

CS481: Game Engine Architecture

Spring 2021

Location: Online

Course Information

Instructor and Teaching Fellows Information

Instructor: Sushil Louis

Office: Check Canvas for Zoom Office hours links

Office Phone: 7757484315

Email: sushil@unr.edu

Office Hours: MW: 11am to noon and by appointment. Check [my calendar](#) for an available time and send me a meeting invitation for that time. In the invitation, let me know what you want to discuss.

Piazza: This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email team@piazza.com.

Find our class page at: <https://piazza.com/unr/spring2021/cs481681/home>

Course Description: CS 481, CS 681 Advanced Computer Game Design

The engineering, science, and art of creating advanced computer games. Design and implementation of game components in producing usable and engaging computer games.

Prerequisite(s): [CS 381](#).

Required Texts/Course Materials

List of required course materials for reading, in-class work, writing, homework, viewing, and listening, including calculators, specialized materials or equipment, and computer software. This list may not be complete.

Textbooks:

- Required: None
- Recommended
 - <https://www.schellgames.com/art-of-game-design/>

- <https://www.theoryoffun.com/>
- <https://learn.unity.com/>
- <https://web.archive.org/web/20190329004305/http://www.pixelprospector.com/>

Computing and Networking:

- **Networked Zoom access to class using a Webcam and Microphone**
- **A Computer with Unity3D (or Unreal Engine) development environment. Drop the class NOW if you cannot get access to a good home computer.**
- You may try to get access to a home computer from UNR:
 - **Loaner Computers:** UNR will continue to loan laptop computers to students in need. Students can check out laptops for the whole semester from the @One Equipment checkout desk on the first floor of the Mathewson-IGT Knowledge Center(<https://library.unr.edu/resources/lendable-technology#AtOneEquipmentCheckout>). Check out the HP Probook or Dell Latitude with Windows 10. We apologize for not being able to support Ogre or Unity on Macs.
 - You may also remotely access computing resources **if your home machine goes down**. Graphics intensive programming assignments cannot be done easily through remote access and you should not think of remote access to these computers as sufficient for classwork. Extensively using remote computer resources will significantly and negatively impact your ability to complete the class.:
 - Remote engineering computing center computing access
 - Windows: Remote ECC Machines: <https://remote.engr.unr.edu>
 - Windows: Remote Desktops: <https://remote.unr.edu>
 - Linux: Request remote access to ECC Linux resources using: https://nevada.formstack.com/forms/cse_remote_linux_desktop_request. This is good to have even if you already have a personal linux box or linux installed on your Virtual Machine
- If you would like a piece of software added or upgraded, please fill out the form below: [Remote Engineering Desktop Software Request](#)

Course objectives, structure, requirements and outcomes

Fully Online: This course is fully online

We will study the technology, science, and art involved in the creation of computer games. The course will emphasize hands-on development of games. We will study the art and design principles for developing useable and engaging games including: game design, software

engineering, human computer interaction, gameplay, and fun. The course will require active class participation and will be based on two large group projects. The group projects will involve game design and development, but also emphasize design and use of existing tools. The final group project will require the students to go through all phases of brainstorming, system conceptualization, specification, design, implementation, and evaluation.

Course Arrangement

All assignments, homework, quizzes, and exams are required.

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Unique Class Procedures/Structures

We have several unique aspects in CS481.

- Required in class student assignment and project demonstrations for grading.
- Peer review of final projects
- There is no textbook but a number of on-line readings and class notes
- Expected independent learning from online tutorials
- Group work is required

Important Dates

- **Final Project Presentations: Monday May 10, 2021, 2:30 p.m. – 4:30 p.m.** If you cannot make this time, **you must drop this course.**

Projects and Assignments

The course will consist of two large (group) projects and several project related assignments.

Course Rules

- Late programming assignments or exercises will not be accepted.

- Exams, tests, or quizzes are individual efforts. The usual penalty for academic dishonesty on assignments or exams, tests, and quizzes is failure in the course.
- Using another person's code or having another person "ghost write" a lab will be considered academic dishonesty. For group assignments, if you are in a group do not show, exchange, or copy code outside your group.
- Plagiarism is academic dishonesty with the usual penalty of failure in the course.
- The two projects are group projects.

Grading and Assessment

- Students will be assigned letter grades. Your grade will be one of A, B, C, D, or F. We will use the +/- grading system.
- There will be two large projects and a number of in class and take home writing assignments. Again, no late assignments will be accepted.
- **Final Project Demos are on Monday May 10, 2021 from 2:30 p.m. – 4:30 p.m.** If you cannot make this date, you must drop this course.
- There will be announced and **unannounced** quizzes.

Tentatively, your final grade will be based on

Item	Percentage
First Project	30%
Second Project	50%
Quizzes and Exercises	20%

Communications

If I need to communicate with the class as group I'll email you through canvas. You are required to check the class website and your UNR email every day. Make sure your email information in MyNevada and Canvas is up to date and implement mail forwarding if you need to. Other resources can be found on the class web page.

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Find our class signup link at: <https://piazza.com/unr/spring2021/cs3811001gameenginearchitecture>

Preliminary course outline

This outline is approximate:

Topic	Material	# Lectures
Introduction	Syllabus	1
Project 1 brainstorming	Notes, In class exercises	1
Project 1 concept scoping	Notes, In class presentations/discussions	1
Project 1 group roles	Notes, in class presentations/discussions	1
Project 1 paper prototyping	In class paper, whiteboarding	1
Project 1 design document	Notes, article , template	1
Project 1 prototype pre-alpa	In class demonstrations, user feedback	1
Project 1 alpha	In class demonstrations, user feedback	2
Project 1 beta	In class demos, user feedback and analysis	2
Project 1 release	Website (Github), video, tutorial, poster	1
Project 1 postmortem	Class presentations	1
Project 2 brainstorming	Notes, In class exercises	1
Project 2 concept scoping	Notes, In class presentations/discussions	1
Project 2 group roles	Notes, in class presentations/discussions	1
Project 2 paper prototyping	In class paper, whiteboarding	1
Project 2 design document	Notes, article , template	1
Project 2 prototype pre-alpa	In class demonstrations, user feedback	1
Project 2 alpha	In class demonstrations, user feedback	2
Project 2 beta	In class demos, user feedback and analysis	2
Project 2 release	Website (Github), video, tutorial, poster	1
Project 2 postmortem	Class presentations	1
Reading Days		2

Student Learning Outcomes

- SLO1. (1, 2) Students will have an ability to apply knowledge of computing, mathematics, science, and engineering. In addition, students will have an ability to analyze a problem, and identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution.
 - You will demonstrate this ability by applying your knowledge of programming, physics, vector math, and game design to design and build games.
 - Strategies and Actions: Lectures, assignments, and projects covering game design, game development, and game production.
 - ABET Criteria covered:
 - (1) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities

- (6) an ability to identify, analyze, and solve broadly-defined engineering technology problems
- Program Objectives covered: Demonstrate strong analytic, design, and implementation skills required to formulate and solve computer science or computer engineering problems in a professional or research environment.
- Assessment: Assignments, two major projects.
- SLO2. (3, 4) Students will have an ability to apply design and development principles in the construction of software systems or computer systems of varying complexity. In addition, Students will have an ability to use current techniques, skills, and tools necessary for computing and engineering practice.
 - Students demonstrate they can learn to design and implement computing solutions using modern computing tools such as a commercial game engine in the pursuit of broader assignment and project goals.
 - Strategies and Actions: Lectures, assignments, and projects covering the design and development of a game.
 - ABET Criteria covered:
 - (1) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
 - (6) an ability to identify, analyze, and solve broadly-defined engineering technology problems
 - Program Objectives covered: Demonstrate strong analytic, design, and implementation skills required to formulate and solve computer science or computer engineering problems in a professional or research environment.
 - Assessment: Programming assignments and final project.

Late Work or Make-up Exams Policies

Late assignments will not be accepted.

Zoom meetings

Participation During Zoom Meetings

Much, if not all, of our class will take place synchronously via Zoom. If possible, find a quiet space without interruptions/background noise.

Zoom etiquette: Be patient

Academic Standards Policy for Writing Code

CSE Department, University of Nevada, Reno

A student may receive academic and disciplinary sanctions for cheating, plagiarism or other attempts to obtain or earn grades under false pretenses. In addition to University definitions of academic dishonesty, the following rules define plagiarism and cheating for students in computer science and engineering classes:

1. Sharing ideas with other students is fine, but you should write your own code. Never copy or read other students code, including code from previous years. Cosmetic changes, such as rewriting comments, changing variable names, and so forth to disguise the fact that your work is copied from someone else, is easy to detect and not allowed.
2. It is your responsibility to keep your code private. Sharing your code in public is prohibited, and may result in zero credit for the assignment.
3. If you find some external code (such as an open-sourced project) that could be reused as part of your assignment, you should first contact the instructor to see whether it is fine to reuse it. If the instructor permits it, she/he may announce it to the entire class so that all students could use it. And if you decide to reuse the external code, you should clearly cite it in comments and keep the original copyright in your code, if applicable.
4. You should be prepared to explain any code you submit, including code copied/modified from external sources.
5. Every student will be asked to sign the following statement for every programming assignment: "This code is my own work. It was written without consulting a tutor or code written by other students."

University Policies

Statement on COVID-19 Policies

Training

Students must complete and follow all guidelines as stated in the *Student COVID-19 Training* modules, or any other trainings or directives provided by the University.

Face Coverings

In response to COVID-19, and in alignment with State of Nevada Governor Executive Orders, Roadmap to Recovery for Nevada plans, Nevada System of Higher Education directives, the University of Nevada President directives, and local, state, and national health official guidelines face coverings are required at all times while on campus, except when alone in a private office. This includes the classroom, laboratory, studio, creative space, or any type of in-person instructional activity, and public spaces.

A "face covering" is defined as a "covering that fully covers a person's nose and mouth, including without limitation, cloth face mask, surgical mask, towels, scarves, and bandanas" (State of Nevada Emergency Directive 024).

Students that cannot wear a face covering due to a medical condition or disability, or who are unable to remove a mask without assistance may seek an accommodation through the Disability Resource Center.

Social Distancing

Face coverings are not a substitute for social distancing. Students shall observe current social distancing guidelines where possible in accordance with the Phase we are in while in the classroom, laboratory, studio, creative space (hereafter referred to as instructional space) setting and in public spaces. Students should avoid congregating around instructional space entrances before or after class sessions. If the instructional space has designated entrance and exit doors students are required to use them. Students should exit the instructional space immediately after the end of instruction to help ensure social distancing and allow for the persons attending the next scheduled class session to enter.

Disinfecting Your Learning Space

Disinfecting supplies are provided for you to disinfect your learning space. You may also use your own disinfecting supplies.

COVID-19, COVID-19 Like Symptoms, and Contact with Someone Testing Positive for COVID-19

Students must conduct daily health checks in accordance with [CDC guidelines](#). Students testing positive for COVID 19, exhibiting COVID 19 symptoms or who have been in direct contact with someone testing positive for COVID 19 will not be allowed to attend in-person instructional activities and must leave the venue immediately. Students should contact the [Student Health Center](#) or their health care provider to receive care and who can provide the latest direction on quarantine and self-isolation. Contact your instructor immediately to make instructional and learning arrangements.

Failure to Comply with Policy (including as outlined in this Syllabus) or Directives of a University Employee

In accordance with section 6,502 of the University Administrative Manual, a student may receive academic and disciplinary sanctions for failure to comply with policy, including this syllabus, for failure to comply with the directions of a University Official, for disruptive behavior in the online classroom, or any other prohibited action. "Disruptive behavior" is defined in part as behavior, including but not limited to failure to follow course, laboratory or safety rules, or endangering the health of others. A student may be dropped from class at any time for misconduct or disruptive behavior in the classroom upon recommendation of the instructor and with approval of the college dean. A student may also receive disciplinary sanctions through the Office of Student Conduct for misconduct or disruptive behavior, including endangering the health of others, in the classroom. The student shall not receive a refund for course fees or tuition.

Statement on Academic Dishonesty

"The University Academic Standards Policy defines academic dishonesty, and mandates specific sanctions for violations. See the University Academic Standards policy: [UAM 6,502](#)."

Statement of Disability Services

For Online Courses:

"If you are a student who would normally seek accommodations in a traditional classroom, please contact me as soon as possible. You may also contact the Disability Resource Center for services for online courses by emailing drc@unr.edu or calling 775-784-6000. Academic accommodations for online courses may be different than those for seated classrooms; it is important that you contact us as soon as possible to discuss services. The University of Nevada, Reno supports equal access for students with disabilities. For more information, visit the [Disability Resource Center](#)."

This course may leverage 3rd party web/multimedia content, if you experience any issues accessing this content, please notify me (sushil@unr.edu).

Statement on Audio and Video Recording

"Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded."

Statement on Maintaining a Safe Learning and Work Environment

The University of Nevada, Reno is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, or stalking, whether on or off campus, or need information related to immigration concerns, please contact the University's Equal Opportunity & Title IX office at 775-784-1547. Resources and interim measures are available to assist you. For more information, please visit the [Equal Opportunity and Title IX](#) page.

Statement for Academic Success Services

"Your student fees cover usage of the [Math Center](#) (775) 784-4433, [Tutoring Center](#) (775) 784-6801, and [University Writing Center](#) (775) 784-6030. These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student."