GAME 180 : GAME PROGRAMMING

Room B110, Section 501, CRN 75895
Monday & Wednesday, 10:30 - 11:45
Fall 2023

Instructor: Ian Burch

E-Mail: ianburch@unm.edu

Office and Hours: B105A, in-person hours Monday & Wednesday @ 2:45 pm - 4:30 pm
Online on Zoom Tuesday @ 1:30 - 3:00 pm

Division Chair: Dr Stephen Takach; set@unm.edu

Course Prerequisites:
Intro to Game Engines (GAME 102) OR Game Scripting (GAME 160)
Recommended: Intermediate Algebra (MATH 1215) or higher

Course Goals:

This course explores the algorithms and ideas required to program video games. Students will learn how to program collisions, pathfinding, and basic AI. Students will gain a conceptual understanding of vectors and randomness, and use them to program motion, fractals, and procedural levels. Best practices for coding will also be explored, such as debugging techniques, code documentation, and version control.

Materials:

- Internet Access, for Learn, Zoom, and Youtube.
- Gamemaker Studio 2.3 or later   (GMS2)
- (Optional) Sprite art program such as Aesprite or GraphicsGale
- (Optional) Github account & software

This course requires a computer. If you do not have one, let me know and we can work with campus IT to let you borrow a laptop with the necessary software.
- Gamemaker Studio 2 can be gotten from https://www.yoyogames.com/gamemaker

Optional Reading:
- *Game Programming Patterns* by Robert Nystrom: Game Programming Patterns
- *The Book of Shaders* by Patricio Gonzalez Vivo and Jen Lowe:
  https://thebookofshaders.com/

Learning Objectives:
By the end of the course, students will be able to:

(1) Program core interactions and algorithms for games

(2) Use best practices when programming

(3) Implement the math and physical concepts behind motion

(4) Create appropriate data structures to manage game systems

(5) Understand and implement types of random generation to build levels

Course Content

The course explores the algorithms, logic, and structure of game design by building an action-adventure game. The first half of the semester focuses on core gameplay algorithms and structure such as object classes, finite state machines, and collision detections. The second half, we'll expand our core gameplay with inventory systems to explore data structures, and build terrain using a variety of procedural generation techniques.

Grade Breakdown:

Homework   50%

Midterm Project   20%

Final Project   25%

Participation & Discussion   5%

Letter grades will be given as follows, with + or - given for the highest and lowest 3% in each range, respectively. Incomplete (I) grades will not be assigned without documented, extenuating, circumstances.

90% - 100%   A

80% - 89%   B

70% - 79%   C

60% - 69%   D

0% - 59%   F

Tentative Schedule:

This schedule is subject to change, but all topics listed will be covered during the semester

Date	Week	Topic	SLOs
8/21	**1**	Installations, Intro to Gamemaker	1
8/28	**2**	Movement & Inputs	1, 3
9/4	**3**	Functions & Loops	1, 2
9/11	**4**	Trigonometry	1, 3

9/18	5	Object Interactions	1, 4
9/25	6	Enemy AI	3, 4
10/2	7	Game Feel	1, 2
10/9	8	Midterm Project	1, 2, 3
10/16	9	Object Functions	2, 4
10/23	10	Data Structures I	2, 4
10/30	11	Data Structures II	2, 4
11/6	12	Procedural Generation I (Box)	1, 5
11/13	13	Procedural Generation II (Miners)	1, 3, 5
11/20	14	Procedural Generation III (Perlin Noise)	2, 4, 5
11/27	15	Final Project	All
12/4	16	Final Project	All

Assignments:
Assignments will be both given in person and posted on UNM Canvas (https://canvas.unm.edu/)
Homework assignments will typically be due either in one class session or a week after being
assigned. Larger assignments and projects will be broken up into smaller pieces (such as drafts
or rough versions) each with their own due dates, and the whole project given at least two
weeks in advance.

Late Work / Absences:
Please email me ianburch@unm.edu if you're going to be late on an assignment and I'll
generally give an extension. Unexcused late work may be docked points at my discretion,
especially collaborative work that puts more of a burden on fellow students. Any assignments
not submitted by the end of the semester (12/17) will be graded 0.

Expectations:
Students are expected to conduct themselves in a professional and collegial manner. This
course will feature discussions, feedback, and group work. Be respectful and polite of others
ideas, work, and contributions. During Zoom meetings, be professional, appropriate, and mute

when not speaking. When posting on discussion boards, be polite, concise, and avoid using internet slang. If you need an extension on an assignment, please email or message me before it is due. Students missing more than 4 consecutive assignments may be dropped from the course.

COVID-19 Health and Awareness:
UNM is a mask friendly, but not a mask required, community. If you are experiencing COVID-19 symptoms, please do not come to class. If you do need to stay home, please email me at ianburch@unm.edu; I can work with you to provide alternatives for course participation and completion. Let me, an advisor, or another UNM staff member know that you need support so that we can connect you to the right resources. Please be aware that UNM will publish information on websites and email about any changes to our public health status and community response.

Accommodations & Support:
UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at arcsrvs@unm.edu or by phone at 505-277-3506 or see (https://arc.unm.edu/) for more information. The UNM-Valencia Equal Access Services (Sarah Clawson, Coordinator), at (505) 925-8840 or by email at sjclawson@unm.edu.

Connecting to Campus and Finding Support:
UNM has many resources and centers to help you thrive, including opportunities to get involved, mental health resources, academic support including tutoring, resource centers for people like you, free food at Valencia Campus Food Pantry, and jobs on campus. Your advisor, staff at the resource centers and Academic Affairs Office, and I can help you find the right opportunities for you.

Academic Integrity:
Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or who

otherwise fails to meet the expected standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic Dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others, including AI generators; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Credit-hour Statement:
This is a three credit-hour course. Class meets for two 75-minute sessions of direct instruction for fifteen weeks during the Fall 2022 semester. Please plan for a minimum of four hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

Title IX :
Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus. Please note that, because UNM faculty, TAs, and GAs are considered "responsible employees" by the Department of Education, any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct, please see: https://policy.unm.edu/university-policies/2000/2740.html

Citizenship and/or Immigration Status :
All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website:
http://undocumented.unm.edu/

Respectful and Responsible Learning:
We all have shared responsibility for ensuring that learning occurs safely, honestly, and equitably. Submitting material as your own work that has been generated on a website, in a publication, by an artificial intelligence algorithm, by another person, or by breaking the rules of an assignment constitutes academic dishonesty. It is a student code of conduct violation that can lead to a disciplinary procedure. *Please ask me for help in finding the resources you need to be successful in this course*. I can help you use study resources responsibly and effectively.

Off-campus paper writing services, problem-checkers and services, websites, and AIs can be incorrect or misleading. Learning the course material depends on completing and submitting your own work. UNM preserves and protects the integrity of the academic community through multiple policies including policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the Student Pathfinder (https://pathfinder.unm.edu) and the Faculty Handbook (https://handbook.unm.edu)

Land Acknowledgement:
Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.