

# CSE 5912: Capstone Design: Game Design and Development

## Course Description

Capstone design project; conceptual and technical design and implementation of interactive game, integrating custom code and toolkits; teamwork, written and oral communication skills.

**Prior Course Number:** CSE 786

**Transcript Abbreviation:** Cpstn: Game Dev

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Undergrad, Graduate

**Student Ranks:** Senior, Masters, Doctoral

**Course Offerings:** Autumn, Spring

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 4.0

**Repeatable:** No

**Time Distribution:** 1.0 hr Lec, 3.0 hr Lab

**Expected out-of-class hours per week:** 8.0

**Graded Component:** Lecture

**Credit by Examination:** No

**Admission Condition:** No

**Off Campus:** Never

**Campus Locations:** Columbus

**Prerequisites and Co-requisites:** (CSE 2501 or CSE 5501 or CSE 601) and (CSE 3901 or CSE 3902 or CSE 4901 or CSE 4902 or CSE 560) and (CSE 3541 or CSE 5541 or CSE 581)

**Exclusions:** Not open to students with credit for CSE 786

**Cross-Listings:**

**Course Rationale:** Existing course.

**The course is required for this unit's degrees, majors, and/or minors:** No

**The course is a GEC:** No

**The course is an elective (for this or other units) or is a service course for other units:** Yes

**Subject/CIP Code:** 14.0901

**Subsidy Level:** Doctoral Course

## Programs

Abbreviation	Description
BS CSE	BS Computer Science and Engineering
MS CSE	MS Computer Science and Engineering
PhD CSE	PhD Computer Science and Engineering

## Course Goals

Master synthesizing and applying prior knowledge to designing and implementing solutions to open-ended computational problems while considering multiple realistic constraints.
Be competent in evaluating design alternatives.
Be competent with software design and development practices and standards.

Be familiar with researching and evaluating computing tools and practices for solving given problems.
Be competent with deadline driven projects in a team setting.
Be competent with issues of project management, such as teamwork, project scheduling, individual and group time management.
Be competent with presenting work to a group of peers.
Be familiar with presenting work to a range of audiences.
Be competent with techniques for effective written communication for a range of purposes (user guides, design documentation, storyboards etc.)
Be familiar with analyzing professional issues, including ethical, legal and security issues, related to computing projects.
Master the development of a complete and functional computer game including elements of computer graphics, artificial intelligence, spatial sound, input controllers and GUI's.

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Course overview and project guidelines	1.0							
Game idea generation and game team formation	2.0							
Software engineering for games, basic game structure, source code control, project management and agile software development concepts	3.0							
Student presentations and demos of current progress on game design and development	4.0		14.0					
Student presentations of team research on current trends, technologies and toolkits used in game programming such as three-dimensional sound, physics, scripting, networking, input controllers, etc.	3.0		14.0					
In-class team game project design and development time			14.0					
Game business and current trends	1.0							

## Representative Assignments

Timebox 1: Basic game structure and overall finite-state machine, including loading content, menu system, play start-up and cleanly terminating.
Timebox 2: Basic gameplay including 3D sound and interactivity. Packaging, compression and installation packages.
Timebox 3: Adding richness through better graphical models, shaders, sound system, AI behaviors and physics. Project goals and management for the next timeboxes.
Timebox 4: Student team-driven development of game based on previously specified objectives. Project goals and management for the next timeboxes.
Final Project: Continued development, forecast for the future and game post-mortem.

## Grades

Aspect	Percent
Homeworks	10%
Group project (split into 5 milestones)	70%
Technology team presentations	20%

## ABET-EAC Criterion 3 Outcomes

Course Contribution	College Outcome
***	a An ability to apply knowledge of mathematics, science, and engineering.

Course Contribution		College Outcome
*	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
***	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
**	f	An understanding of professional and ethical responsibility.
***	g	An ability to communicate effectively.
*	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
***	i	A recognition of the need for, and an ability to engage in life-long learning.
***	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## BS CSE Program Outcomes

Course Contribution		Program Outcome
***	a	an ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering;
*	b	an ability to design and conduct experiments, as well as to analyze and interpret data;
***	c	an ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations;
***	d	an ability to function on multi-disciplinary teams;
***	e	an ability to identify, formulate, and solve engineering problems;
**	f	an understanding of professional, ethical, legal, security and social issues and responsibilities;
***	g	an ability to communicate effectively with a range of audiences;
*	h	an ability to analyze the local and global impact of computing on individuals, organizations, and society;
***	i	a recognition of the need for, and an ability to engage in life-long learning and continuing professional development;
***	j	a knowledge of contemporary issues;
***	k	an ability to use the techniques, skills, and modern engineering tools necessary for practice as a CSE professional;
***	l	an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
***	m	an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
***	n	an ability to apply design and development principles in the construction of software systems of varying complexity.

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