# COMP3011 Computer Graphics

# Spring 2024

# Assessment 3

# Description (v2)

## Introduction

This coursework will test your understanding of the concepts of 3D computer graphics taught during the course, and your ability to create, implement and display a 3D scene of your choice. You have been provided with APIs to use during the course and you can use them in your coursework. **You cannot use any other API**.

You are required to write a report outlining how you have met the requirements. The report should be no more than 6 pages and should contain screenshots of your program. **The report is compulsory. Failure to submit a report will result in a zero mark for the assessment.**

You are also required to demonstrate your running program to a member of the teaching team. Your demo will need to highlight your coursework features, and you will be required to answer questions about your program and its implementation. This will be an opportunity to show off your knowledge and skills in computer graphics. **The demonstrations are compulsory. Failure to attend the demonstration will result in a zero mark for the assessment.** You will be provided the location in A32 and a time slot for the demonstration in due time.

## Submission

You need to submit two separate files to Moodle:

1. A zip file containing your visual studio solution and all required files. Before submitting your code, test it on an A32 lab PC. Marks will be lost for programs that do not compile or have issues with linking to resources. The marker will download your submitted zip file, unzip it to a directory on a school PC, open the Visual Studio .sln file, click the Run Button, and your project should compile and run without any further interventions.
2. Your report. You must fill in the provided report sheet.

# Technical Requirements

The technical requirements, as covered in the lectures and lab sessions, are as follows:

**TR1 – General 3D Graphics Programming**

You need to demonstrate the essentials of 3D graphics programming including window creation, handling input, using depth test & Antialiasing, specifying VAO, correct use of projection, and a fragment and vertex shader.

**TR2 – 3D Modelling**

Marks are awarded for creativity, see the example projects on Moodle. You **must** include:

1. *A procedurally generated model*. Marks for this object will be based on the complexity of the model.
2. *An OBJ file model*. You **must** provide OBJ file(s) in your submission.

**TR3 - 3D Transformations & Animation**

For high marks you need to demonstrate that you can apply transformations, rotate, translate, and scale, to achieve a desired effect, for example automatically transforming an object through the scene over time. This must be separate from the moving camera.

**TR4 - Cameras**

Implement at least one camera. Marks will be awarded for the complexity of the camera you implement, including animated or multiple cameras.

**TR5 - Textures**

The mark will be proportionate to the complexity of the mapping, not the complexity of the texture. The absolute minimum is to map a texture to a triangle. Bonus available for using mipmaps.

**TR6 - Lighting**

Create a light by specifying its location and properties. You will receive marks for each type of light you include and bonus will be given for combining lights.

**TR7 - Shadow**

Dynamic shadows need to look accurate according to the lights and geometry in the scene.

**TR8 – An interactive object**

You need to have an interactive object which responds to user input. This needs to be separate from camera control. Bonus available for more imaginative interaction.

**TR9 – Curves**

Implement Bezier curves and use a curve with at least 3 control points. Bonus marks for using curve(s) with more control points and imaginative use of the curve(s).

**TR10 – Transparency**

Include a transparent surface in your scene which is blended with surfaces behind. Bonus marks are available for correctly rendering overlapping transparent surfaces.

**Research & Development**

Marks are available for you to program something I haven't given a lecture on.