# Course Outline (Higher Education)

**School:** School of Engineering, Information Technology and Physical Sciences

**Course Title:** GAME PROGRAMMING

**Course ID:** ITECH3104

**Credit Points:** 15.00

**Prerequisite(s):** (ITECH2100 or ITECH2306)

**Co-requisite(s):** Nil

**Exclusion(s):** (ITECH3205 and ITECH3206)

**ASCED:** 020103

**Description of the Course:**

Video games are unique among software products in the sheer breadth of creative, technical and mathematical skills required to develop them. This course aims to equip students with an understanding of the various technical components that comprise a modern video game, and enable students to create an interactive video game using code. Students can explore their creativity while studying this highly technical course with a strong focus on developing advanced game programming skills.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

**Work Experience:**

No work experience: Student is not undertaking work experience in industry.

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

**Program Level:**

| Level of course in Program | AQF Level of Program | | | | | |
|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 |
| Introductory | | | | | | |
| Intermediate | | | | | | |

| Level of course in Program | AQF Level of Program | | | | | |
|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 |
| Advanced | | | ✔ | | | |

**Learning Outcomes:**

**Knowledge:**

**K1.** Explain the concept of the game loop which sits at the core of a real-time interactive video game.

**K2.** Describe fundamental theoretical concepts relating to computer graphics, three-dimensional geometry and the graphics rendering pipeline.

**K3.** Discuss the indicators and impact of code performance in relation to interactive video games.

**K4.** Describe how images and colours are represented, generated and stored in computer graphics.

**K5.** Describe the operation, data structure, architecture and algorithms commonly implemented in a computer game engine.

**Skills:**

**S1.** Construct a software application to display three dimensional graphics.

**S2.** Apply input handling techniques to manipulate an interactive video game.

**S3.** Analyse and debug the functionality and performance of interactive computer games.

**S4.** Implement computer animation using interpolation and simulation approaches.

**S5.** Implement data structures and algorithms commonly used in computer game engines.

**Application of knowledge and skills:**

**A1.** Create interactive video games to meet supplied specifications.

**A2.** Create a working game engine using inputs, graphics and animations.

**Course Content:**

Topics may include:

- Game and graphics loops.
- Graphics hardware and the graphics rendering pipeline.
- Shader programming.
- Input and animation programming.
- Geometry representations and data structures.
- Particle systems.
- Sound programming.
- Materials and lighting.
- Shading, shadows and advanced graphics effects.
- Collision detection and physics-based responses.
- Game engine architecture, data structures and algorithms.

**Values:**

**V1.** Recognise the legal and ethical issues that underpin responsible application development.

**Graduate Attributes**

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in

explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

| Graduate attribute and descriptor | | Development and acquisition of GAs in the course | |
|---|---|---|---|
| | | Learning Outcomes (KSA) | Assessment task (AT#) |
| GA 1 Thinkers | Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions. | S3 | 1, 2 |
| GA 2 Innovators | Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change. | S1, A1, A2 | 1, 2 |
| GA 3 Citizens | Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately. | N/A | Not applicable |
| GA 4 Communicators | Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand. | N/A | Not applicable |
| GA 5 Leaders | Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices. | N/A | Not applicable |

**Learning Task and Assessment:**

As there is a focus on development of technical skills in this course, practical lab work forms part of the assessment. It is anticipated that early lab assessment will be used to identify those students requiring early intervention.

| Learning Outcomes Assessed | Learning Tasks | Assessment Type | Weighting |
|---|---|---|---|
| S1, S2, S3, S4, S5, A1, A2 | Assignments involving the implementation and application of computer game technologies. | Individual Practical Assignment | 40-60% |
| S1, S2, S3, S4, S5 | Complete weekly lab tasks. | Minor assignment demonstrating completion of lab exercises. | 10-20% |
| K1, K2, K3, K4, K5 | Students will provide theoretical answers and provide practical solutions to a range of questions and problem types drawn from theory and examples used during this course. | Test(s) | 10-30% |

**Adopted Reference Style:**

APA

Refer to the library website for more information

Fed Cite - referencing tool