

Arch 565, Adv Computer Applications II

School of Architecture | Montana State University

Fall Semester 2025

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CRN	21915
Credits	3 credits
Class Schedule	Tuesday and Thursday 15:00-16:40 Cheever Hall, Room 131.
Schedule	Final project will be reviewed during the week prior to finals week.
Office Hours	By Appointment in person or via video.

Course Description

Arch 565 explores advanced applications of digital technologies in architectural design, emphasizing computational methods, fabrication, integrative workflows, and AI. The course positions computation as an ever-changing tool, encouraging students to navigate the potential and ethical dimensions of emerging technologies. Through lectures, workshops, case studies, and project-based work, students will engage with digital methodologies and develop critical perspectives on the evolving role of computation in architecture.

Learning Outcomes

By the end of the course, students will be able to demonstrate the following competencies:

Computational Fabrication Techniques

- Translate parametric and algorithmic models into fabrication-ready digital files for CNC milling, robotic arms, laser-cutting and 3D printing.
- Apply strategies for material-informed computation, such as adaptive geometry and toolpath optimization.
- Evaluate the environmental and economic implications of computational fabrication methods.

Advanced Workflows

- Design integrated digital workflows that connect modeling platforms, scripting environments, and data analysis tools.
- Manage complex datasets (environmental, structural, social) and integrate them into design decision-making processes.
- Critically compare and select workflow strategies for efficiency, adaptability, and accuracy in architectural practice

Ethics

- Identify and analyze ethical issues in computational design, including authorship, intellectual property, bias in algorithms, and the impact of automation on labor.
- Evaluate the sustainability implications of computational workflows, from energy use in digital processes to lifecycle analysis of fabricated materials.
- Communicate ethical positions effectively in both written and visual design presentations, linking theory to practice.

Course Structure

- **Lectures & Discussions:** Theoretical frameworks, case studies, and critical readings.
- **Workshops:** Hands-on sessions with AI platforms, parametric modeling software, and fabrication equipment.
- **Projects:** Progressive design assignments culminating in a final project that integrates AI, fabrication, and workflow innovation.
- **Readings:** Selected academic papers, essays, and book chapters

Assessment & Grading

Attendance	15%
Participation & Engagement	15%
Projects	45%
Final	25%

Attendance

You are all in this together and each of you is an integral part of this class. Learn from each other. While you are in school you have an obligation to your peers to participate fully in class and in the program. Get to know one another and help each other. It is mandatory you attend the entire class period. It is imperative you attend every class, but sometimes illness and other emergencies will force you to miss class. Please contact me as soon as practical so you can stay on track. If you miss more than 20% or more of the course, there may be grade implications and you may fail the course.

Please evaluate your own health status regularly and refrain from attending class and other on-campus events if you are ill. MSU students who miss class due to illness will be given opportunities to make up class according to the course's medical absence policy. You are encouraged to seek appropriate medical attention for treatment of illness. In the event of contagious illness, please do not come to class or to campus to turn in work. Instead notify me by email about your absence as soon as practical, so that accommodations can be made. Please note that documentation (e.g., a doctor's note) for medical excuses is not required. MSU University Health Partners - as part their commitment to maintain patient confidentiality, to encourage more appropriate use of healthcare resources, and to support meaningful dialogue between instructors and students - does not provide such documentation.

In the event of contagious illness, please do not come to class or to campus to turn in work. You should email me if you will miss class due to illness as soon as practical.

Coursework Expectations

As a guide, for every 1 hour of in class scheduled time, it is expected that you will spend a minimum of 2 hours outside of class devoted to coursework.

Late Submittals

All assignments are due at the time indicated on the schedule and must be submitted at that time or the assignment/project will be considered late. Late assignments and projects will be adjusted downward by 10% (downward at least one letter grade). Failure to have submitted assignments and projects by the last class meeting of the semester will result in a final grade of "F" for failure to complete the course.

Add/Drop

If you find yourself needing to drop, withdraw or seek an incomplete MSU has processes and specific deadlines if you need to drop the class. You can find this semester's dates and instructions on the Registrar's website https://www.montana.edu/registrar/add_drop.html.

Plagiarism

This syllabus, course lectures and presentations, and any course materials provided throughout this term are protected by U.S. copyright laws. Students enrolled in the course may use them for their own research and educational purposes. You are encouraged to explore and learn from the extensive references and precedents of architecture. The Renee Library and the Internet are particularly valuable resources that should be discovered and explored at each student's initiative. Proper acknowledgement and credit to any attributable sources (including internet sources and images) must be given, regardless of its form. Complete or altered designs that are created by others must never be attributed to you. Plagiarism in design, as well as any other creative or scholarly effort, is a very serious matter, and carries substantial penalties as outlined in the University Student Conduct

Guidelines are located on the MSU website. [http://www2.montana.edu/policy/student conduct/](http://www2.montana.edu/policy/student%20conduct/)

Paraphrasing or quoting another's work without citing the source is a form of academic misconduct. Even inadvertent or unintentional misuse or appropriation of another's work (such as relying heavily on source material that is not expressly acknowledged) is considered plagiarism. If you have any questions about using and citing sources, you are expected to ask for clarification. MSU detailed statement on academic writing and student responsibilities from the MSU Dean of Student's Office and MSU Writing Center that can be used for syllabi.

Behavioral Expectations

Students are expected to follow the Code of Student Conduct which can be found online. Students writing in an academic setting are responsible for approaching all assignments with rigor, integrity, and in compliance with the University Code of Student Conduct. This responsibility includes:

- consulting and analyzing sources that are relevant to the topic of inquiry.
- clearly acknowledging when they draw from the ideas or the phrasing of those sources in their own writing.
- learning and using appropriate citation conventions within the field in which they are studying; and
- asking their instructor for guidance when they are uncertain of how to acknowledge the contributions of others in their thinking and writing.

When students fail to adhere to these responsibilities, they may intentionally or unintentionally "use someone else's language, ideas, or other original (not common-knowledge) material without properly acknowledg-ing its source" (<http://www.wpacouncil.org>). When the act is intentional, the student has engaged in plagiarism. Plagiarism is an act of academic misconduct, which carries with it consequences including but not limited to receiving a course grade of "F" and a report to the Office of the Dean of Students. Unfortunately, it is not always clear if the misuse of sources is intentional or unintentional, which means that you may be accused of plagiarism even if you do not intentionally plagiarize. If you have any questions regarding use and citation of sources in your academic writing, you are responsible for consulting with your instructor before the assignment due date. In addition, you can work with an MSU Writing Center tutor at any point in your writing process, including when you are integrating or citing sources. You can make an appointment and find citation resources at www.montana.edu/writingcenter.

Disability and Academic Accommodations

If you are a student with a disability and wish to use your approved accommodations for this course, contact me to discuss. Please have your Accommodation Notification available for verification of accommodations. Accommodations are approved through the Office of Disability Services located in 137 Romney Hall. www.montana.edu/disabilityservices.

Diversity

Respect for Diversity: It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexual orientation, disability, age, first-generation college student, socioeconomic status, ethnicity, race, religion, culture, perspective, and other background characteristics. Your suggestions about how to improve the value of diversity in this course are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups.

In addition, in scheduling exams, I have attempted to avoid conflicts with major religious holidays. If, however, I have inadvertently scheduled an exam or major deadline that creates a conflict with your religious observances, please let me know as soon as possible so that we can make other arrangements.

Inclusivity

MSU supports an inclusive learning environment where diversity and individual differences are understood, respected, appreciated, and recognized as a source of strength. We expect that students, faculty, administrators, and staff at MSU will respect differences and demonstrate diligence in understanding how other peoples' perspectives, behaviors, and worldviews may be different from their own.

Student Well-Being

You Are Not Alone. Students at Montana State University have the right to live and learn in an academic environment that is free from all forms of discrimination including sexual and gender-based discrimination, harassment, and violence including sexual assault, relationship violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, please know that you are not alone. Resources and support are available at MSU. You can learn more at: www.montana.edu/voice. MSU has confidential resources available to you through the VOICE Center, MSU Counseling and Psychological Services, and University Health Partners Health Services. These services are available to provide support, resources, and referrals to numerous campus and community agencies that can provide the information and support you need.

Please know that if you choose to confide in me, I am required by the university to report to the Title IX Coordinator/MSU Office of Institutional Equity, as MSU and I want to ensure you are connected with all the support the university can offer. You are not required to respond to outreach from the university if you do not want to do so. You can also make a report yourself, including an anonymous report, through switness@montana.edu

Mental Health and Wellness

MSU strives to create a culture of support and recognizes that your mental health and wellness are equally as important as your physical health. We want you to know that it's OK if you experience difficulty, and there are several resources on campus to help you succeed emotionally, personally, and academically.