**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*](https://cccconfer.zoom.us/j/961817861)

**Instructor Contact**

**Ethan Wilde**

Email: ewilde@santarosa.edu

Phone: [707-527-4855](http://tel:1-707-527-4855)

**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](https://join.skype.com/invite/TIvoQmrUjQBu)* |

[» Reserve a future office hour appointment](http://srjc.ethan.com/reserve/)

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](http://eloquentjavascript.net/)

[***The Transformational Framework*** (1st)](http://press.etc.cmu.edu/index.php/product/the-transformational-framework/)
Sabrina Culyba
[Free PDF available](file:////courses/36420/files/1914706/download%3Fwrap%3D1)

*Consider buying a used copy or renting the Phaser textbook.* You can locate and order textbooks online via the [SRJC Bookstore](http://bookstore.santarosa.edu/santarosa/home.aspx).

**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](https://www.google.com/chrome/browser/desktop/) strongly recommended
	+ Support for the Adobe Flash browser plugin
* **MIT Scratch cloud hosting + development service**
	+ <https://scratch.mit.edu/>
* **Coding education site**
	+ [CodeCombat](https://codecombat.com/) free account required for all students.
* **Text editor,** for Week 1 only, such as:
	+ [TextWrangler](http://www.barebones.com/products/textwrangler/) (Mac OS only)
	+ [Brackets](http://brackets.io/) (Windows, Mac OS)
	+ [Sublime Text](https://www.sublimetext.com) (Windows, Mac OS, Linux)
* **Cloud hosting + development service**
	+ [Cloud9](https://c9.io/) 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](http://www.adobe.com/creativecloud/buy/students.html) subscription
	+ [Gimp](https://www.gimp.org) open source application
	+ [Pixlr](https://pixlr.com) browser-based image editor
* **PDF display software** such as:
	+ [**Adobe Reader**](http://get.adobe.com/reader/)
* **Phaser.js JavaScript library:**
	+ Found online at [phaser.io](http://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](https://www.blender.org/)
	+ [Trimble Sketchup Pro](https://www.sketchup.com/) ($49 education license)
* **Enterprise-class game development engine software** including:
	+ [Unity3D, Personal Edition](https://store.unity.com/)
	+ [Unreal Engine](https://www.unrealengine.com/)

**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](https://student-conduct.santarosa.edu/).

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](http://srjcwritingcenter.com/research/plagiarism/plagiarism.html)
[SRJC's statement on Academic Integrity](https://studentlife.santarosa.edu/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](https://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](https://shs.santarosa.edu) or call them at (707) 527-4445.

**Course Outline**

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| --- | --- | --- | --- |
| **StartDate** | **Canvas****Module** | **Topics** | **Assignments** |
| 1/14 | Week 1 | The World of Game Development | Hosting Signup SurveyAssignment 1: Syllabus QuizDiscussion 1: Check-in Discussion |
| 1/21 | NO CLASS | MLK Holiday |  |
| 1/28 | Week 2 | Play a Game, Learn to Code | Assignment 2: CodeCombatReading:*Game Dev w Phaser,* Ch. 1 |
| 2/4 | Week 3 | Introduction to the Transformational Process of Game Development | Assignment 3: Transformational ProcessDiscussion 2: History + Origins of GamesReading: *Game Dev w Phaser,* Ch. 2 |
| 2/11 | Week 4 | Introduction to JavaScript + Systems Thinking | Assignment 4: First GameReading: *Eloquent JavaScript,* Introduction + Ch. 1 |
| 2/18 | NO CLASS | Washington Holiday |  |
| 2/25 | Week 5 | Get Started with Browser-Based Games | Assignment 5: First Phaser GameReading: *Eloquent JavaScript,* Chs. 2 + 3; *Game Dev w Phaser,* Ch. 3 |
| 3/4 | Week 6 | Working with Sprites, Controls + Physics | Assignment 6: Working with Sprites + ControlsReading: *Game Dev w Phaser,* Ch. 6, pp. 55-69 + 72-75 |
| 3/11 | Week 7 | Level Maps, Atlases + Tiles | Assignment 7: Using Animation + TilesDiscussion 3: Game TypologiesReading: *Game Dev w Phaser,* Ch. 6, pp. 69-72 |
| 3/18 | NO CLASS | Spring Break |  |
| 3/25 | Week 8 | UI + Sound | Assignment 8: UI + SoundReading: *Game Dev w Phaser,* Ch. 6, pp. 76-81 |
| 4/1 | Week 9 | Simulating the Physical World, Particles + Effects | Assignment 9: Arcade PhysicsAssignment 10: P2 PhysicsDiscussion 4: History of Console GamesReading: *Game Dev w Phaser,* Ch. 6, pp. 92-122Quiz 1 |
| 4/8 | Week 10 | Midterm Review / Draft GDD | Assignment 11: Game Design DocumentMidterm ExamExtra Credit: Unity |
| 4/15 | Week 11 | Prefabs + Classes / Build Systems | Assignment 12: First Build-System-Based Phaser GameDiscussion 5: GDD Presentations Reading: *Game Dev w Phaser,* Chs. 4 + 5; *Eloquent JavaScript,* Ch. 6Extra Credit: Unity |
| 4/22 | Week 12 | Final Project: Design Your GameAdvanced Development Techniques | Assignment 13: Final GDDReading: onlineExtra Credit: Unity |
| 4/29 | Week 13 | Build + Playtest Sprint 1: Final Project | Assignment 14: Rough PrototypeDiscussion 6: Approaches to Game DesignReading: onlineExtra Credit: UnityQuiz 2 |
| 5/6 | Week 14 | Build + Playtest Sprint 2: Final Project | Final ProjectReading: online |
| 5/13 | Week 15 | Build + Playtest Sprint 3: Final Project | Final ProjectDiscussion 7: Game Dev Teams + RolesExtra Credit: Unity |
| — | Weeks 16-17 | NONE DUE TO MONDAY HOLIDAYS |  |
| 5/20Mon | Week 18 | No Regular Class | Final ExamDiscussion: 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**.