Module Code | CS7GV5
---|---
Module Name | Real-time Animation
ECTS Weighting | 5 ECTS
Semester taught | Semester 2
Module Coordinator/s | Rachel McDonnell

**Module Learning Outcomes**

On successful completion of this module, students will be able to:

- **LO1.** demonstrate a fundamental understanding of real-time animation algorithms and techniques that would be employed in a typical game.
- **LO2.** develop and explain code that performs different methods of rotation interpolations.
- **LO3.** develop and explain systems for character animation
- **LO4.** Demonstrate the ability to gather, analyse, and propose a project based on relevant literature in real-time animation.

**Module Content**

The aim of this module is to provide students with a deep understanding of the theory and techniques behind real time animation. We will explore computer animation and advanced issues such as character animation and motion capture and also look at specific fundamental concepts such as interpolation. We will begin the programming assignments using low-level graphics library OpenGL with C++ and then move towards a gaming engine for the final assignment (student chooses Unity 3D or Unreal Engine 4) in order to explore more advanced concepts. Specific topics addressed in this module include:

- Key-frame techniques
- Quaternions for rotations / orientations
- Blending and interpolation
- Kinematics
- Motion capture systems
- Motion graphs and character control
- Animation data representations
- Behavioural Animation
- Facial Animation

**Teaching and Learning Methods**

The module will include lectures and laboratories/tutorials. The laboratories will be programming-intensive, using both OpenGL and C++ and game engines.

**Assessment Details**

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Brief Description</th>
<th>Learning Outcomes Addressed</th>
<th>% of total</th>
<th>Week set</th>
<th>Week due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>Lab - Interpolation</td>
<td>LO1, LO2, LO3</td>
<td>10%</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Coursework</td>
<td>Lab - Kinematics</td>
<td>LO1, LO2, LO3</td>
<td>20%</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Coursework</td>
<td>Lab - Character Animation</td>
<td>LO1, LO2, LO3</td>
<td>20%</td>
<td>4</td>
<td>7</td>
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<tr>
<td>Coursework</td>
<td>Project</td>
<td>LO4</td>
<td>50%</td>
<td>7</td>
<td>10</td>
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1. **TEP Glossary**
2. **TEP Guidelines on Workload and Assessment**
### Reassessment Details
Programming assignment (100%)

### Contact Hours and Indicative Student Workload

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Hours (scheduled hours per student over full module), broken down by:</td>
<td></td>
</tr>
<tr>
<td>lecture</td>
<td>11</td>
</tr>
<tr>
<td>laboratory</td>
<td>11</td>
</tr>
<tr>
<td>tutorial or seminar</td>
<td>0</td>
</tr>
<tr>
<td>other</td>
<td>0</td>
</tr>
<tr>
<td>Independent study (outside scheduled contact hours), broken down by:</td>
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<tr>
<td>preparation for classes and review of material</td>
<td>40</td>
</tr>
<tr>
<td>(including preparation for examination, if applicable)</td>
<td></td>
</tr>
<tr>
<td>completion of assessments (including examination, if applicable)</td>
<td>63</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
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</tr>
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</table>

### Recommended Reading List
- Game Engine Architecture by Jason Gregory [https://www.gameenginebook.com/](https://www.gameenginebook.com/)

### Module Pre-requisites
**Prerequisite modules:** Computer Graphics

**Other/alternative non-module prerequisites:** Good programming ability in C++, linear algebra, OpenGL or equivalent 3D graphics library

### Module Co-requisites

### Module Website
Blackboard

### Last Update
28/08/2020 by Rachel McDonnell