Game Design Academy Scope and Sequence Outline

# 11th Grade

## Fall Semester

### 11th Grade Fall Semester SLOs:

General:

* Students have a strong understanding of game mechanics (what they are and why they’re important)
* Students have performed at two game analyses (one in a group, one individual)
* Students have written a short, functional program from scratch
* Students have learned enough BYOB/Scratch to fix a broken game

Art Students:

* Have built a simple set of 3 or 4 art assets. Storyboard.

Design Students:

* Created and refined (through iterative testing) a simple game mechanic. Storyboard.

Engineering Students:

* Debugged a simple broken program

### Topics:

1. Intro to Game Design - This covers the very basics and outlines of game design.
   1. What is a game? (**AME Pathway Standards: D1.0 Demonstrate understanding of current trends and the historical significance of both electronic and non-electronic games. Students will analyze different game systems and identify how these systems have influenced consumer technology.**)
      1. Rules and aesthetics
      2. Game vs. Toy? (win condition, level of randomness)
      3. Vocabulary (Crossword)
   2. History of games
      1. Early games (knuckle bones, cards, joss sticks, Go, chess.)
      2. Early video games (Space War, Pong, Adventure, Arcades, NES, etc.)
      3. Modern games (Indie games, big box games, social-mobile games, educational games.)
      4. Who Plays Games Now? (Everybody!!)
      5. ESRB standards
   3. What are the parts of a game? (**AME Pathway Standards: D1.2 Define and use necessary vocabulary related to games, their genres, game platforms, and game hardware.**)
      1. Mechanics/Rules
      2. Aesthetics
      3. Dynamics (Mood)
      4. Milestone and first playable slice of game.
   4. What is game analysis? (**ICT Pathway Standards: D2.0 Demonstrate an understanding of game and simulation analysis, design, standard documentation, and development tools.**)
      1. PROJECT: Take apart Pac-man
      2. PROJECT: “Game Report”
      3. PROJECT: Tic-Tac-Toe - Add a rule. Play it. Add another rule. Take away one rule. How has the game changed? Is it more fun or challenging?
      4. PROJECT: Begin building Portfolio of work.
2. Intro to Programming (**ICT Pathway Standards D3.1 Implement common programming concepts, including logic operators, conditional statements, loops, variables, events, actions, and handling user input.**)
   1. Data
      1. Data Exercise
   2. Variables
      1. Variable Exercise
      2. Declaring Variable Drills
   3. If/Then
      1. If/Then Exercise
      2. Real World Examples of Functions: Stoplights, timers, marble runs, etc.
   4. Loops
      1. Loops Exercise?
   5. Functions
      1. Function Exercise
3. Analysis of a board/card game: (**ICT Pathway Standard D2.1 Demonstrate an understanding of the vocabulary for discussing games and play by listing and describing the general procedure and requirements of game and simulation design.**)
   1. In a group, take a board and/or card game and describe the mechanics of that game
   2. How do those mechanics work together?
   3. Does the game have a “dominant strategy?”
4. PROJECT: Build your own board/card game (**ICT Pathway Standard D2.8 Prototype a small game using real-world objects, such as dice, cards, balls, pen and paper, etc.**)
   1. Develop a theme
   2. Determine a mechanic
   3. Build a board game
5. BYOB/Scratch (**AME Pathway Standard D3.0 Create a working game or simulation individually or as part of a team.**)
   1. Here is a broken game
      1. How do we fix it?
         1. Analysis
      2. What do we want it to do?
         1. Problem solving
6. Cohort work
   1. Design Cohort
      1. Pick a game and describe all of its mechanics as completely as possible (**ICT Pathway Standard: D2.2 Break down and identify the fundamental building blocks of game play: player goals, player actions, rewards, and challenges.**)
   2. Art Cohort (**ICT Pathway Standard: D4.1 Demonstrate understanding of the elements of art, including line, shape, color, value, texture, space, and balance, to set the mood and feel of a scene.**)
      1. Pick a game and describe the art as completely as possible
         1. How does it make you feel?
   3. Engineering Cohort (**ICT Pathway Standard D3.0 Acquire and apply appropriate game programming concepts and skills to develop a playable video game.**)
      1. Pick a game and talk about its procedural structure

## Spring Semester

### 11th Grade Spring Semester SLOs:

General:

* Students have designed and developed one game from scratch, using JS/pygame/Corona
  + Mechanics
  + Aesthetics
  + Rules
  + Engineering
* Students assemble into teams, brainstorm ideas for their game and paper prototype

Art Students:

* Lead Art discussions on their games
* Build three art assets used in the game you’re working on

Design Students:

* Lead Design discussions on their games
* Deliver the design document for the game you’re working on
  + Core Loop

Engineering Students:

* Lead the Engineering Discussions on their games
* Deliver the code for the game you’re working on

### Topics:

1. What game are you making? (**AME Pathway Standard D4.0 Students will demonstrate mastery of game art and multimedia, including music, sound, art, and animation.**)
   1. What is the theme?
   2. What are the rules?
   3. Mechanics → Dynamics: How does a game make you FEEL?
      1. PROJECT: Choose a game and talk about its mechanics
2. Programming a Game (**AME Pathway Standard D10.3 Use computer tools to create game programming, art, and audio.**)
   1. The Draw Loop
   2. Simple Physics
      1. Jumping and falling
      2. Different types of Movement
   3. How to think about Mechanics (**AME Pathway Standard D10.0 Students will build a game that demonstrates teamwork and project management by creating a game design production plan that describes the game play, outcomes, controls, rewards, interface, and artistic style of a video game.**)
   4. Procedures:
      1. Spawning enemies and bullets
      2. Collisions
3. Design Considerations
   1. Importance of play vs. Addiction.
   2. Game currency vs. US Dollar
4. Cohort work
   1. Design Cohort
      1. Describe one mechanic that’s going to make your game different
      2. Describe the story of your game (**AME Pathway Standard D4.9 Understand the basics of character design and development, world design, and level design.**)
      3. Deliver the design for that mechanic (**AME Pathway Standard D10.1 Use design documents to create a game design production plan.**)
      4. Make a game that has a positive impact in your community and you’ll earn community service hours in addition to your grade.
   2. Art Cohort
      1. Describe the art style of the game you’re making
      2. Find/use/alter assets that fit that style (**AME Pathway Standard D10.4 Create and use animated objects in a game.**)
   3. Engineering Cohort ( **ICT Pathway Standard D3.3 Examine the use of math and physics (such as gravity and friction) in game development.**)
      1. Describe the program flow of your game
      2. What is your game’s physics like?

# 12th Grade

## Fall Semester

### 12th Grade Fall Semester SLOs:

General:

* Students are able to do deeper mechanics analysis
* Students are able to compare and contrast different games in the same genre
* Students are able to confidently translate emotional dynamics into game mechanics
* Students have a clear grasp of the production pipeline of a game, and understand how to work together with other students to build a video game.

Art Students:

* Discuss UI and UX of a game you love: How do they help the experience? Talk about examples of bad UI/UX.

Design Students:

* Discuss mechanics of a game you love: How do the mechanics help the experience? Pick one mechanic in a game you love that you would change/improve to make your play experience better.

Engineering Students:

* Discuss the procedural elements of a game you love: What’s happening “under the hood?”

### Topics:

1. Redesign a game you worked on last year (11th Grade capstone) (**ICT Pathway Standards: D5.2 Identify the key elements in a game and make intelligent judgments about whether the game succeeded or failed in its objectives.**)
   1. How can you make it better?
2. PROJECT: Work with Larson’s CAST Academy (or a Zynga volunteer) to build and refine 3 or 4 assets (**ICT Pathway Standards D5.2 Identify commonly used art and animation production tools in the game design industry**)
   1. Assets are 2D
   2. Designers deliver design constraints
   3. Larson’s students collaborate on the vision for the game
   4. Assess, test, and revise assets
3. Intro to 3D games (**ICT Pathway Standards D6.0 Understand the general procedures, documentation, and requirements of large scale game design projects. Examine and categorize the significant processes in the production of games.**)
   1. What changes in 3D games?
   2. What gets easier?
   3. What gets harder?
   4. What is a game engine (Unity) and why would you use it? Pros and cons.
4. PROJECT: Bartle’s Player Types (**AME Pathway Standard D1.4 Describe the psychological impact of games on individuals and groups.**)
   1. How do players play?
   2. Take a game you know (Monopoly?) and redesign it for a specific Bartle’s Type.
5. Cohort work
   1. Design Cohort
      1. Identify 3 mechanics unique to 3D games (**AME Pathway Standard D1.7 Identify the core tasks and challenges that face a game or simulation design team.**)
      2. How would you make a 2D mechanic 3D?
   2. Art Cohort
      1. Identify 3 different art styles in 3D games (**AME Pathway Standard D1.7 Identify the core tasks and challenges that face a game or simulation design team.**)
      2. Why would you use each one?
   3. Engineering Cohort
      1. Identify 3 ways that programming a 3D game is different than a 2D game (**AME Pathway Standard D1.7 Identify the core tasks and challenges that face a game or simulation design team.**)

## Spring Semester

### 12th Grade Spring Semester SLOs:

General:

* Students are able to work comfortably and confidently in Unity
* Students understand the increased demands of developing for a 3D environment
* Students are able to use an asset pipeline to build, test, and instance game assets.

Art Students:

* Develop an art design for the game you’re working on
* Support your choices of art style, referring to the mechanics and dynamics of the game
* Develop and justify the use of lighting to create a mood/psychological experience. (Limbo vs. Super Mario Smash Bros.)

Design Students:

* Deliver the design document for your Unity game

Engineering Students:

* Deliver the code for your Unity game

### Topics:

1. How do you make a game in Unity? (**ICT Pathway Standards D2.5 Know how to use tools and software commonly used in game/simulation development and become familiar with popular game tools and different gaming engines.**)
   1. Game Object Basics
   2. Physics
      1. Rigid body
      2. Collision
   3. Scripts
      1. Why are they useful?
      2. How to write them
2. What kinds of mechanics are available in a 3D game? (**AME Pathway Standard D5.3 Compare and contrast the differences between functionality and usability of software.**)
   1. Sight-lines
   2. Physics
3. Art Styles in 3D games (**AME Pathway Standard D4.9 Understand the basics of character design and development, world design, and level design.**)
   1. How to support the mechanic?
4. Cohort work
   1. Design Cohort (**AME Pathway Standard D2.2 Break down and identify the fundamental building blocks of game play: player goals, player actions, rewards, and challenges.**)
      1. Other than the primitive actions available (running, jumping, etc.) what will you put in this game?
      2. Work backwards from how you want the game to feel.
   2. Art Cohort (**AME Pathway Standard D4.1 Demonstrate understanding of the elements of art, including line, shape, color, value, texture, space, and balance, to set the mood and feel of a scene.**)
      1. How should the game look?
      2. What kinds of ways can you change the look of the game?
         1. Particle systems
         2. UX/UI
   3. Engineering Cohort (**ICT Pathway Standard D2.10 Make informed decisions about game physics: how the game world works, how the players interact with the game world, and how the players interact with one another.**)
      1. How should the games scripts be written?
      2. What parts of the game need to be able to interact?
      3. How can the code be made as concise and understandable as possible if someone new to the project had to take over?

Visual Resources:

<http://opengameart.org/>

<http://freegamearts.tuxfamily.org/>

<http://makegames.tumblr.com/post/42648699708/pixel-art-tutorial>

<http://www.pixelprospector.com/the-big-list-of-pixel-art-tutorials/>

Sound Resources:

<http://www.bfxr.net/>

<http://www.flashkit.com/soundfx/>

<http://www.pdsounds.org/>