubemaps, skymaps Reflection calculation Framebuffers and render targets Post Processing Introduction	Cubemaps, Skyboxes and Reflections	Assignment 2 due
10	Course Recap. What's next? What didn't we cover in this course that's still exciting and interesting?	Planar Reflections or Shadow Mapping. Possibly Screen space effects.	Assignment 3 released

Resources for Students

Texts and recommended readings:

- https://learnopengl.com/ (https://learnopengl.com/) is the semi-official textbook for the course.

Course Evaluation and Development

This course is evaluated each session using the myExperience system.

The previous offering of this course was in 2019 and was a different course. We do not have access to the feedback from previous iterations, but it's also important to note that the current course is not an iteration of the previous course, it's a completely new offering built with the intention to bring some parts of the course closer to common graphics implementation practices and to give the course a big refresh (one could say we're trying to increase our refresh rate . . .).

Resource created 2 months ago (Monday 06 September 2021, 03:31:54 PM), last modified 2 months ago (Saturday 18 September 2021, 04:45:11 PM).

Comments (/COMP3421/21T3/forums/search?forum_choice=resource/66481) (/COMP3421/21T3/forums/resource/66481)

There are no comments yet.