

**School of Arts, Media and Computer Games**

# Session 2016/17

# Module Code: CMP203

# Module Title: Graphics Programming

## Module Deliverer: Dr Paul Robertson

Unit of Assessment: **Unit 1 of the module assessment – 100%**

Learning outcomes assessed:

**LO1.** Demonstrate the fundamentals of 3D computer graphics.  
**LO2.** Design and develop real-time 3D graphics applications.   
**LO3.** Describe and explain 3D graphics techniques.

Submission date: **Tuesday 6th December 2016.**

Suggested Feedback Return Date: **10th January 2017.**

Feedback Type: **Feedback will be provided during demonstration.**

## Assessment overview

**Task 1: Build a Graphics Application**

Design and develop a 3D graphics application and scene that exhibits key techniques in graphics programming. The application should demonstrate your ability to use the OpenGL API in a structured and efficient manner. The 3D scene constructed can be of your own design or a limited re-creation of a scene from a game or film. Note that I do NOT expect you to create the gameplay from the game only a mostly static scene with some interactivity is expected. A single 3D object on a black background is insufficient. Multiple objects that complement each other arranged into a 3D scene representing a recognisable scene are required.

Only the OpenGL API may be used to construct your rendering system. Third party game engines cannot be used. However, if you wish to use direct input for Input or FMOD for sound, this is permissible.

The minimum requirements for this coursework are a 3D scene with at least one light source, a functional camera (with keyboard and mouse control), some simple textured geometry (that you created in code), a loaded modelled and a wireframe mode. A good coursework should include all of the following features:

* The scene must show lighting from multiple lights of different types, colours and some animated.
* The scene must show use of texturing. Additionally, demonstrating texture filtering and advance use of texturing coordinates.
* A working camera. The user must be able to manipulate the view through using the mouse and keyboard to control the camera. Additionally, you should provide multiple cameras each with a different focus such as limited controls, fixed views, procedurally controlled views or different camera types.
* A clear example of using the matrix stack for Hierarchical modelling and animation through hierarchical means.
* Use of transparency effects / Alpha blending
* Use vertex arrays (not including model loading)
* Models loaded in from an external file
* Examples of Procedurally generated shapes
* User interaction (controlling objects in the scene other than the camera)
* A wireframe mode
* Advance features such as shadows and use of the stencil buffer
* The application should be carefully designed and constructed showing appropriate use of classes and well commented

This exercise is designed let you demonstrate your knowledge of OpenGL and graphics programming concepts covered in class.

The assignment is designed to be very wide in scope so there is plenty room for creativity. If you are concerned your idea does not meet the requirements, please consult me to ensure the idea is appropriate for a passing submission.

**ENSURE YOUR APPLICATION WORKS ON THE LAB COMPUTERS!**

### Task 2: Demonstration

As part of the submission you are required to demonstrate the working application to the module tutor. During week 14 & 15, after the submission date, you will be scheduled a demonstration date and time. You must demonstrate the version of your application you submitted to Blackboard. This demonstration will provide the opportunity for you to discuss what you developed with the module tutor. Additionally, the module tutor will have the opportunity to ask questions about the work and provide feedback.

As part of the demonstration any feedback received must be written down and emailed to the module tutor.

If you are unable to attend the suggested demonstration time, please contact the module tutor as soon as possible to organise an alternative time. This demonstration is a required part of the coursework, failure to attend will negatively affect your grade.

### Submission

**Electronically via Blackboard by Tuesday 6th December 2016.**

* The submission should include the source code/project and an executable version of the project. These files should be contained within a zip file for uploading, using the following folder structure:
  + A folder titled "source" containing the entire Visual Studio project. You can exclude the project SQL file and the “ipch” folder as these will increase the size of your submission but are not required.
  + A folder titled "exe" containing the executable file and any textures/models required for the project to run standalone.

All submissions must be uploaded to the appropriate location within the Blackboard system. You will be able to have multiple submissions (in case of errors) but only the last submission will be marked.

# Marking scheme

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| Literal Grade | Evaluative Descriptor | This Assessment |
| A+ | Excellent overall.   * Demonstrates an excellent grasp of the subject matter. * Excellent capacity for original and creative enquiry. * Excellent ability to critically evaluate, analyse, synthesise and integrate complex information. * Excellent communication skills.   In addition, exceptional in at least one of the above. |  |
| A | Excellent overall.   * Demonstrates an excellent grasp of the subject matter. * Excellent capacity for original and creative enquiry. * Excellent ability to critically evaluate, analyse, synthesise and integrate complex information.   Excellent communication skills. | A meticulously constructed application demonstrating all of the graphical programming techniques outlined in the specification.  Code is well structured and well commented with good use of additional classes.  Application was well demonstrated showing clear and detailed understanding of the work completed. |
| B+ | Very good overall.   * Demonstrates a very good grasp of the subject matter. * Very good capacity for original and creative enquiry. * Very good ability to critically evaluate, analyse, synthesise and integrate complex information. * Very good communication skills.   In addition, excellent in at least one of the above but overall performance deemed to be very good. |  |
| B | Very good overall.   * Demonstrates a very good grasp of the subject matter. * Very good capacity for original and creative enquiry. * Very good ability to critically evaluate, analyse, synthesise and integrate complex information.   Very good communication skills. | A well-constructed application demonstrating many of the graphical programming techniques outline in the brief. One or two techniques missing or lacking in complexity.  Code is well structured and well commented with good use of additional classes.  Application is well demonstrated, showing very good understanding of the subject. |
| C+ | Good overall.   * Demonstrates a good grasp of the subject matter. * Good capacity for original and creative enquiry. * Good ability to critically evaluate, analyse, synthesise and integrate complex information. * Good communication skills   In addition, very good in at least one of the above but overall performance deemed to be good. |  |
| C | Good overall.   * Demonstrates a good grasp of the subject matter. * Good capacity for original and creative enquiry. * Good ability to critically evaluate, analyse, synthesise and integrate complex information.   Good communication skills | The constructed application demonstrates some of the graphical programming techniques discussed in class. Shows limited work outside that covered in class or techniques missing or lacking complexity.  Code is well structured and commented.  Application is well demonstrated showing good understanding of the work completed. |
| D+ | Satisfactory overall.   * Demonstrates a satisfactory grasp of the subject matter but limited grasp in some areas * Satisfactory capacity for original and creative enquiry. * Satisfactory ability to critically evaluate, analyse, synthesise and integrate information.   Satisfactory communication skills |  |
| D | Adequate.  Achievement of all threshold standards but grasp of some subject areas and graduate attribute development may be more limited. | The application meets the minimum requirements. Lacking many of the suggest graphical programming techniques.  Demonstration shows basic understanding of the subject. |
| MF | Marginal fail.  Performance just below the threshold standard. A reasonable expectation that a pass is achievable by reassessment without the need to repeat the module. | A very simple application that fails to meet the minimum requirements. Poor or no demonstration of application. |
| F | Performance well below the threshold level. Some limited evidence of achievement of the outcomes. | No working application or little evidence of work. No demonstration of application. Little or no indication of understanding of subject. |
| NS | No assessments submitted |  |