



**ARIZONA STATE UNIVERSITY**  
**GENERAL STUDIES COURSE PROPOSAL COVER FORM**

**Course information:**

Copy and paste current course information from [Class Search/Course Catalog](#).

Academic Unit Informatics Department CIDSE

Subject CPI Number 111 Title Game Development 1 Units: 3

Is this a cross-listed course? No  
 If yes, please identify course(s) \_\_\_\_\_

Is this a shared course? No If so, list all academic units offering this course \_\_\_\_\_

Course description:  
 Introduces video game design, art theory, and concepts as they apply to video game development. Basic art principles used in game development. Covers the fundamental video game art principles of 2-D and 3-D composition, color theory, modeling, and lighting techniques. Demonstrates practical application of these art fundamentals in establishing style guides, concept art, storyboards, and in-game assets. Also includes game design, game production, asset production, and game programming. Hands-on experience by creating 2-D game prototypes belonging to different video game genres and evaluating the techniques.

**Requested designation:** Mathematical Studies-CS

*Note- a separate proposal is required for each designation requested*

**Eligibility:**

Permanent numbered courses must have completed the university's review and approval process.  
 For the rules governing approval of omnibus courses, contact [Phyllis.Lucie@asu.edu](mailto:Phyllis.Lucie@asu.edu) or [Lauren.Leo@asu.edu](mailto:Lauren.Leo@asu.edu).

**Submission deadlines dates are as follow:**

For Fall 2015 Effective Date: October 9, 2014

For Spring 2016 Effective Date: March 19, 2015

**Area(s) proposed course will serve:**

A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

**Checklists for general studies designations:**

- Complete and attach the appropriate checklist
- [Literacy and Critical Inquiry core courses \(L\)](#)
  - [Mathematics core courses \(MA\)](#)
  - [Computer/statistics/quantitative applications core courses \(CS\)](#)
  - [Humanities, Arts and Design core courses \(HU\)](#)
  - [Social-Behavioral Sciences core courses \(SB\)](#)
  - [Natural Sciences core courses \(SQ/SG\)](#)
  - [Cultural Diversity in the United States courses \(C\)](#)
  - [Global Awareness courses \(G\)](#)
  - [Historical Awareness courses \(H\)](#)

**A complete proposal should include:**

- Signed General Studies Program Course Proposal Cover Form
- Criteria Checklist for the area
- Course Catalog description
- Course Syllabus
- Copy of Table of Contents from the textbook and list of required readings/books

**Respectfully request that proposals are submitted electronically with all files compiled into one PDF. If necessary, a hard copy of the proposal will be accepted.**

**Contact information:**

Name Brian Nelson Phone 480-965-0383

Mail code 8809 E-mail: Brian.Nelson@asu.edu

**Department Chair/Director approval:** *(Required)*



ARIZONA STATE UNIVERSITY

Chair/Director name (Typed): Ron Askin Date: 1/27/15

Chair/Director (Signature): \_\_\_\_\_

## Arizona State University Criteria Checklist for

### **MATHEMATICAL STUDIES [CS]**

#### **Rationale and Objectives**

The **Mathematical Studies** requirement is intended to ensure that students have skill in basic mathematics, can use mathematical analysis in their chosen fields, and can understand how computers can make mathematical analysis more powerful and efficient. The **Mathematical Studies** requirement is completed by satisfying both the **Mathematics [MA]** requirement and the **Computer/Statistics/Quantitative Applications [CS]** requirement explained below.

The **Mathematics [MA]** requirement, which ensures the acquisition of essential skill in basic mathematics, requires the student to complete a course in College Mathematics, College Algebra, or Pre-calculus; or demonstrate a higher level of skill by completing a mathematics course for which a course in the above three categories is a prerequisite.

The **Computer/Statistics/Quantitative Applications [CS]** requirement, which ensures skill in real world problem solving and analysis, requires the student to complete a course that uses some combination of computers, statistics, and/or mathematics.\* Computer usage is encouraged but not required in statistics and quantitative applications courses. At a minimum, such courses should include multiple demonstrations of how computers can be used to perform the analyses more efficiently.

\*CS does *not* stand for computer science in this context; the “S” stands for statistics. Courses in computer science must meet the criteria stated for CS courses.

Revised April 2014

Proposer: Please complete the following section and attach appropriate documentation.

<b>ASU--[CS] CRITERIA</b>			
<b>A COMPUTER/STATISTICS/QUANTITATIVE APPLICATIONS [CS] COURSE MUST SATISFY ONE OF THE FOLLOWING CRITERIA: 1, 2, OR 3</b>			
YES	NO		Identify Documentation Submitted
		<b>1. Computer applications*:</b> courses must satisfy both <b>a</b> and <b>b</b> :	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>a.</b> Course involves the use of computer programming languages or software programs for quantitative analysis, algorithmic design, modeling, simulation, animation, or statistics.	Course Syllabus and schedule
		<b>b.</b> Course requires students to analyze and implement procedures that are applicable to at least one of the following problem domains ( <b>check those applicable</b> ):	
<input type="checkbox"/>	<input type="checkbox"/>	i. Spreadsheet analysis, systems analysis and design, and decision support systems.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ii. Graphic/artistic design using computers.	Course Syllabus and schedule
<input type="checkbox"/>	<input type="checkbox"/>	iii. Music design using computer software.	
<input type="checkbox"/>	<input type="checkbox"/>	iv. Modeling, making extensive use of computer simulation.	
<input type="checkbox"/>	<input type="checkbox"/>	v. Statistics studies stressing the use of computer software.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	vi. Algorithmic design and computational thinking.	Course Syllabus and schedule
<p>*The <b>computer applications</b> requirement <b>cannot</b> be satisfied by a course, the content of which is restricted primarily to word processing or report preparation skills, the study of the social impact of computers, or methodologies to select software packages for specific applications. Courses that emphasize the use of a computer software package are acceptable only if students are required to understand, at an appropriate level, the theoretical principles embodied in the operation of the software and are required to construct, test, and implement procedures that use the software to accomplish tasks in the applicable problem domains. Courses that involve the learning of a computer programming language are acceptable only if they also include a substantial introduction to applications to one of the listed problem domains.</p>			

YES	NO		Identify Documentation Submitted
		<b>2. Statistical applications:</b> courses must satisfy <b>a, b,</b> and <b>c.</b>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>a.</b> Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Pre-calculus, or a course already approved as satisfying the MA requirement.	
		<b>b.</b> The course must be focused principally on developing knowledge in statistical inference and include coverage of all of the following:	
<input type="checkbox"/>	<input type="checkbox"/>	i. Design of a statistical study.	
<input type="checkbox"/>	<input type="checkbox"/>	ii. Summarization and interpretation of data.	
<input type="checkbox"/>	<input type="checkbox"/>	iii. Methods of sampling.	
<input type="checkbox"/>	<input type="checkbox"/>	iv. Standard probability models.	
<input type="checkbox"/>	<input type="checkbox"/>	v. Statistical estimation	
<input type="checkbox"/>	<input type="checkbox"/>	vi. Hypothesis testing.	
<input type="checkbox"/>	<input type="checkbox"/>	vii. Regression or correlation analysis.	
<input type="checkbox"/>	<input type="checkbox"/>	<b>c.</b> The course must include multiple demonstrations of how computers can be used to perform statistical analysis more efficiently, if use of computers to carry out the analysis is not required.	

YES	NO		Identify Documentation Submitted
		<b>3. Quantitative applications:</b> courses must satisfy <b>a, b, and c:</b>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>a.</b> Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Pre-calculus, or a course already approved as satisfying the MA requirement.	
		<b>b.</b> The course must be focused principally on the use of mathematical models in quantitative analysis and decision making. Examples of such models are:	
<input type="checkbox"/>	<input type="checkbox"/>	i. Linear programming.	
<input type="checkbox"/>	<input type="checkbox"/>	ii. Goal programming.	
<input type="checkbox"/>	<input type="checkbox"/>	iii. Integer programming.	
<input type="checkbox"/>	<input type="checkbox"/>	iv. Inventory models.	
<input type="checkbox"/>	<input type="checkbox"/>	v. Decision theory.	
<input type="checkbox"/>	<input type="checkbox"/>	vi. Simulation and Monte Carlo methods.	
<input type="checkbox"/>	<input type="checkbox"/>	vii. Other (explanation must be attached).	
<input type="checkbox"/>	<input type="checkbox"/>	<b>c.</b> The course must include multiple demonstrations of how computers can be used to perform the above applications more efficiently, if use of computers is not required by students.	

Course Prefix	Number	Title	General Studies Designation
CPI	111	Game Development 1: General Studies Designation: CS	

Explain in detail which student activities correspond to the **specific** designation criteria.  
 Please use the following organizer to explain how the criteria are being met.

Criteria (from checklist)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
Graphic/artistic design using computers	students design 2d computer game prototypes and assets for the prototypes: 2d sprites, background graphics, GUI elements, 2d composition, lighting techniques	Assignments (pg. 4): final project: design document, implementation, etc. Week 1 (elements of game design) Week 3 (UI elements) Week 7 (game design documents) Week 12 (Game art and textures)
Algorithmic design and computational thinking	Students are introduced to basic programming concepts through both a simple 'drag and drop' coding tool and later via GML scripting language. Both are used regular programming assignments and for final game development projects	All Game Maker assignments require either 'drag and drop' scripting. Some require direct coding via GML. Week 8-9: GML introduction Week 13: Basic AI coding

## CPI 111: Game Development 1

### Course Catalog Description

Introduces video game design, art theory, and concepts as they apply to video game development. Basic art principles used in game development. Covers the fundamental video game art principles of 2-D and 3-D composition, color theory, modeling, and lighting techniques. Demonstrates practical application of these art fundamentals in establishing style guides, concept art, storyboards, and in-game assets. Also includes game design, game production, asset production, and game programming. Hands-on experience by creating 2-D game prototypes belonging to different video game genres and evaluating the techniques.



# CPI 111- Game Development 1

## Spring 2015

ARIZONA STATE UNIVERSITY - TEMPE, AZ  
SCHOOL OF COMPUTING, INFORMATICS AND DECISION SYSTEM ENGINEERING (CIDSE)

**Instructor:** Brian C Nelson  
Associate Professor, CIDSE

Office Room: BYEG M1-04  
Office Hours: TH 2:45-3:45 PM  
E-mail: [Brian.Nelson@asu.edu](mailto:Brian.Nelson@asu.edu)

**Lecture/Lab**  
Room: BYEG M1-11  
Meeting Days: T TH 1:30-2:45 PM



- I. Catalog Description:**

Introduces video game design elements and concepts as they apply to video game development. Covers the fundamental video game art principles of 2D composition, color theory, and lighting techniques. Demonstrates practical application of these art fundamentals in establishing style guides, concept art, storyboards, and in-game assets. Also includes game design, game production, asset production, and game programming. Hands-on experience is gained by creating 2D game prototypes belonging to different video game genres and evaluating the techniques.
- II. Prerequisite:**

NONE
- III. General Description**

This course is intended to serve as an introduction into the game production cycle. The course breaks down the complex process of game creation into a simple step by step program. No programming knowledge is required for the course. However some degree of computer knowledge is desirable. The course will go into detail the design and production methodologies used for creating games in various genres. Students will apply the skills taught during class in the various assignments. The assignments will lead into each other and the final project will be a simple game created by the student as a result of successfully completing the various assignments. The class will teach the students how to use Game Maker 8, which is a simple easy to use visual game design and development software.
- IV. Learning Objectives**

The main learning objective is to learn how to design and develop 2D games using GameMaker8, which includes:  
Game development, Level Design, Art, and AI engine editing using GML script (programming).

**V. Instructional Method**

This is a hands-on class. Each student has one PC at class. In class the instructor explains the basic concepts and theory using PowerPoint Slides shown on the projectors, and demonstrates the functions of commands in Game Maker. The students follow the instructions using their PCs. If they have questions or problems during the instruction, the instructor will show the solutions. The assignments are due a week from when first assigned. Assignments will accepted late at a -10% per day late penalty and will not be accepted after one week. A final project is announced in the 2nd week of class, and the solutions and problems related to the final project are discussed at class through the semester. It may be requested to meet individually for catching up with the topics outside of class. All of the materials using in class are available online at myASU course site. In addition, the students can learn from each other using Discussion board outside class time.

**VI. Attendance Policy**

Attendance in this class is expected and vital for completing assignments and the final project. We expect the students to maintain an atmosphere conducive to teaching and learning in the class. Active student participation is expected in all in-class discussions.

**VII. Textbooks**

“*The Game Maker’s Apprentice: Game Development for Beginners*”, by Jacob Habgood and Mark Overmars, ISBN-1-59059-615-3



**VIII. References**

A few web sites showing Game Maker examples:

<http://www.yoyogames.com>

<https://www.yoyogames.com/gamemaker/#download>

<http://sandbox.yoyogames.com/make/tutorials>

<http://wiki.yoyogames.com/>

IX. Schedule

Week	Topics	Reading	Homework
1	1/13 Introduction to the course Game maker installation and setup Quick tutorial	Syllabus	
	1/15 Elements of Game Design <b>Assignment 1: Creating your first Game</b>	<a href="http://goo.gl/ElZg4">http://goo.gl/ElZg4</a>	
2	1/20 Final Project Overview Previous Examples		
	1/22 <b>Game: Evil Clutches</b>	Ch. 2	<b>Assignment 1</b>
3	1/27 <b>Lab: Assignment 2: Evil Clutches</b>		
	1/29 <b>UI Elements</b>		<b>FG Paragraphs</b>
4	2/3 Game Maker Angles and Rotations	<b>Ch. 3</b>	
	2/5 Parenting: Space Shooter Game		<b>Assignment 2</b>
5	2/10 <b>Game: Mazes</b>		
	2/12 <b>Lab: Assignment 3: Chapter 7</b>	Ch. 7	
6	2/17 <b>Game: Platformer</b>	<a href="http://goo.gl/Bxflo">http://goo.gl/Bxflo</a>	
	2/19 <b>LAB: Platformer</b>		<b>Assignment 3</b>
7	2/24 <b>LAB: Work on Game Design Docs</b>		
	2/26 <b>LAB: Work on Game Design Docs</b>		<b>FG Design Docs</b>
8	3/3 GML Introduction	Ch. 12	
	3/5 <b>LAB: Assignment 4: Tic-Tac-Toe</b>	Ch. 13	
9	3/10 <b>Spring Break: No class</b>		
	3/12		
10	3/17 <b>GML: Point and Click</b>		
	3/19 <b>LAB: Assignment 5: Card Game</b>		<b>Assignment 4</b>
11	3/24 Rainbow Reef, Chapter 6	Ch. 6	
	3/26 <b>LAB: Assignment 6: Rainbow Reef</b>		
12	3/31 Game Art and Textures		
	4/2 <b>LAB: Textures</b>		<b>Assignment 5</b>
13	4/7 <b>Game: Pyramid Panic (basic enemy AI)</b>	Ch 14	
	4/9 <b>LAB: Pyramid Panic</b>		
14	4/14 <b>LAB: Final Prep</b>		
	4/16 <b>LAB: Final Prep</b>		<b>Assignment 6</b>
15	4/21 <b>LAB: Final Prep</b>		
	4/23 <b>LAB: Final Prep</b>		<b>Final Games</b>
16	4/28 <b>Final Presentations</b>		<b>Final Games</b>
	4/30 <b>Final Presentations</b>		
17	5/7 <b>Final Presentations</b>	Exam Period: 12:10-2pm	

\*The syllabus may change throughout the semester

**X. Assignments**

Students will be assigned 6 game development assignments, each worth 50 points (60% of the final grade). The assignments will test a student's skill in implementing the concepts discussed in class. These assignments will be implemented in Game Maker.

The Final Project will be the culmination of the efforts put by the student in the class assignments in developing a simple playable game. The Final project will have different deliverables over the time frame of the class

1. Initial Game Plot Paragraph (3<sup>rd</sup> week)
2. Game Design Document (7<sup>th</sup> week)
3. Final Game implementation, Presentation and Demo. (16-17<sup>th</sup> weeks)

**XI. Evaluation**

The breakdown is as follows:

6 Individual Assignments (50 points each)	300
Plot Paragraph	25
Design Docs & Presentation	75
Final Game Project & Presentation	100
<hr/>	
TOTAL	500

**XII. Grading Policy**

501+	A+
461 - 500	A
450 - 460	A-
440 - 449	B+
411 - 439	B
400 - 410	B-
350 - 399	C
300 - 349	D
0 - 348	E

**I (Incomplete) grade is not offered in this course**

**XIII. Disability resource center**

Please check the website for ASU's Disability Resource Center (<http://www.asu.edu/drc/>) for assistance. Students with special needs should contact the center prior in order to secure assistance.

**XIV. Honor policy:**

The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the University or other sanctions as specified in the University Student Academic Integrity Policy. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities.

**XV. Expected Workload:**

The course is designed to distribute workload pretty evenly over the semester. Students would typically spend **3-5 hours per week** working on homework assignments and projects. Plan your schedule accordingly.

## CPI 111: Required Textbook

*"The Game Maker's Apprentice: Game Development for Beginners"*, by Jacob Habgood and Mark Overmars, ISBN-1-59059-615-3

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