

CS74.42A: Game Development 1

Section 5363, Spring 2019 Course Syllabus

Instructor: Ethan Wilde, ewilde@santarosa.edu

Course Description

An introduction to game development for students interested in the technical aspects of making video games. This course provides the technical and mathematical background to develop a 2D arcade game using JavaScript and HTML 5, with brief introduction to other high-level languages and their applicability to game development. During the course, students will be introduced to modern game platforms, and the effect of their differences, evolution, and limitations, on game programming. In addition, students will learn the rudiments of game design and the common work flow practices within the industry.

Recommended Preparation: Course completion of CS 110A and/or programming experience

Prerequisites: None

Whether you want to become a member of a professional AAA game development team, or just want to try your hand as an independent game developer, mastery of the game development process, including coding, is essential to those goals. We will work with the ECMA-compliant JavaScript language and real-world tools to develop proficiency in the creation of browser-based, mobile and console games. This course will follow the Transformational Process in development of final game projects.

Student Learning Outcomes

Students will be able to:

1. Utilize fundamental practices of contemporary software development, such as object-oriented programming and the purpose and implementation of various design patterns.
2. Discuss the theory of developing a realtime application such as a game.
3. Independently develop 2D arcade titles of the approximate complexity of Space Invaders, PacMan, or similar.
4. Through an overview of contemporary development practices within the games industry, determine an appropriate career path (Art, Design, Engineering, Production, and Quality Assurance).

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 PacMan.
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:

1. JavaScript Language Fundamentals
 1. Introduction to JavaScript and HTML5
 2. Project design and organization
 3. Programming language fundamentals
 4. Data types
 5. Object-oriented programming (review)
 6. Containers
 7. Exceptions
 8. Delegates and Events
 9. String manipulation
2. Mathematics
 1. Cartesian Coordinate Systems
 2. World space, object space, camera space
 3. Vectors
 4. Matrices
3. Game Design and Development
 1. Cultural and function definition of games
 2. Rudiments of game design
 3. Development processes
 4. Documentation
4. Game Development Technical Aspects
 1. User input
 2. Graphics
 3. Audio
 4. Game Engine Architecture
 5. Collision Detection
 6. Publication
 7. Lessons from the Underground: DIY/Indie techniques
 8. XNA Content Pipeline

Assignments:

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. Midterm
5. Final Project: a working 2D arcade game simulation that demonstrates the use of the techniques developed in this class

Class Meetings

Spring 2019 Schedule

Online	Weeks start on Monday	Canvas shell
Live weekly Web conference (optional) https://cccconfer.zoom.us/j/961817861	Mondays, 12:00pm - 2:50pm	Zoom

All class materials for each module will be released online in Canvas on Mondays throughout the entire semester. A weekly live online meeting will be held on Mondays, 12:00pm - 2:50pm. Attendance at the live web conferences is optional but highly recommended. Use this link to join: <https://cccconfer.zoom.us/j/961817861>

Instructor Contact

Ethan Wilde

Email: ewilde@santarosa.edu

Phone: [707-527-4855](tel:707-527-4855)

Spring 2019 Office Hours

January 14 – May 17, 2019

Tuesdays (in office)	12:40pm - 2:00pm	Maggini 2937
Thursdays (online)	10:00am - 3:00pm	Online: Email ewilde@santarosa.edu or Skype ethanwilde

[» Reserve a future office hour appointment](#)

I respond to emails within 48 hours, weekends excepted. I never respond on Sundays.

Course Web Site

Students will use the Canvas course web site for assignment instructions, submitting assignments, viewing classmates' work, sharing resources, and viewing grades. *The Google Chrome browser is recommended for viewing the Canvas-powered course site. Internet Explorer is not recommended.*

Textbooks

An Introduction to HTML5 Game Development with Phaser.JS

Travis Faas, CRC Press, 2016
ISBN 978-1-138-92184-9 print
ISBN 978-1-315-31921-6 ebook

Eloquent JavaScript (3rd)

Marijn Haverbeke
[Free PDF eBook available](#)

The Transformational Framework (1st)

Sabrina Culyba
[Free PDF available](#)

Consider buying a used copy or renting the Phaser textbook. You can locate and order textbooks online via the [SRJC Bookstore](#).

Equipment

- **A personal computer**, either at home, work or on the Santa Rosa or Petaluma campuses.

Required Software + Services

- **Internet access**
- **Web browser**
 - [Google Chrome](#) strongly recommended
 - Support for the Adobe Flash browser plugin
- **MIT Scratch cloud hosting + development service**
 - <https://scratch.mit.edu/>
- **Coding education site**
 - [CodeCombat](#) free account required for all students.
- **Text editor**, for Week 1 only, such as:
 - [TextWrangler](#) (Mac OS only)
 - [Brackets](#) (Windows, Mac OS)
 - [Sublime Text](#) (Windows, Mac OS, Linux)
- **Cloud hosting + development service**
 - [Cloud9](#) IDE (Integrated Development Environment) required for all students, starting Week 2, for hosting class assignments. This service provides a complete

set of browser-based tools in place of the optional software listed below.
Complete the hosting survey to get your free account.

- **2D Graphics software** such as:
 - Adobe Photoshop, part of a [Creative Cloud](#) subscription
 - [Gimp](#) open source application
 - [Pixlr](#) browser-based image editor
- **PDF display software** such as:
 - [Adobe Reader](#)
- **Phaser.js JavaScript library:**
 - Found online at [phaser.io](#)

Optional Software

The additional software listed below is often used for game development. Our two IDEs – the Cloud9 cloud-based IDE for our work with Phaser.js, and the browser-based Scratch software – both provide code editors and file transfer support without any additional software needed.

- **3D modeling software** including:
 - [Blender](#)
 - [Trimble Sketchup Pro](#) (\$49 education license)
- **Enterprise-class game development engine software** including:
 - [Unity3D, Personal Edition](#)
 - [Unreal Engine](#)

Important Dates

Day Class Begins: Monday, January 14, 2019

Day Class Ends: Friday, May 24, 2019

Last Day to Add without instructor's approval: Sunday, January 20, 2019

Last Day to Drop with refund: Sunday, January 27, 2019

Last Day to Add with instructor's approval: Sunday, February 3, 2019

Last Day to Drop without a 'W' symbol: Sunday, February 3, 2019

Last Day to Opt for Pass/No Pass: Sunday, February 24, 2019

Last Day to Drop with a 'W' symbol: Sunday, April 21, 2019

Dropping the Class

If you decide to discontinue this course, it is your responsibility to officially drop it. A student may be dropped from any class when that student's absences exceed ten percent (10%) of the total hours of class time. It is strongly advised that if you need to miss more than one class/homework deadline in a row that you contact the instructor to avoid being dropped from the class.

Attendance

For online courses, students who fail to complete the requirements of the first and second class modules will be dropped by the instructor.

Pass-NoPass (P/NP)

You may take this class P/NP. You must decide before the deadline, and add the option online with TLC or file the P/NP form with Admissions and Records. With a grade of C or better, you will get P.

You must file for the P/NP option by February 24, 2019. Once you decide to go for P/NP, you cannot change back to a letter grade. If you are taking this course as part of a certificate program, you can probably still take the class P/NP. Check with a counselor to be sure.

Instructor Announcements and Q&A Forum

The instructor will post announcements on the “Instructor Announcements” page in Canvas throughout the semester. Canvas notifies students according to their preferred Notification Preferences.

Late Policy

All assignments are due at 11:59pm Pacific time on the Sunday corresponding to the due date. A late submission will receive a 10% penalty for each week it is late. Submissions more than two weeks late are not accepted without prior written arrangement.

Exams

There will be online midterm and final exams. The material comes from the textbook, class lectures and supplemental materials. If any exam is missed, a zero will be recorded as the score, unless you have made prior written arrangements with me. It is your responsibility to take the exams by the due date.

Grading Policy

Click the “Grades” link in Canvas to keep track of your grades. I grade once a week and post grades and comments in the Canvas gradebook.

Grades will be assigned as follows:

A	90% - 100%	900 points or more
B	80% - 89%	800 to 899 points
C	70% - 79%	700 to 799 points
D	60% - 69%	600 to 699 points
F	59% or lower	599 points or less

Grading Breakdown

68%	680 points	Projects + Assignments
12%	120 points	Discussions (Writing)
6%	60 points	Quizzes
7%	70 points	Midterm
7%	70 points	Final Exam
100%	1000 points	1000 points possible

Standards of Conduct

Students who register in SRJC classes are required to abide by the SRJC Student Conduct Standards. Violation of the Standards is basis for referral to the Vice President of Student Services or dismissal from class or from the College. See the [Student Code of Conduct page](#).

Collaborating on or copying of tests or homework in whole or in part will be considered an act of academic dishonesty and result in a grade of 0 for that test or assignment. Students are

encouraged to share information and ideas, but not their work. See these links on Plagiarism:
[SRJC Writing Center Lessons on avoiding plagiarism](#)
[SRJC's statement on Academic Integrity](#)

Special Needs

Every effort is made to conform to accessibility standards for all instructor-created materials. Students should contact their instructor as soon as possible if they find that they cannot access any course materials. Students with disabilities who believe they need accommodations in this class are encouraged to contact Disability Resources by calling (707) 527-4278 or visit online at drd.santarosa.edu.

Student Health Services

Santa Rosa Junior College offers extensive health services to students. Visit Student Health Services online at shs.santarosa.edu or call them at (707) 527-4445.

Course Outline

Start Date	Canvas Module	Topics	Assignments
1/14	Week 1	The World of Game Development	Hosting Signup Survey Assignment 1: Syllabus Quiz Discussion 1: Check-in Discussion
1/21	NO CLASS	MLK Holiday	
1/28	Week 2	Play a Game, Learn to Code	Assignment 2: CodeCombat Reading: <i>Game Dev w Phaser</i> , Ch. 1

2/4	Week 3	Introduction to the Transformational Process of Game Development	Assignment 3: Transformational Process Discussion 2: History + Origins of Games Reading: <i>Game Dev w Phaser</i> , Ch. 2
2/11	Week 4	Introduction to JavaScript + Systems Thinking	Assignment 4: First Game Reading: <i>Eloquent JavaScript</i> , Introduction + Ch. 1
2/18	NO CLASS	Washington Holiday	
2/25	Week 5	Get Started with Browser-Based Games	Assignment 5: First Phaser Game Reading: <i>Eloquent JavaScript</i> , Chs. 2 + 3; <i>Game Dev w Phaser</i> , Ch. 3
3/4	Week 6	Working with Sprites, Controls + Physics	Assignment 6: Working with Sprites + Controls Reading: <i>Game Dev w Phaser</i> , Ch. 6, pp. 55-69 + 72-75
3/11	Week 7	Level Maps, Atlases + Tiles	Assignment 7: Using Animation + Tiles Discussion 3: Game Typologies Reading: <i>Game Dev w Phaser</i> , Ch. 6, pp. 69-72

3/18	NO CLASS	Spring Break	
3/25	Week 8	UI + Sound	Assignment 8: UI + Sound Reading: <i>Game Dev w Phaser</i> , Ch. 6, pp. 76-81
4/1	Week 9	Simulating the Physical World, Particles + Effects	Assignment 9: Arcade Physics Assignment 10: P2 Physics Discussion 4: History of Console Games Reading: <i>Game Dev w Phaser</i> , Ch. 6, pp. 92-122 Quiz 1
4/8	Week 10	Midterm Review / Draft GDD	Assignment 11: Game Design Document Midterm Exam Extra Credit: Unity
4/15	Week 11	Prefabs + Classes / Build Systems	Assignment 12: First Build-System-Based Phaser Game Discussion 5: GDD Presentations Reading: <i>Game Dev w Phaser</i> , Chs. 4 + 5; <i>Eloquent JavaScript</i> , Ch. 6 Extra Credit: Unity
4/22	Week 12	Final Project: Design Your Game Advanced Development Techniques	Assignment 13: Final GDD Reading: online Extra Credit: Unity

4/29	Week 13	Build + Playtest Sprint 1: Final Project	Assignment 14: Rough Prototype Discussion 6: Approaches to Game Design Reading: online Extra Credit: Unity Quiz 2
5/6	Week 14	Build + Playtest Sprint 2: Final Project	Final Project Reading: online
5/13	Week 15	Build + Playtest Sprint 3: Final Project	Final Project Discussion 7: Game Dev Teams + Roles Extra Credit: Unity
—	Weeks 16-17	NONE DUE TO MONDAY HOLIDAYS	
5/20 Mon	Week 18	No Regular Class	Final Exam Discussion: Final Project Presentations

Note to students: the assignments listed above will become available as modules are released in sequence each week. To view course content, go to **Modules**.