

**CS 74.42A Course Outline as of Spring 2011****CATALOG INFORMATION**

Dept and Nbr: CS 74.42A Title: GAME DEVELOPMENT 1

Full Title: Game Development with C#/XNA 1

Last Reviewed: 11/26/2018

Units	Course Hours per Week		Nbr of Weeks		Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	4	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

An introduction to game development for students interested in the technical aspects of making video games for consoles such as the Xbox 360. This course provides the technical and mathematical background to develop a 2D arcade game using Microsoft C# and the XNA (Xbox Next-generation Architecture) framework. In addition, students will learn the rudiments of game design and common workflow practices within the industry.

**Prerequisites/Corequisites:**

Course Completion of CS 19.21A ( or CIS 19A)

**Recommended Preparation:****Limits on Enrollment:****Schedule of Classes Information:**

Description: An introduction to game development for students interested in the technical aspects of making video games for consoles such as the Xbox 360. This course provides the technical and mathematical background to develop a 2D arcade game using Microsoft C# and the XNA (Xbox Next-generation Architecture) framework. In addition, students will learn the

rudiments of game design and common workflow practices within the industry. (Grade or P/NP)

Prerequisites/Corequisites: Course Completion of CS 19.21A ( or CIS 19A)

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

### **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:

<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
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<b>CSU Transfer:</b>	Transferable	Effective:	Spring 2011	Inactive:
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<b>UC Transfer:</b>	Transferable	Effective:	Fall 2020	Inactive:
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**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

### **COURSE CONTENT**

**Outcomes and Objectives:**

Upon completion of the course, students will be able to:

1. Discuss the history of computer programming languages, in particular the trend of managed code as a safer alternative to native code.
2. Practice the rudiments of Linear Algebra, using vectors and matrices to solve numerous analytical/scientific problems.
3. Create 2D arcade-style game simulations such as Space Invaders or Pac-Man.
4. Identify best practices for memory-constrained devices such as gaming consoles and discuss the particular issues of developing software for a console as opposed to a personal computer.

**Topics and Scope:**

- I. C# language fundamentals
  - A. Introduction to C# and .Net 3.5
    1. History
    2. Managed vs. Native code
    3. XNA framework
  - B. Using Visual Studio 2008 Express
    1. Starting a new project
    2. Compilation
    3. Rudiments of the Visual Studio debugger
  - C. Language fundamentals
    1. Data types
    2. Variables and constants
    3. Whitespace
    4. Statements

- 5. Operators
- 6. Functions
- 7. Preprocessor directives
- D. Object-oriented programming (review)
  - 1. Class definitions
  - 2. Object instantiation
  - 3. Static members
  - 4. Garbage collection
  - 5. Interfaces
  - 6. Inheritances
  - 7. Encapsulation
  - 8. Polymorphism
  - 9. Structs
- E. Arrays, Indexers, Collections
  - 1. Generics
  - 2. Foreach statements
  - 3. List<T> vs. fixed-size arrays
- F. Exceptions
- G. Delegates and Events
- H. String manipulation
- II. Mathematics
  - A. Cartesian Coordinate Systems
  - B. World space, object space, camera space
  - C. Vectors
    - 1. Addition and subtraction
    - 2. Dot and cross product
    - 3. Normalization
    - 4. Distance formula
  - D. Matrices
    - 1. Matrix dimension and notation
    - 2. Transposition
    - 3. Scalar and matrix multiplication
    - 4. Row vs. column matrices
    - 5. Linear transformation
      - a. Rotation
      - b. Translation
      - c. Scale
      - d. Orthographic projection
  - E. Physics simulation
    - 1. Numerical representation and inaccuracy
    - 2. Fixed vs. variable time step
    - 3. Performance considerations
- III. Game Design and Development
  - A. Cultural and function definition of games
    - 1. Serious game development
    - 2. Game vs. puzzles vs. play
  - B. Rudiments of game design
    - 1. History
    - 2. Player feedback
    - 3. Risk vs. Reward
    - 4. Game vs. Simulation
  - C. Development processes

1. Scrumm
  - a. User stories
  - b. Tasks
  - c. Prioritization
2. Iterative design of game mechanics
- D. Documentation
  1. Concept document
  2. Game design document
  3. Technical design document
- IV. Game Development Technical Aspects
  - A. User input
    1. Gamepad
    2. Keyboard
    3. Mouse
    4. Debounce and other forms of signal processing
  - B. Graphics
    1. Image representation
    2. XNA Concept: SpriteBatch
  - C. Audio
    1. Streaming audio
    2. Audio event prioritization
    3. XACT (X Audio Compression Toolkit) authoring tool
  - D. Game Engine Architecture
    1. The game loop
      - a. Fixed
      - b. Variable time step
    2. Separation of simulation and presentation
  - E. Collision Detection
    1. What is collision detection
    2. Responding to collision detection
  - F. Publication
    1. PC publication
    2. Publication to the Xbox 360 Indie games channel
  - G. Lessons from the Underground: DIY/Indie techniques
    1. Agile methodologies for content generation
    2. Intellectual property and copyright issues
    3. Free resources
  - H. XNA Content Pipeline
    1. What are assets
    2. Importing assets into applications

**Assignment:**

1. Read approximately 25-30 pages a week
2. Prepare three written documents that closely mirror the documentation process used in the games industry: a concept document, game design document, and technical design document. (3-7 pages each)
3. Weekly programming assignments that solve particular technical challenges
4. Weekly programming assignments that demonstrate knowledge of C# language fundamentals
5. Midterm
6. Final Project: a working 2D arcade game simulation that demonstrates the use of the techniques developed in this class

## Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Concept document, game design document, technical design document

Writing  
10 - 20%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Programming assignments -- technical challenges

Problem solving  
20 - 40%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Programming assignments with C#; Final project

Skill Demonstrations  
30 - 60%

**Exams:** All forms of formal testing, other than skill performance exams.

Mid-term exam: multiple choice, true/false, matching, short answer

Exams  
10 - 20%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

None

Other Category  
0 - 0%

## Representative Textbooks and Materials:

Hall, Joseph. XNA Game Studio Express: Developing Games for Windows and the Xbox 360. Course Technology PTR, 2007.

Lobao, Alexandra Santos. Beginning XNA 3.0 Game Programming: From Novice to Professional. Apress, 2009.

Nitschke, Benjamin. Professional XNA Game Programming. Wrox, 2008.

Reed, Aaron. Learning XNA 3.0: XNA 3.0 Game Development for the PC, Xbox 360, and Zune. O'Reilly Media, 2008.

Instructor prepared materials