

# Simulation and Game Development

Home to the first state-approved associate degree program in game development in the United States, Central Piedmont's Simulation and Game Development program offers a student-centered, multidisciplinary approach to the study of simulation and game development, with opportunities to develop skills in design, programming, and 3D modeling and animation. Developed in response to industry needs, the curriculum includes both 2D and 3D game development and utilizes industry-standard technologies. Students work with a wide range of tools, including Maya, Adobe Premiere Pro, MS Visual Studio, GitHub, Adobe Photoshop, Adobe Substance Painter, Adobe After Effects, Adobe Fuse, Adobe Animate, Adobe Illustrator, ZBrush, StereoKit, Twine, Unreal Engine and Unity 3D. Coursework provides students with a broad background in simulation and game development and prepares them for success in collaborative, creative work environments.

Graduates may qualify for employment as designers, artists, animators, programmers, testers and quality assurance analysts in various industries and sectors, including entertainment, education, healthcare, engineering, forensics, banking and government.

The Simulation and Game Development program at Central Piedmont offers three degree options:

## Design

The Simulation and Game Development Design degree prepares students to work as entry level designers in the game industry or similar industries. Students explore: game design and mechanics, level design, virtual environments, MMO, game narrative and audio, 2D and 3D art, playtesting, prototyping, and project management. Work-based learning provides opportunities for real-world skill development.

## Programming

The Simulation and Game Development Programming degree prepares students to work as entry level programmers in the game industry or similar industries. Students explore: mobile game development and programming, tool development, virtual/augmented/mixed reality programming utilizing multiple forms of VR hardware, Artificial Intelligence, database systems, software engineering, and game engine scripting. Work-based learning provides opportunities for real-world skill development.

## 3D Modeling and Animation

The Simulation and Game Development 3D Modeling and Animation degree prepares students to work as entry level 3D modelers and animators in the game industry or similar industries. Students explore: tools and techniques used in computer graphics, 3D model assets, 2D and 3D animation, storyboarding, virtual and augmented environments, and concept art techniques. Work-based learning provides opportunities for real-world skill development.

The Simulation and Game Development program also offers six certificates and a diploma program.

For specific information about potential positions and wages in simulation and game development employment, visit the Central Piedmont Career Coach website.

## Simulation and Game Development (A25450)

### Degree Awarded

The Associate in Applied Science degree in Simulation and Game Development is awarded by the college upon completion of one of the following three tracks:

- Simulation and Game Development - Design (A25450A) (p. 1)
- Simulation and Game Development - Programming (A25450B) (p. 2)
- Simulation and Game Development - 3D Modeling and Animation (A25450C) (p. 3)

### Admissions

- A high school diploma or equivalent is required.
- Placement tests determine placement in English (ENG) and mathematics (MAT).
- Some courses have prerequisites or co-requisites; Check the Courses section for details.

### Contact Information

The Simulation and Game Development program is in the Information Technology Division. For more information, call the program chair at 704.330.6398 or the program office at 704.330.6549.

## Simulation and Game Development - Design (A25450A)

### General Education Requirements

ENG 111	Writing and Inquiry	3.0
Take 3.0 credits from the following:		3.0
ENG 112	Writing and Research in the Disciplines	
ENG 113	Literature-Based Research	
ENG 114	Professional Research & Reporting	
COM 110	Introduction to Communication	
COM 231	Public Speaking	
Take 3.0 credits from the following:		3.0
MAT 121	Algebra/Trigonometry I	
MAT 143	Quantitative Literacy	
MAT 152	Statistical Methods I	
MAT 171	Precalculus Algebra	
MAT 271	Calculus I	
Take 3.0 credits from the following:		3.0
ART 111	Art Appreciation	
ART 114	Art History Survey I	
ART 115	Art History Survey II	
DRA 111	Theatre Appreciation	
HUM 120	Cultural Studies	
HUM 130	Myth in Human Culture	
MUS 110	Music Appreciation	
MUS 112	Introduction to Jazz	

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PHI 215	Philosophical Issues	
PHI 240	Introduction to Ethics	
REL 110	World Religions	
Take 3.0 credits from the following:		3.0
ECO 251	Principles of Microeconomics	
ECO 252	Principles of Macroeconomics	
HIS 111	World Civilizations I	
HIS 112	World Civilizations II	
HIS 131	American History I	
HIS 132	American History II	
POL 120	American Government	
PSY 150	General Psychology	
SOC 210	Introduction to Sociology	

**Major Requirements**

ACA 122	College Transfer Success	1.0
SGD 111	Introduction to Simulation and Game Development	3.0
SGD 112	SGD Design I Design	3.0
SGD 113	SGD Programming I Programming	3.0
SGD 114	SGD 3D Modeling I	3.0
SGD 162	SGD 3D Animation I	3.0
SGD 165	SGD Character Development Development	3.0
SGD 168	SGD Mobile Programming I	3.0
SGD 172	SGD Virtual Environments	3.0
SGD 212	Simulation and Game Development Design II	3.0
SGD 213	Simulation Game Development Programming II	3.0
SGD 214	SGD 3D Modeling II	3.0
SGD 289	Simulation and Game Development Project	3.0
SGD 124	Massive Multiplayer Online Programming	3.0
SGD 164	SGD Audio/Video	3.0
SGD 174	SGD Level Design I	3.0
SGD 274	SGD Level Design II	3.0
Take 2.0 credits from the following:		2.0
WBL 111	Work-Based Learning I	
WBL 121	Work-Based Learning II	
WBL 131	Work-Based Learning III	
WBL 112	Work-Based Learning I	
WBL 122	Work-Based Learning II	
WBL 132	Work-Based Learning III	

**Total Credits** **66**

**Simulation and Game Development - Programming (A25450B)**

**General Education Requirements**

ENG 111	Writing and Inquiry	3.0
Take 3.0 credits from the following:		3.0
ENG 112	Writing and Research in the Disciplines	
ENG 113	Literature-Based Research	
ENG 114	Professional Research & Reporting	
COM 110	Introduction to Communication	
COM 231	Public Speaking	
Take 3.0 credits from the following:		3.0
MAT 121	Algebra/Trigonometry I	

MAT 143	Quantitative Literacy	
MAT 152	Statistical Methods I	
MAT 171	Precalculus Algebra	
MAT 271	Calculus I	

Take 3.0 credits from the following: 3.0

ART 111	Art Appreciation	
ART 114	Art History Survey I	
ART 115	Art History Survey II	
DRA 111	Theatre Appreciation	
HUM 120	Cultural Studies	
HUM 130	Myth in Human Culture	
MUS 110	Music Appreciation	
MUS 112	Introduction to Jazz	
PHI 215	Philosophical Issues	
PHI 240	Introduction to Ethics	
REL 110	World Religions	

Take 3.0 credits from the following: 3.0

ECO 251	Principles of Microeconomics	
ECO 252	Principles of Macroeconomics	
HIS 111	World Civilizations I	
HIS 112	World Civilizations II	
HIS 131	American History I	
HIS 132	American History II	
POL 120	American Government	
PSY 150	General Psychology	
SOC 210	Introduction to Sociology	

**Major Requirements**

ACA 122	College Transfer Success	1.0
SGD 111	Introduction to Simulation and Game Development	3.0
SGD 112	SGD Design I Design	3.0
SGD 113	SGD Programming I Programming	3.0
SGD 114	SGD 3D Modeling I	3.0
SGD 162	SGD 3D Animation I	3.0
SGD 165	SGD Character Development Development	3.0
Take one from the following:		3.0
SGD 168	SGD Mobile Programming I	
CSC 118	Swift Programming I	
SGD 172	SGD Virtual Environments	3.0
SGD 212	Simulation and Game Development Design II	3.0
SGD 213	Simulation Game Development Programming II	3.0
SGD 214	SGD 3D Modeling II	3.0
SGD 289	Simulation and Game Development Project	3.0
SGD 122	Simulation and Game Database Programming	3.0
SGD 125	Simulation and Game Artificial Intelligence	3.0

Take one from the following: 3.0

SGD 268	SGD Mobile Programming II II	
CSC 218	Swift Programming II	
SGD 285	SGD Software Engineering	3.0

Take 2.0 credits from the following: 2.0

WBL 111	Work-Based Learning I	
WBL 121	Work-Based Learning II	
WBL 131	Work-Based Learning III	

WBL 112	Work-Based Learning I	
WBL 122	Work-Based Learning II	
WBL 132	Work-Based Learning III	
<b>Total Credits</b>		<b>66</b>

## Simulation and Game Development - 3D Modeling and Animation (A25450C)

### General Education Requirements

ENG 111	Writing and Inquiry	3.0
Take 3.0 credits from the following:		3.0
ENG 112	Writing and Research in the Disciplines	
ENG 113	Literature-Based Research	
ENG 114	Professional Research & Reporting	
COM 110	Introduction to Communication	
COM 231	Public Speaking	
Take 3.0 credits from the following:		3.0
MAT 121	Algebra/Trigonometry I	
MAT 143	Quantitative Literacy	
MAT 152	Statistical Methods I	
MAT 171	Precalculus Algebra	
MAT 271	Calculus I	
Take 3.0 credits from the following:		3.0
ART 111	Art Appreciation	
ART 114	Art History Survey I	
ART 115	Art History Survey II	
DRA 111	Theatre Appreciation	
HUM 120	Cultural Studies	
HUM 130	Myth in Human Culture	
MUS 110	Music Appreciation	
MUS 112	Introduction to Jazz	
PHI 215	Philosophical Issues	
PHI 240	Introduction to Ethics	
REL 110	World Religions	
Take 3.0 credits from the following:		3.0
ECO 251	Principles of Microeconomics	
ECO 252	Principles of Macroeconomics	
HIS 111	World Civilizations I	
HIS 112	World Civilizations II	
HIS 131	American History I	
HIS 132	American History II	
POL 120	American Government	
PSY 150	General Psychology	
SOC 210	Introduction to Sociology	

### Major Requirements

ACA 122	College Transfer Success	1.0
SGD 111	Introduction to Simulation and Game Development	3.0
SGD 112	SGD Design I Design	3.0
SGD 113	SGD Programming I Programming	3.0
SGD 114	SGD 3D Modeling I	3.0
SGD 162	SGD 3D Animation I	3.0
SGD 165	SGD Character Development Development	3.0
SGD 168	SGD Mobile Programming I	3.0

SGD 172	SGD Virtual Environments	3.0
SGD 212	Simulation and Game Development Design II	3.0
SGD 213	Simulation Game Development Programming II	3.0
SGD 214	SGD 3D Modeling II	3.0
SGD 289	Simulation and Game Development Project	3.0
SGD 117	Art for Games	3.0
SGD 161	SGD 2D Animation	3.0
SGD 237	Rigging 3D Models	3.0
SGD 244	SGD 3D Modeling III	3.0
Take 2.0 credits from the following:		2.0
WBL 111	Work-Based Learning I	
WBL 121	Work-Based Learning II	
WBL 131	Work-Based Learning III	
WBL 112	Work-Based Learning I	
WBL 122	Work-Based Learning II	
WBL 132	Work-Based Learning III	

**Total Credits** **66**

## Simulation and Game Development Diploma Specialization in Game Development (D25450-21)

### General Education Requirements

ENG 111	Writing and Inquiry	3.0
COM 231	Public Speaking	3.0

### Major Requirements

SGD 111	Introduction to Simulation and Game Development	3.0
SGD 112	SGD Design I Design	3.0
SGD 113	SGD Programming I Programming	3.0
SGD 114	SGD 3D Modeling I	3.0
SGD 212	Simulation and Game Development Design II	3.0
SGD 213	Simulation Game Development Programming II	3.0
SGD 214	SGD 3D Modeling II	3.0
SGD 162	SGD 3D Animation I	3.0
SGD 165	SGD Character Development Development	3.0
SGD 168	SGD Mobile Programming I	3.0
SGD 268	SGD Mobile Programming II II	3.0
SGD 172	SGD Virtual Environments	3.0
SGD 289	Simulation and Game Development Project	3.0
WBL 111	Work-Based Learning I	1.0
WBL 121	Work-Based Learning II	1.0

**Total Credits** **47**

## Simulation and Game Development Certificates (C25450)

- Simulation and Game Development Certificate Specialization in Simulation and Game Development Level I (C25450-21) (p. 4)
- Simulation and Game Development Certificate Specialization in Simulation and Game Development Level II (C25450-22) (p. 4)
- Simulation and Game Development Certificate Specialization in Simulation and Game Development Level III (C25450-30) (p. 4)
- Simulation and Game Development Certificate Specialization in Design (C25450-24) (p. 4)

- Simulation and Game Development Certificate Specialization in Programming (C25450-26) (p. 4)
- Simulation and Game Development Certificate Specialization in 3D Modeling and Animation (C25450-28) (p. 4)

### Simulation and Game Development Certificate Specialization in Simulation and Game Development Level I (C25450-21)

This certificate is also available to high school students enrolled in Career & College Promise.

#### Major Requirements

SGD 111	Introduction to Simulation and Game Development	3.0
SGD 112	SGD Design I Design	3.0
SGD 113	SGD Programming I Programming	3.0
SGD 114	SGD 3D Modeling I	3.0
<b>Total Credits</b>		<b>12</b>

### Simulation and Game Development Certificate Specialization in Simulation and Game Development Level II (C25450-22)

#### Major Requirements

SGD 162	SGD 3D Animation I	3.0
SGD 165	SGD Character Development Development	3.0
SGD 168	SGD Mobile Programming I	3.0
SGD 172	SGD Virtual Environments	3.0
<b>Total Credits</b>		<b>12</b>

### Simulation and Game Development Certificate Specialization in Simulation and Game Development Level III (C25450-30)

#### Major Requirements

SGD 212	Simulation and Game Development Design II	3.0
SGD 213	Simulation Game Development Programming II	3.0
SGD 214	SGD 3D Modeling II	3.0
SGD 289	Simulation and Game Development Project	3.0
<b>Total Credits</b>		<b>12</b>

### Simulation and Game Development Certificate Specialization in Design (C25450-24)

#### Major Requirements

SGD 124	Massive Multiplayer Online Programming	3.0
SGD 164	SGD Audio/Video	3.0
SGD 174	SGD Level Design I	3.0
SGD 274	SGD Level Design II	3.0
<b>Total Credits</b>		<b>12</b>

### Simulation and Game Development Certificate Specialization in Programming (C25450-26)

#### Major Requirements

SGD 122	Simulation and Game Database Programming	3.0
SGD 125	Simulation and Game Artificial Intelligence	3.0
SGD 268	SGD Mobile Programming II II	3.0

SGD 285	SGD Software Engineering	3.0
<b>Total Credits</b>		<b>12</b>

### Simulation and Game Development Certificate Specialization in 3D Modeling and Animation (C25450-28)

#### Major Requirements

SGD 117	Art for Games	3.0
SGD 161	SGD 2D Animation	3.0
SGD 237	Rigging 3D Models	3.0
SGD 244	SGD 3D Modeling III	3.0
<b>Total Credits</b>		<b>12</b>

The following is the suggested plan for when to take each course to complete the Associate in Applied Science degree, based on the program requirements of the 2022-2023 catalog. This is only a recommendation — you may take courses in another order upon consultation with your advisor. This plan is based on you starting with college-level math and English courses, starting your program in the fall, and attending full-time. You can also follow this sequence if you attend part-time. Speak with an advisor about the plan and any questions. This program might also offer diplomas or certificates; visit the catalog or contact the program for details.

Simulation and Game Development - 3D Modeling and Animation - option 1 suggested course sequence

Simulation and Game Development - 3D Modeling and Animation - option 2 suggested course sequence

Simulation and Game Development - Design - option 1 suggested course sequence

Simulation and Game Development - Design - option 2 suggested course sequence

Simulation and Game Development - Programming - option 1 suggested course sequence

Simulation and Game Development - Programming - option 2 suggested course sequence

**SGD 111. Introduction to Simulation and Game Development. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0  
This course provides students with an introduction to simulation and game development. Topics include setting, storytelling, narrative, character design, interface design, game play, internal economy, core mechanics, game genres, AI, the psychology of game design and professionalism. Upon completion, students should be able to demonstrate knowledge of the major aspects of simulation and game design and development.

**SGD 112. SGD Design I Design. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0  
This course introduces the fundamentals of simulation and game design. Topics include industry standards and design elements for simulation and games. Upon completion, students should be able to design simple simulations and/or games.

**SGD 113. SGD Programming I Programming. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the fundamentals of programming languages and tools employed in simulation and game development. Emphasis is placed on programming concepts used to create simulations and games. Upon completion, students should be able to program simple games and/or simulations.

**SGD 114. SGD 3D Modeling I. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the tools required to create three-dimensional (3D) models. Emphasis is placed on exploring tools used to create 3D models. Upon completion, students should be able to create and animate 3D models using 3D modeling tools.

**SGD 115. Physically-Based Modeling. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces fundamental physical concepts as applied to the simulation and game design fields. Topics include hands-on programming of vectors, matrices, graphical analyses, forces, laws of motion, work, energy, momentum, properties of matter, and problem-solving methods. Upon completion, students should be able to demonstrate an understanding of the principles studied as applied to the simulation and game design fields.

Prerequisites: Take One: MAT 121 or MAT 171

**SGD 116. Graphic Design Tools. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces students to computer-based graphic design tools and their use within the context of simulation and game design. Topics include texture creation, map creation, and introduction to advanced level graphic design techniques. Upon completion, students should be able to competently use and explain industry-standard graphic design software.

**SGD 117. Art for Games. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces students to the basic principles of art and how they apply to simulations and games. Emphasis is placed on learning to develop industry quality concept art for characters and other assets, as well as techniques needed to create such art. Upon completion, students should be able to create their own industry standard concept art for use in SGD projects.

**SGD 122. Simulation and Game Database Programming. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers the creation and application of databases for simulation and game development. Emphasis is placed on various database and software development kits. Upon completion, students should be able to apply their knowledge of databases to the creation of simulations and games.

**SGD 123. Windows and Console Programming. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the concepts of Windows and Console Programming. Emphasis is placed on learning MS Windows, the operating systems of various consoles and programming techniques. Upon completion, students should be able to demonstrate an understanding of Windows and of various consoles' operating systems.

Prerequisites: Take SGD 113

**SGD 124. Massive Multiplayer Online Programming. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the concepts of Massive On-line Programming for simulations and games. Emphasis is on learning Massive Multiplayer On-line simulation and game programming techniques. Upon completion, students should be able to create Massive Multiplayer On-line simulation or game.

**SGD 125. Simulation and Game Artificial Intelligence. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the artificial intelligence concepts related to simulation and game development. Emphasis is placed on expert systems. Upon completion, students should be able to describe the basic concepts and procedures related to the development of artificial intelligence systems used in simulation and games.

**SGD 126. Simulation and Game Engine Design. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the techniques needed to design and create a simulation/game engine. Emphasis is placed on learning core techniques used to design and create simulation and/or game engines. Upon completion, students should be able to design and create a simulation or game engine.

**SGD 134. SG Quality Assurance. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course provides an introduction to software quality assurance as it relates to simulation and game development. Emphasis is placed on designing testing tools, bug databases, and on learning methodologies required for systematic, detail-oriented testing procedures for the simulation and game industry. Upon completion, students should be able to demonstrate the proper skills to obtain a job as a quality assurance tester in the simulation/game industry.

**SGD 135. Serious Games. 3.0 Credits.** Class-3.0. Clinical-0.0. Lab-0.0. Work-0.0

This course provides students with an overview of serious games and their applications in immersive learning and education. Emphasis is placed on developing games for education, corporate training, and medical/military simulations. Upon completion, students should be able to design their own serious games.

**SGD 158. SGD Business Management. 3.0 Credits.** Class-3.0. Clinical-0.0. Lab-0.0. Work-0.0

This course introduces the business side of the interactive game industry. Emphasis will be placed on licenses, serious games, psychological profiling, publisher/developer relations, and contract negotiation skills. Upon completion, students should be able to understand how a game evolves from concept to the customer.

**SGD 159. SGD Production Management. 3.0 Credits.** Class-3.0. Clinical-0.0. Lab-0.0. Work-0.0

This course introduces the techniques and methods used in interactive game production and how to manage a project. Emphasis is placed on scheduling, production plans, marketing and budgeting. Upon completion, students should be able to manage a team, track production, and understand the process of project management.

**SGD 161. SGD 2D Animation. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the fundamental principles of animation used in simulation and game development. Emphasis is placed on historical survey of animation, aspects of the animation process and animation techniques. Upon completion, students should be able to produce character sketches, morph simple objects, create walk and run cycles and develop professional storyboards.

**SGD 162. SGD 3D Animation I. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the fundamental principles of 3D animation used in simulation and game development. Emphasis is placed on a historical survey of 3D animation, aspects of the 3D animation techniques. Upon completion, students should be able to produce 3D character sketches, morph simple objects, create walk and run cycles and develop professional storyboards.

**SGD 163. Simulation and Game Documentation. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the techniques and methods used to create simulation and game production and design documents. Emphasis is placed on the design document to include scheduling, production plans, marketing and budgeting. Upon completion, students should be able to create design and produce documents for any simulation or game.

**SGD 164. SGD Audio/Video. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces various aspects of audio and video and their application in simulations and games. Topics include techniques for producing and editing audio and video for multiple digital mediums. Upon completion, students should be able to produce and edit audio and video for simulations and games.

**SGD 165. SGD Character Development Development. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the concepts needed to create fictional personalities for use in digital videos, animations, simulations, and games. Topics include aspects of character, developing backgrounds, mannerisms, and voice. Upon completion, students should be able to develop characters and backgrounds for simulations and games.

**SGD 167. Simulation and Game Ethics. 3.0 Credits.** Class-3.0. Clinical-0.0. Lab-0.0. Work-0.0

This course introduces principles of philosophy and ethics as they relate to simulation and game development. Topics include moral philosophy and ethics. Upon completion, students should be able to discuss philosophical and ethical issues related to simulation and game development.

**SGD 168. SGD Mobile Programming I. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the mobile simulation and game programming process. Topics include mobile simulation/game programming, performance tuning, animation, sound effects, music, and mobile networks. Upon completion, students should be able to apply simulation/game programming concepts to the creation of mobile simulations and games.

**SGD 170. Handheld Simulation and Game Programming. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the concepts of hand-held simulation and game development. Emphasis is placed on hand-held game API, including stylus input, system buttons, infrared communications audio/visual creation and the physics of hand-held game API. Upon completion, students should be able to create a simple simulation or game for a hand-held device.

**SGD 171. Flash Simulation and Game Programming. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the Flash programming environment for use in simulation and game development. Topics include timeline effects, extensibility layers, alias text, globalization tools, ActionScript and lingo programming. Upon completion, students should be able to create a simple simulation or game using Flash.

**SGD 172. SGD Virtual Environments. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers the use of virtual reality tools and techniques in simulation and game development. Emphasis is placed on acquiring the skills necessary to create scalable virtual characters and environments for use in simulations and games. Upon completion, students should be able to create a simple game or simulation in a virtual environment.

**SGD 173. Lighting and Shading Algorithms. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the concepts of various lighting and shading algorithms for use in simulation and game development. Topics include various tools used to create light and shadows. Upon completion, students should be able to apply knowledge of various lighting and shading algorithms to the creation of simulation and games.

Prerequisites: Take SGD 214

**SGD 174. SGD Level Design I. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the tools used to create levels for real-time simulation and games. Topics include level design, architecture theory, modeling for 3D engines, and texturing methods. Upon completion, students should be able to design simple levels using industry-standard tools.

**SGD 181. Machinima. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers machinima techniques in the simulation and game industry. Emphasis is placed on developing movies and animations within industry-standard game engines for simulations and games. Upon completion, students should be able to demonstrate a basic understanding of in-game cinematic creation.

**SGD 210. 3D Data Capture. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces students to the tools used to capture data in a 3D environment. Emphasis is placed on capturing data from motion capture and/or 3D scanning devices for use in 3D models and animations. Upon completion, students should be able to capture data from a 3D environment and import for use in 3D models, simulations, and animations.

Prerequisites: Take SGD 114

**SGD 212. Simulation and Game Development Design II. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers the advanced principles of simulation and game design. Topics include advanced design concepts in simulation and game development. Upon completion, students should be able to design an advanced simulation or game.

Prerequisites: Take SGD 112

**SGD 213. Simulation Game Development Programming II. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers advanced programming concepts used to create simulations and games. Emphasis is placed on acquiring advanced programming skills for use in creating simulations and games. Upon completion, students should be able to program an advanced simulation or game.

Prerequisites: Take One: SGD 113, CSC 134, CSC 151 or CSC 153

**SGD 214. SGD 3D Modeling II. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the tools used to create and animate advanced 3-dimensional models. Emphasis is placed on identifying and utilizing the tools required to create and animate advanced 3D models. Upon completion, students should be able to create and animate advanced 3D models using 3D modeling tools.

Prerequisites: Take SGD 114

**SGD 232. Survey of Game Engines. 3.0 Credits.** Class-3.0. Clinical-0.0. Lab-0.0. Work-0.0

This course provides students with an overview of various types of game engines. Emphasis is placed on learning industry-standard game engines. Upon completion, students should be able to demonstrate a basic understanding of the different types of game engines.

**SGD 237. Rigging 3D Models. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers the fundamentals of rigging 3D models for animation. Emphasis is placed on learning how to properly weight a model, rig it with a skeleton, and create fluid movement. Upon completion, students should be able to demonstrate the ability to properly rig 3D models.

Prerequisites: Take SGD 114

Corequisites: Take SGD 162

**SGD 244. SGD 3D Modeling III. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course is designed to further a student's knowledge in creating visually compelling 3D models through the use of industry-standard software. Emphasis is placed on learning how to develop accurate textures and normal maps. Upon completion, students should be able to develop industry-caliber 3D models.

Prerequisites: Take SGD 214

**SGD 268. SGD Mobile Programming II. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces advanced mobile simulation and game programming processes. Topics include advanced mobile simulation/game platforms, performance tuning, animation, sound effects, music, and mobile networks. Upon completion, students should be able to apply advanced simulation/game programming concepts to the creation of mobile simulations and games.

Prerequisites: Take SGD 168

**SGD 271. Advanced Flash Programming. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course is designed to expand students' previous knowledge of the Flash programming environment. Emphasis is placed on learning advanced Flash techniques for use in the simulation and game industry. Upon completion, students should be able to create industry-quality simulations or games using Flash.

Prerequisites: Take SGD 171

**SGD 274. SGD Level Design II. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the advanced tools used to create levels for real-time simulations and games. Topics include advanced-level guide and architecture theory, concepts related to "critical path" and "flow," game balancing, playtesting, and storytelling. Upon completion, students should be able to design complex levels using industry-standard tools.

Prerequisites: Take SGD 174

**SGD 285. SGD Software Engineering. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces object-oriented software engineering concepts related to simulation and game development. Topics include systematic approaches to the development, operation and maintenance of simulations and games. Upon completion, students should be able to apply software engineering techniques to the development of simulations and games.

Prerequisites: Take One: SGD 212, SGD 213, or SGD 214

**SGD 289. Simulation and Game Development Project. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course provides students with the opportunity to create a functional simulation or game with minimal instructor support. Emphasis is placed upon verbal and written communication, skill documentation, professional presentation and user training. Upon completion, students should be able to create and professionally present a fully functional simulation or game.

Prerequisites: Take One: SGD 212, SGD 213, SGD 214, or SGD 285