CS74.42A: Game Development 1

Section 1827, Fall 2017 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

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 and UnityScript languages and real-world tools to develop proficiency in the creation of browser-based, mobile and console games.

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 real-time application such as a game.

3. Independently develop 2D arcade titles of the approximate complexity of Space Invaders, Pac-Man, 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 Pac-Man.

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:

I. JavaScript Language Fundamentals
      A. Introduction to JavaScript and HTML5
      B. Project design and organization
      C. Programming language fundamentals 1. Data types
      D. Object-oriented programming (review)
      E. Containers
      F. Exceptions
      G. Delegates and Events
      H. String manipulation
II. Mathematics
      A. Cartesian Coordinate Systems
      B. World space, object space, camera space
      C. Vectors
      D. Matrices
III. Game Design and Development
      A. Cultural and function definition of games
      B. Rudiments of game design
      C. Development processes
      D. Documentation
IV. Game Development Technical Aspects
      A. User input
      B. Graphics
      C. Audio
      D. Game Engine Architecture
      E. Collision Detection
      F. Publication
      G. Lessons from the Underground: DIY/Indie techniques
      H. 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

Fall 2017 Schedule

Online	Weeks start on Tuesdays	Canvas shell
In-person and Web conference (optional)	Tuesdays, 4:00pm – 5:00pm	Maggini 2923

All class materials for each module will be released online in Canvas on Tuesdays throughout the entire semester. A weekly in-person meeting will be held on Tuesdays, 4:00pm to 5:00pm, on the Santa Rosa campus in Maggini 2923. Attendance at the in-person meeting is optional but highly recommended. Remote Web conference access will be provided to students who can only attend remotely.

Instructor Contact

Ethan Wilde

Email: ewilde@santarosa.edu

Phone: 707-527-4855

Fall 2017 Office Hours
August 21 – December 15, 2017

| Mondays	2:00pm – 3:00pm	Maggini 2937
Tuesdays	8:00am – 11:00am	Online: Email ewilde@santarosa.edu or Skype ethanwilde
Tuesdays	4:40pm – 5:40pm	Online: Email ewilde@santarosa.edu or Skype ethanwilde

I respond to emails within 48 hours. 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.*
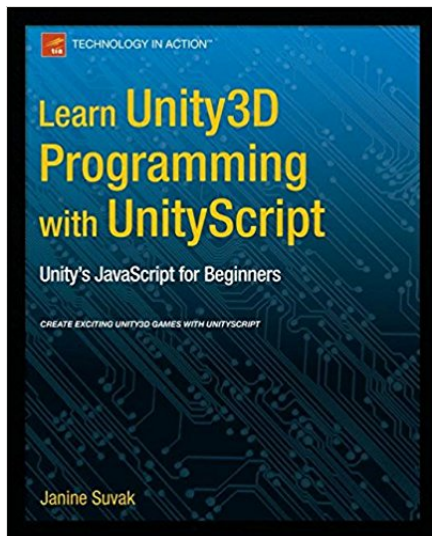
Textbooks
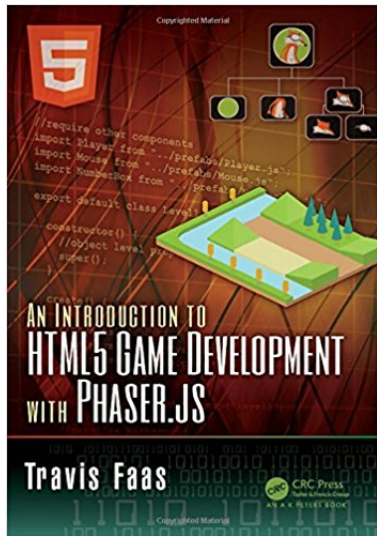
An Introduction to HTML5 Game Development with Phaser.JS
Travis Faas, CRC Press, 2016
ISBN 978-1-138-92184-9 print
ISBN 978-1-315-31921-6 ebook

Learn Unity3D Programming with UnityScript
Janine Suvak, Apress, 2014
ISBN 978-1-4302-6586-3 print
978-1-4302-6587-0 ebook

Consider buying a used copy. 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

All software used in this course is freely available online.

- **Internet access**
- **Web browser**
  - Google Chrome strongly recommended
- **Text editor,** for Week 1 only, such as:
  - Brackets (Windows, Mac OS)
- **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 development tools. *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**
- **Unity3D game development platform, Personal edition**:
  - **Found online at store.unity.com**

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 Unity3D IDE – both provide code editors and file transfer support without any additional software needed.

- **3D modeling software** including:
  - Blender
  - Trimble Sketchup Pro ($49 education license)

Important Dates

Day Class Begins: Tuesday, August 22, 2017

Day Class Ends: Friday, December 15, 2017

Last Day to Add without instructor's approval: Sunday, August 27, 2017

Last Day to Drop with refund: Sunday, September 3, 2017

Last Day to Add with instructor's approval: Sunday, September 10, 2017

Last Day to Drop without a 'W' symbol: Sunday, September 10, 2017

Last Day to Opt for Pass/No Pass: Sunday, October 1, 2017

Last Day to Drop with a 'W' symbol: Sunday, November 19, 2017

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 October 1, 2017. 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 or degree 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 PST on the Monday 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

If taking Pass/No Pass you need at least 70% of the total class points and to complete the midterm exam and the final exam to pass the class.

Grading Breakdown

62%	620 points	**Projects: Problem-Solving + Skill Demonstration**
18%	180 points	**Writing**
10%	100 points	**Midterm**
10%	100 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

	Topics	Assignments / Discussion / Reading
Week 1	The World of Game Development / Introduction to JavaScript	Hosting Signup Survey Assignment 1: Syllabus + JavaScript Quiz Discussion 1: Check-in Discussion Reading: Online + *Intro to HTML5 Game Dev,* Ch. 1
Week 2	Get Started with Browser-Based 2D Games	Assignment 2: First Game Reading: *Intro to HTML5 Game Dev,* Chs. 2-3
Week 3	Build from a Blueprint: Game Design Document	Assignment 3: Game Design Document Discussion 2: History + Origins of Games Reading: Online + *Intro to HTML5 Game Dev,* Ch. 4-6
Week 4	Build and Playtest Sprint 1: Midterm Project	Assignment 4: Midterm Game Draft Build 1 Quiz 1 Reading: Online + *Intro to HTML5 Game Dev,* Chs. 7-8
Week 5	Build and Playtest Sprint 2: Midterm Project	Assignment 5: Midterm Game Draft Build 2 Discussion 3: Game Typologies Reading: Online + *Intro to HTML5 Game Dev,* Ch. 9
Week 6	Midterm Project Review	Midterm Project: Midterm Game Final Build Discussion: Midterm Project Presentations Reading: Online
Week 7	Introducing Unity: Building Games for Multiple Platforms	Assignment 6: Unity Setup + Tutorial Discussion 4: History of Console Games Reading: *Learn Unity3D,* Chs. 1-2
Week 8	Create a Scene	Assignment 7: First Scene

		Reading: *Learn Unity3D,* Ch. 3
Week 9	Start Scripting / Midterm Exam	Midterm Exam Reading: *Learn Unity3D,* Ch. 4
Week 10	Modeling and Rigging / Learning Physics	Assignment 8: Basic Physics in a Game Discussion 5: Development Workflows + Agile Reading: *Learn Unity3D,* Chs. 5-6
Week 11	Advanced Physics and Special Effects	Assignment 9: Advanced Physics Lab Reading: *Learn Unity3D,* Chs. 7-8
Week 12	Final Project: Design Your Game	Assignment 10: Draft GDD Discussion 6: Approaches to Game Design Reading: *Learn Unity3D,* Ch. 9
Week 13	Build and Playtest Sprint 1: Final Project	Assignment 11: Rough Prototype Quiz 2 Reading: *Learn Unity3D,* Ch. 10
Week 14	Enhancing UI and Sound	Assignment 12: Enhancing the User Experience Discussion 7: Game Dev Teams + Roles Reading: *Learn Unity3D,* Ch. 11
Week 15	Build and Playtest Sprint 2: Final Project	Assignment 13: Revising + Improving Reading: Online
Week 16	Finalizing and Optimizing	Assignment 14: Final Art + Polish Discussion 8: Future of Game Development Reading: *Learn Unity3D,* Ch. 12
Week 17	Taking Your Game Further	Final Project: 2D Mobile or Console Game Reading: *Learn Unity3D,* Ch. 13
Week 18	Final Exam / Final Project Review Discussion	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**.