

**STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK**



MASTER SYLLABUS

GAME110 – Fundamentals of Game Design

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Canino School of Engineering Technology

Department: Decision Systems

Semester/Year: Spring 2020

- A. **TITLE:** Fundamentals of Game Design
- B. **COURSE NUMBER:** GAME110
- C. **CREDIT HOURS:** 3 credit hour(s) per week for 15 weeks
(2 hours lecture, 2 hours recitation per week)
- D. **WRITING INTENSIVE COURSE:** Yes No
- E. **GER CATEGORY:** None: Yes:
If course satisfies more than one:
- F. **SEMESTER(S) OFFERED:** Fall Spring Fall & Spring

G. **COURSE DESCRIPTION:**

This is a broad survey course that focuses on understanding the industry, the game-development cycle, aspects of design and mechanics, statistics and an introduction to programming. Students will analyse games in the context of mechanical balance, narrative development, UI elements and level design. Further, they will study the mechanical property of games, including transitive and intransitive properties, numeric relationships, and balancing of game variables. Students will learn about careers in the game industry, and also explore the challenges and rewards of independent game entrepreneurship. As part of their studies, students will listen to successful indie game developers dissect the strengths and (more importantly) weaknesses of their own products. Major projects will include the development of a board game prototype, design and implementation of an escape room, creation of a sprite-sheet and two elementary mobile games.

- H. **PRE-REQUISITES:** None Yes If yes, list below:

CO-REQUISITES: None Yes If yes, list below:

I. STUDENT LEARNING OUTCOMES: (see key below)

By the end of this course, the student will be able to:

<u>Course Student Learning Outcome</u> <u>[SLO]</u>	<u>Program Student Learning Outcome</u> <u>[PSLO]</u>	<u>GER</u> <i>[If Applicable]</i>	<u>ISLO & SUBSETS</u>	
Describe the complex relationship between developers, publishers, distributors and consumers.	PSLO2 - Research, organize, evaluate, and document gathered information for a comprehensive examination of the design process and manage a professional game design, development, and production workflow, including development roles and the specific skill sets required by each role, in order to develop a successful career path.		5- Industry, Professional, Discipline Specific Knowledge and Skills	
Follow a creative design process to bring innovation to a crowded marketplace of games.	PSLO2 - Research, organize, evaluate, and document gathered information for a comprehensive examination of the design process and manage a professional game design, development, and production workflow, including development roles and the specific skill sets required by each role, in order to develop a successful career path.		2- Critical Thinking 5- Industry, Professional, Discipline Specific Knowledge and Skills	PS
Apply mathematical principles to design, including relationships and balance.	PSLO4 - Recognize the underlying principles guiding the relevant visual, audio, interactive, and narrative aesthetics of an animation or a game.		5- Industry, Professional, Discipline Specific Knowledge and Skills	
Work in groups with differentiated roles to build on strengths and improve deficiencies.	PSLO1 - Present working prototypes and listen to, analyze and evaluate, and respond critically to the ideas of others.		2- Critical Thinking 4- Social Responsibility	PS T

Give and accept criticism of game concepts.	PSLO1 - Present working prototypes and listen to, analyze and evaluate, and respond critically to the ideas of others.		1- Communication Skills 2- Critical Thinking	O CA
Design and use a sprite sheet to animate a character.	PSLO4 - Recognize the underlying principles guiding the relevant visual, audio, interactive, and narrative aesthetics of an animation or a game.		5- Industry, Professional, Discipline Specific Knowledge and Skills	
Program two simple mobile-focused games.	<p>PSLO1 - Present working prototypes and listen to, analyze and evaluate, and respond critically to the ideas of others.</p> <p>PSLO2 - Research, organize, evaluate, and document gathered information for a comprehensive examination of the design process and manage a professional game design, development, and production workflow, including development roles and the specific skill sets required by each role, in order to develop a successful career path.</p>		5- Industry, Professional, Discipline Specific Knowledge and Skills	

KEY	<u>Institutional Student Learning Outcomes [ISLO 1 – 5]</u>
ISLO #	ISLO & Subsets
1	Communication Skills Oral [O], Written [W]
2	Critical Thinking <i>Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]</i>
3	Foundational Skills <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
4	Social Responsibility <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
5	Industry, Professional, Discipline Specific Knowledge and Skills

*Include program objectives if applicable. Please consult with Program Coordinator

J. **APPLIED LEARNING COMPONENT:** Yes No

If YES, select one or more of the following categories:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Classroom/Lab | <input type="checkbox"/> Civic Engagement |
| <input type="checkbox"/> Internship | <input type="checkbox"/> Creative Works/Senior Project |
| <input type="checkbox"/> Clinical Placement | <input type="checkbox"/> Research |
| <input type="checkbox"/> Practicum | <input type="checkbox"/> Entrepreneurship |
| <input type="checkbox"/> Service Learning | (program, class, project) |
| <input type="checkbox"/> Community Service | |

K. **TEXTS:**

No mandatory texts assigned.

L. **REFERENCES:**

Blood, Sweat and Pixels by Jason Schreier ISBN: 9780062651235

M. **EQUIPMENT:** None **Needed:** PC and Macintosh Computer Lab with Microsoft Office, Unity, Godot and Adobe Creative Suite installed, all available in NN119.

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Project-based evaluations that follow a rubrics that emphasize the skills being taught.
Homework evaluations evaluated on the merit of accuracy.
Midterm multiple choice and short answer exam.

P. **DETAILED COURSE OUTLINE:**

- I. Building Our Vocabulary
 - Determinism, Non-Determinism, Solvability, Trivial Solvability, Theoretical Complete Solvability, Solving Non-Deterministic Games, Solving Intransitive Games, Perfect Information, Symmetry, Metagame
 - Board Game Development Project
- II. Numeric Relationships, Transitive Mechanics and Cost Curves
 - Identity relationships, Linear relationships, Exponential relationships. Triangular relationships.
 - Setting hard-limits.
 - Central resources.
 - Signs of imbalance.
 - Relationship diagrams.
 - Examples of Transitive Mechanics
 - Underpowered, Overpowered, Undercosted, Overcosted

- The Work that Goes Into Cost Curves, an Actuarial Study
- III. Probability and Randomness
 - Finite and Probability Exercises
 - IV. Dependent v. Independent Variables
 - The Monty Hall Problem
 - The Sibling Problem
 - The Sibling Problem Extreme
 - The Lottery Card Calculation
 - V. Puzzle Design
 - VI. Finite and Probability Exercises
 - Dependent v. Independent Variables
 - The Monty Hall Problem
 - The Sibling Problem
 - The Sibling Problem Extreme
 - The Lottery Card Calculation
 - VII. Probability and Randomness Gone Wrong
 - Randomness and Pseudorandomness
 - The Luck - Skill Spectrum, and your audience.
 - Interference from human psychology in randomness.
 - When game designers go evil.
 - When game designers go good.
 - Ethics and transparency in probability.
 - VIII. Advancement, Progression and Pacing
 - PvE vs. PvP progression mechanics.
 - PvE setting a game length.
 - Game flow and the four elements of difficulty.
 - Can skill growth be mathematically assumed?
 - Rewarding your player.
 - Positive-sum, zero-sum, negative-sum games.
 - Positive and negative feedback loops.
 - Progression in PvP games.
 - Case studies in progression curves.
 - IX. Case Studies of Situational Balance
 - Attack vs. Defense
 - Single-Target vs. Area Damage
 - Specialized Target Damage
 - X. Breaking Games
 - Kill the turtle.
 - Prevent the pile-on.
 - Smite the kingmaker.
 - Stop the game-leaver.
 - XI. Additive and Subtractive Mechanics
 - Rationales for both during game design, and how developers adapt.

- Who has the power? Why games don't follow traditional market forces.

XII. Universal Interfaces

- Feedback process. Examples of positive and obstructive design.
- Discussion of current UI trends.
- Games With Purpose
- Games As Art
- Games As Business

XIII. Introduction to Programming

- Concepts
- Application / Applied Learning

Q. **LABORATORY OUTLINE:** None Yes