GAME 220 : ENVIRONMENTAL MODELING

Room B110, Section 501, CRN 78181
Monday & Wednesday, 9:00 - 10:15
Fall 2024

Instructor: Ian Burch

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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: Melinda Schwartz, mcschwartz@unm.edu

Course Prerequisites:
Intro to 3D Modeling (GAME 120) OR Game Engines (GAME 102)

Course Goals:
This course explores what is necessary to build a full 3D game environment, including modeling, texturing, baking, lighting, and construction. Students will learn how to sculpt, texture, and map landscapes in Unreal Engine. For interiors, the class will build a kit-based level framework in Blender; making modular components which can be assembled into a level. Much of the technical focus will be on making efficient and performant scenes, using baked maps, level of detail, and procedural texturing.

Materials:
- Internet Access, for Canvas, Zoom, and Youtube.
- Unreal Engine 5.0 or higher (5.1 recommended)
- Blender (3.0 or higher)

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.
- Blender is free, and can be gotten from https://www.blender.org/
- Unreal Engine is free, and can be gotten from https://www.unrealengine.com/

Learning Objectives:
By the end of the course, students will be able to:
   (1) Build and texture game environments using engine tools
   (2) Design complex shaders for environmental features
   (3) Construct a modular building system for interiors
   (4) Model and texture natural objects at various levels of detail
   (5) Refine an environment with lighting, shaders, and details

Course Content

This course is split into two main parts. The first half focuses on building an outdoor environment in Unreal Engine. We'll use landscape tools to sculpt terrain, build shaders for both ground and water, model grass, bushes, and trees in Blender, and then assemble everything into a coherent scene. When we finish with our exteriors, we'll move on to designing modular interior pieces. Once we've built walls, floors, doors, and windows, we can bake them for efficiency and assemble them into a coherent room. During the semester we'll frequently discuss optimization, efficiency, and limitations and alternate processes to the techniques we use. Expect either 2 small assignments per week or 1 larger project.

Grade Breakdown:

Assignments - 45%

Projects - 45% (15% each)

Participation, Discussion, and Feedback - 10%

Each unit's grade will be split evenly between the weekly assignments and the unit's final submission. 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
8/19	1	Unreal Engine Landscapes	1
8/26	2	Terrain Shaders	1, 2
9/2	3	Terrain Details	2, 4, 5
9/9	4	Water	1, 2
9/23	5	Tunnels & Non-Heightmap Terrain	1, 2, 4

9/30	6	*Project 1 - Landscape* Due	1, 2, 5
10/7	7	Foliage	1, 4
10/14	8	Trees	1, 2, 4
10/21	9	Level of Detail	1, 4, 5
10/28	10	Post-Processing	2, 5
11/4	11	*Project 2 - Forest* Due	1, 2, 4, 5
11/11	12	Modular Systems, Design	1, 3
11/18	13	Modular Systems, Building	1, 2, 3
11/25	14	Modular Assembly	1, 5
12/2	15	Baking	2, 3, 5
12/9	16	*Project 3 - Modular System* Due	1, 2, 3, 5

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 projects 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, up to 10% per day, or 20% in the case of collaborative work that unduly burdens other students. **Any assignments not submitted by the end of the semester** *(December 13th)* **will be automatically graded 0%**

Attendance is important to this class for me to give quick feedback, as well as for peer review and discussion. If you let me know in advance or inform me of a reason within 1 week, absences will be excused. Illness, transportation issues, or mental health concerns are all valid excuses. Four or more unexcused absences may result in being dropped from the course. If you will be absent for an extended duration, please let me know ASAP.

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 please 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 contact me at ianburch@unm.edu before it is due.

I am committed to building with you a positive classroom environment in which everyone can learn. I reserve the right to intervene and enforce standards of respectful behavior when classroom conduct is inconsistent with University expectations. Interventions and enforcement may include, but are not limited to, required meetings to discuss classroom expectations, written notification of expectations, and/or removal from a class meeting. Removal from a class meeting will result in an unexcused absence. The University of New Mexico ensures freedom of academic inquiry, free expression and open debate, and a respectful campus through adherence to the following policies: D75: Classroom Conduct, Student Code of Conduct, University Policy 2240 – Respectful Campus, University Policy 2210 – Campus Violence.

Wellness
If you do need to stay home due to illness or are experiencing a wellness challenge, please inform me. You can communicate with 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. UNM is a mask friendly, but not a mask required, community. If you are experiencing COVID-19 symptoms, please do not come to class.

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.