



# AMERICAN COLLEGE

## CSC314 GAME DESIGN AND DEVELOPMENT

### ECTS Course Syllabus

<b>Code</b> CSC314	<b>Title</b> Game Design and Development	
<b>ECTS Credits</b> 6	<b>Department</b> Computer Science	<b>Instructor</b>
<b>Semester</b> Spring	<b>Cycle</b> First	<b>Language of Instruction</b> English

### Description

This course is an introduction to game development process, covering game development topics including graphics, sound, artificial intelligence, animation, game engines and Web-based games. Real games will be created using Python and Pygame.

### Learning outcomes

By the end of the course, students are expected to:

- Deal with all different aspects of producing a computer game.
- Identify and analyze the roles of the major members in a game production team.
- Design a computer game
- Produce code in a language used for game development.
- Be able to apply motion, sound, 3d effects, animations;

**Prerequisite(s):** CSC103, CSC112

### Learning methods and educational activities

Lectures, problem solving, labs, lab exercises, discussing questions, assignments preparation, preparation of projects, project presentations, independent and private study.

**Teaching hours:** 39

### Assessment methods and weight

Mid-term Examination:	20%
Assignments:	15%
Project:	15%
Final Examination:	50%

### Grading system

90-100	<b>A</b>	85-89	<b>B+</b>	80-84	<b>B</b>	75-79	<b>C+</b>
70-74	<b>C</b>	65-69	<b>D+</b>	60-64	<b>D</b>	0-59	<b>F</b>

### Required book(s)

<b>Title:</b>	Game Development Using Python
<b>Author(s):</b>	James R. Parke
<b>Publisher:</b>	Mercury Learning & Information
<b>Edition:</b>	2nd
<b>Year:</b>	2021

## Content

<b>Week 1</b>	<b>Introduction to Game Internals;</b> A brief history of game design and development; Initial idea; Game elements; Create a theme; Game mechanics; Stories and game structures; Characters; Spaces; Multiplayers; Project team; Team roles; Tools and technology for game development; Game architecture; Physical simulations; Game simulations; Players and avatars; Game Modes; The entity class; Object identification; Game events; Game levels; User Interfaces; Interacting with the simulation;
<b>Week 2</b>	<b>Game Designing:</b> From Idea to Game, Collecting all Ideas and Resources; Setting up the Architecture of the Game; Class diagram; Designing the Game Objects; Creating the Game Logics; Creating Random Levels; Finalizing the Game
<b>Week 3</b>	<b>Game programing: Pygame library:</b> Classes approach (OOP); The Game Loop; Event Objects Display Screen; Colors; Drawing Functions; Frames per second; Creating Shapes; Quitting the Game loop;
<b>Week 4</b>	<b>Graphics and Image with Python:</b> Graphics engines; 2D Engines; 3D Engines; Graphics Engine Subcomponents; Competing APIs; Art pipeline; Graphics module interface; Graphics object interface; functions: image.load(); get_rect(); get_pressed(); move_ip(); blit(); <b>Sound:</b> Audio concept; Amplitude; Frequency channels; Sample rate; Pulse code modulation;
<b>Week 5</b>	<b>2D Game Example:</b> Hockey Pong; Sprites; Sprites grouping; Python Pygame Mixer Library; <b>Sound Functions:</b> Using the Mixer; Music.play();Music.queue();Music.stop() Music.pause() and Music.unpause();Music.set_endevent(); <b>3D Graphics:</b> Basics; Coordinate Spaces; Lighting and Shading ; Visibility; World Transform;
<b>Week 6</b>	<b>Artificial Intelligence and Collision Detection:</b> Basic state machines; State machine enhancements; Transition validation; State inputs; Parallel state machines; Pathfinding concept; Visualizing the pathfinder; Classifying objects for collision; Partitioning the world for collision detection; Methods of collision checking;
<b>Week 7</b>	<b>3D Games:</b> Example 3D Game; Python and Blender; Python Scripting in Blender; List of all objects in the scene; create a 3d object; Creating Meshes; Low Level APIs; PyOpenGL; <b>Assingment:</b> Develop a 3D game;
<b>Week 8</b>	<b>Revision for Mid-term examination; Mid-term Examination.</b>
<b>Week 9</b>	<b>Web-Based Games and Processing:</b> Why Should You Target Online Browser Games? The Role of Python in The Web Gaming Industry; How To Use Python For Browser Games Development; Technology for browser-based Python game development; Python Libraries For Online Game Development; Advantages and disadvantages of using python for online games development; <b>Assingment:</b> Develop a web based game;
<b>Week 10</b>	<b>Animations and Video:</b> define the meta data for the movie; decide what in the background that no need to change; decide the objects that need to change in each movie frame; import the appropriate modules; initialize the movie background figure; update the frames for the movie; Examples: create linechart animation; create a barchart animation; Clean the previous graph; Filter your data in the update function; animate Scatter Plot; improve the fluency of Python animations; Create more observations between the data; create horizontal movement; Avoid jumps in animations;
<b>Week 11</b>	<b>Assignment: Develop an Android game;</b> challenges of developing a mobile application; Module for Developing Android Mobile Game using Python; Kivy;
<b>Week 12</b>	<b>Networking and Multi-player Games:</b> Network concept; Network layers; Game protocol design; Multiplayers game architectures; A Simple Multiplayer example; Code organization; A game server; A game client;
<b>Week 13</b>	<b>Revision for Final Examination.</b>

## Student workload

Activity	Hours
Class attendance	36
Independent Study	31
Test Preparation	15
Test	1,5
Mid-term Preparation	20
Mid-term Examination	1,5
Project Preparation	18
Final Exam Preparation	25
Final Examination	2
<b>Total</b>	<b>150</b>