

# CSE 1211 (Approved): Computational Thinking in Context: Images, Animation, and Games

## Course Description

Introduction to computational thinking, focusing on problem solving and programming concepts and skills needed to manipulate digital images and to create interactive graphics, animations, and games; creativity and imagination encouraged.

**Prior Course Number:** CSE 203 and CSE 204

**Transcript Abbreviation:** Comput Thnkng: Art

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Undergrad

**Student Ranks:** Freshman

**Course Offerings:** Autumn, Spring

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 3.0

**Repeatable:** No

**Time Distribution:** 2.0 hr Lec, 1.5 hr Lab

**Expected out-of-class hours per week:** 5.5

**Graded Component:** Lecture

**Credit by Examination:** No

**Admission Condition:** No

**Off Campus:** Never

**Campus Locations:** Columbus

**Prerequisites and Co-requisites:**

**Exclusions:** Not open to students with credit for CSE 203 or CSE 204

**Cross-Listings:**

**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:** Baccalaureate Course

## General Information

Recommended for students with little or no computer programming experience or who are not confident in their programming background.
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## Course Goals

Be competent with using basic constructs provided by high-level imperative programming languages: sequencing, selection, and iteration.
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Be familiar with algorithmic thinking.
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Be familiar with simple media manipulation algorithms and how to apply them to solve interesting media manipulation problems.
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Be familiar with using basic data structure interfaces such as arrays or lists in simple programs.
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Be familiar with procedural composition.
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Be familiar with many of the possibilities available for creative combination in programmed interactive animations.
Be familiar with working in a window-based computing environment.
Be familiar with using a modern interactive program development environment.
Be exposed to the virtual machine model of modern computer systems.

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Course introduction, software installation, and basic concepts	1.5		1.0					
Introduction to programming with media, images, colors, encodings	3.0		2.5					
Loops, new definitions, simple image manipulations	3.0		2.5					
Nested loops, conditionals, Boolean expressions, advanced image manipulations	6.0		4.0					
Animation via sprite movement using iteration	1.5		1.5					
Sequencing, iteration, and drawing	1.0		1.0					
Selection and collision detection and polled input for user interaction	1.0		2.0					
Managing sprite velocities	1.0		1.0					
Course project: discussion and evaluation of preliminary ideas	2.0		1.0					
Course project: discussion of problems encountered and possible solutions	2.0		1.0					
Course project: presentation and evaluation of final projects	3.0		1.0					
Midterms, quizzes, and exam reviews	3.0							

## Representative Assignments

Make a collage of several pictures using various transformations
Generate an animation, e.g., using digital image techniques learned earlier
Reproduce an interesting digital image effect from Photoshop/Gimp
"Create an interesting scene" (placement of sprites and words in the window using its coordinate system; program-controlled drawing using sequencing)
"Create an interesting animation" (movement of sprites by iterative relocation)
"Create an interesting animation where something bounces" (collision detection using continuation conditions)
"Create an interesting interactive situation" (user-influenced movement of sprites using selection)
Course project: "create an interactive education/information environment or a game"

## Grades

Aspect	Percent
Quizzes	5%
Midterm Exams	15%
Final Exam	20%
General Attendance	7%
Attendance at Project Presentations	3%
Homeworks	10%
Lab Assignments	20%
Course Project	20%

## Representative Textbooks and Other Course Materials

Title	Author
<i>Introduction to Computing and Programming in Python: A Multimedia Approach, Pearson Prentice Hall, 2005, ISBN 0-13-117655-2</i>	Mark Guzdial
<i>Phrogram (Windows Computer Program (Software))</i>	The Phrogram Company

## ABET-EAC Criterion 3 Outcomes

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

Prepared by: Bruce Weide