Course Title:	**Computer Graphics Programming**
Course Code:	**COMP612**
Descriptor Start Date:	**01/01/2022**
Descriptor End Date:	**31/12/2022**
POINTS:	**15.00**
LEVEL:	**6**
PREREQUISITE/S:	**(MATH502 or MATH503) and (COMP603 or COMP610)**
COREQUISITE/S:	**None**
RESTRICTION/S:	**None**

LEARNING HOURS

Hours may include lectures, tutorials, online forums, laboratories. Refer to your timetable and course information in Canvas for detailed information.

Total learning hours: 150

PRESCRIPTOR

A practical introduction to the fundamentals and foundations of programming real time computer graphics. An overview of proven graphics algorithms and software techniques is presented with a focus on those techniques that have become common currency in the field of interactive computer graphics.

LEARNING OUTCOMES

1. Apply computer graphics concepts and techniques
2. Use and seamlessly integrate external graphics libraries
3. Apply algebra and geometry in a computer graphics context
4. Design and implement hierarchically structured graphics scenes
5. Implement a simple real-time animation.

CONTENT

- OpenGL
- Graphics pipeline
- Algorithmic modelling and interactive graphics applications
- Coordinate systems and transformations in 2D and 3D
- Particle Systems
- Polygonal models, GLU Quadrics and meshes
- Hierarchical modelling
- Projection and viewing
- Light, Materials, and Textures
- Shaders

LEARNING & TEACHING STRATEGIES

The course is structured to enable students to learn the core foundation concepts of 2D and 3D real time graphics rendering and interaction before moving onto modern graphics and programmable shaders using an industry standard library.

Each week there will be two, teacher directed sessions. The weekly sessions will introduce fundamental graphics theory and OpenGL programming using a combination of problem and project based learning approaches. Students will continuously develop their graphics programming skills through the completion of short in-class programming exercises and time spent developing and completing individual assignments. Video lectures and video demonstrations covering key concepts will be provided to support student learning.

In the first half of the semester there is a graphics programming assignment that evaluates each student's foundation graphics programming skills prior to the completion of a major individual project that showcases the graphics techniques the students have learned throughout the semester. During the project there will be two formative milestones to track student progress. In line with open assessment strategies each student will be given a certain degree of freedom to tailor their individual assignment and design and implement their own project, under the guidance of the lecturer, scaffolded with a small set of fixed but flexible criteria.

ASSESSMENT PLAN

Assessment Event	Weighting %	Learning Outcomes
Assignment 1: 2D	30.00	1,2,3
Project	70.00	1,2,3,4,5

Grade Map **MAP1**

A+ A A- Pass with Distinction
B+ B B- Pass with Merit
C+ C C- Pass
D Fail

Overall requirement/s to pass the course:

To pass the course, the student needs a minimum mark of 35% in each assessment and a C- overall grade.

LEARNING RESOURCES

A recommended reading list will be provided.

For further information, contact: Te Ara Auaha - Faculty of Design & Creative Technologies

Principal Programme:	**DJ1041, Bachelor of Science**
Related Programme/s:	**AK3698** **AK1041** **AK3001** **AK3003** **AK3756** **AK3706**