

Computer Science and Game Design Certificate

Developed by
Zulama and the Computer Science Teachers Association

The *Computer Science and Game Design* course is offered by the Computer Science Teachers Association (CSTA) in partnership with Zulama. The 30-hour course is divided into three self-paced levels. The course provides a broad, comprehensive computer science professional development experience that is designed for teachers who want to develop their computer science skills. No prior programming experience is necessary. Teachers who successfully complete all three levels are jointly awarded the CSTA and Zulama Computer Science and Game Design Certificate. They will also be able to transfer their knowledge into the classroom and help their students learn computer programming in a high-interest and engaging environment.

Time to complete: 30 hours

Game Design Software: GameMaker: Studio™ v 1.4

Course Project: Zulama Pinball

Requirements: Desktop or Laptop - Windows 8 or newer

Through this engaging and highly interactive online course, teachers:

- Use their favorite browser to log into Zulama
- Download and install GameMaker: Studio
- Learn and apply game design principles and basic programming knowledge by completing three Tiers:
 - **Level 1 (12 hours)** - Build and code Zulama Pinball, a fully playable video game
 - **Level 2 (12 hours)** - Design and code their own video game
 - **Level 3 (6 hours)** - Showcase their game design and coding skills in a digital portfolio
- Receive their digital badge and Computer Science and Game Design Certificate issued jointly by Zulama and CSTA
- Become ready to bring a host of new skills to their classroom!

Certificate Structure

	Level 1 Badge (12 hours)	Level 2 Badge (12 hours)	Level 3 Badge (6 hours)
Goals	To introduce teachers to: <ul style="list-style-type: none"> ● game design ● the software development life cycle ● application of coding concepts 	To deepen teacher computer science skills through application of coding and game design concepts	To assist teachers in compiling a digital portfolio to showcase their computer game design skills
Objectives	By the end of Level 1 , teachers will demonstrate knowledge of: <ul style="list-style-type: none"> ● computer science principles ● game design principles ● GML scripting language 	By the end of Level 2 , teachers will demonstrate the ability to: <ul style="list-style-type: none"> ● design and code an original playable computer game ● attain a proficiency or exemplary rating using the parameters in the Game Programming Rubric 	By the end of Level 3 , the submitted digital portfolio will: <ul style="list-style-type: none"> ● include each design specific as detailed in the Computer Game Digital Portfolio Guide, including examples of the iterative process ● attain a proficiency or exemplary rating based on the parameters set forth in the Digital Portfolio Guide and Rubric
Outcomes and Competencies	Teachers will: <ul style="list-style-type: none"> ● Articulate game design principles ● Navigate the GameMaker: Studio interface ● Apply coding to build a computer game including: <ul style="list-style-type: none"> ○ functions ○ variables ○ conditional statements ○ arrays and loops ○ variable scope ● Allocate game resources ● Distinguish between objects and instances ● Test and debug ● Authentically assess their deliverables using Zulama-provided game programming and digital portfolio rubrics ● Receive professional feedback from game design and computer science professionals ● Gain confidence in their ability to learn and transfer computer science knowledge and skills 		

Syllabus

Module	Lessons	Activities and Projects
Level 1: Computer Science Skill Development (12 hours)		
Getting Started	Course Structure and Guide Game Design and Core Competencies Curriculum Standards	
Module 1: Setting up GameMaker: Studio	Lesson 1: What Is a Game?	Discussion Game Jams Discussion Zulama Pinball Game Design Journal
	Lesson 2: Setting up GameMaker Projects	Downloading GameMaker: Studio Game Design Journal
	Lesson 3: GameMaker: Studio Interface and Game Assets	Game Design Journal
	Lesson 4: Parts of a GameMaker Game	Discussion GameMaker Tips Game Design Journal
Module 2: Adding Game Resources	Lesson 5: Backgrounds and Rooms	Game Design Journal
	Lesson 6: Adding Code	Game Design Journal
	Lesson 7: Complete the Navigation Workshop	Project Navigation Workshop Game Design Journal
Module 3: Zulama Pinball Game Mechanisms	Lesson 8: Controlling the Paddle	Game Design Journal
	Lesson 9: Using Mouse Input	Game Design Journal
	Lesson 10: Collision with Ball	Discussion Debugging Tips Game Design Journal
Module 4: Enhancing Zulama Pinball	Lesson 11: Adding More Assets	Game Design Journal
	Lesson 12: Add Game Balance	Game Design Journal
	Lesson 13: Completing Zulama Pinball	Activity Level 1 Project Game Design Journal
Module 5: Computer Science Connections	Lesson 14: Equity in Computer Science	Discussion Internet Usage Discussion Global Equity Divide Game Design Journal
	Lesson 15: K-12 CS Framework and Game Design	Discussion Computer Science and Game Design Discussion Indie Games Game Design Journal
	Lesson 16: Computer Science and STEM	Activity Computer Science, Game Design, and STEM

		<p>Discussion STEM to STEAM Game Design Journal</p>
<p>Level 2: Build an Original Game (12 hours)</p>		
<p>Module 6: Building the Game Prototype</p>	<p>Lesson 17: The Player Experience</p>	<p>Discussion Fun and the Player Experience Game Design Journal</p>
	<p>Lesson 18: Game Design Document</p>	<p>Activity Game Design Document (GDD) Game Design Journal</p>
	<p>Lesson 19: First Prototype</p>	<p>Game Design Journal</p>
<p>Module 7: The Iterative Cycle</p>	<p>Lesson 20: Playtest</p>	<p>Discussion Playtesting Activity Playtest an Original Game Game Design Journal</p>
	<p>Lesson 21: Final Prototype</p>	<p>Game Design Journal</p>
	<p>Lesson 22: The Game Design Industry and You</p>	<p>Project Original Game Discussion Coding and Games Game Design Journal</p>
<p>Level 3: Your Digital Portfolio (6 hours)</p>		
<p>Module 8: Your Digital Portfolio</p>	<p>Lesson 23: Setting up Your Portfolio</p>	<p>Game Design Journal</p>
	<p>Lesson 24: Building Your Portfolio</p>	<p>Discussion Building a Digital Portfolio Game Design Journal</p>
	<p>Lesson 25: Showcasing Your Portfolio</p>	<p>Discussion Reflection Project Digital Portfolio Project Test Course Exam - Multiple Choice Game Design Journal</p>