



Fall 2023

Course Number	ARCH 672	Classroom	TBC
Course Name	Designing for the Metaverse		
Pre/Co-Requisites	N/A		
Instructor	Sumer Singh	Office Hours/Location	By Appointment
	Email: sumer.matharu@ucalgary.ca		
Class Dates	Monday to Friday, Nov 06 – 10, 1:00pm to 5:00pm. Combination of in-person (location TBD), and online (Zoom and Discord).		
Instructor Email Policy	Please note that all course communications must occur through your @ucalgary email, and I will respond to emails sent via student's @ucalgary emails within 48 hours.		
Name and Email of Teaching Assistant(s)	N/A		

Course Description:

Designing for the Metaverse

"It's not new. I realized that nothing we've been doing is new. We haven't been tapping into new areas of the brain - we've just been awakening the most ancient. This technology is simply a route to powers that conjurers and alchemists used centuries ago. The human race lost that knowledge and now I'm reclaiming it through virtual reality. ." - Jobe Smith, The Lawnmower Man, 1992

With its recent surge in popularity, the Metaverse is a place where the possibilities are virtually endless. Worlds can be created from scratch, and rules can be rewritten. So what does this mean for Architects? Whether it be immersive experiences, or applications to augment the AEC industry, Architects are at a crossroads where using the Metaverse can be a potent instrument to inform our physical reality. This course will explore the origins and cutting edge of Mixed Reality, along with providing the students with the foundation to create their own VR and Metaverse applications using Unity.

Students will be introduced to the basics of Unity and how to create and launch applications in an Oculus Quest 2 headset, as well as launch to cloud based Metaverse platforms. Applied research will become crucial when taking these basics and building upon them for the

remainder of the block week. The teaching method and lecture is studio based, with a focus on skills-building via technical and theoretical content. Assignments shall be provided in class, and the outcome will include digital content.

Over the course of 5 days, each student will be introduced to XR fundamentals and learning to approach their architecture projects with a renewed perspective of integrating mixed reality. After a brief lecture and discussion on XR, the students will be introduced to world building in Unity. This will quickly pivot into a self-directed project that the students will execute from start to finish in groups, and showcase on the last day of the Block Week course.

Online Delivery

Learning shall occur in both synchronous (real-time/Zoom/Discord) and asynchronous (i.e. students complete on their own time such as watching videos, applied research, etc.) contexts. Students are required to participate during all synchronous sessions during the dates and times already timetabled for this course. Students are also required to participate in the asynchronous learning tasks using the resources provided by the instructor. If unable to participate live due to unforeseen circumstances, inform the instructor in advance to work out an alternative participation activity (e.g. Follow written instructions, submit a brief reflection, submit daily outcomes, and actively contribute to the follow-up discussions).

Course Learning Outcomes:

Upon completion of this course, students will know and be able to:

1. Gain a foundational understanding of Mixed Reality and the Metaverse
2. Gain a basic understanding of Unity and how it works
3. Gain an understanding of AEC software interoperability using Speckle
4. Launch a VR application in Oculus Quest 2
5. Launch a Metaverse application

Learning Resources:

Readings, textbooks and learning materials:

<https://www.imdb.com/title/tt0104692/>

<https://www.hok.com/ideas/research/how-architects-and-designers-can-help-define-the-metaverse/#:~:text=There%20are%20nearly%20as%20many,and%20conduct%20real%2Dworld%20activities.>

<https://www.youtube.com/watch?v=9wJgUAHxYzo>

<https://www.archdaily.com/968905/architecting-the-metaverse>

<https://archinect.com/features/article/150248232/investigating-the-emerging-field-of-xr-and-its-applications-in-architecture-with-popular-youtuber-and-software-developer-matthew-hallberg>

<https://www.xrtoday.com/mixed-reality/how-xr-will-transform-the-aec-sector/>

<https://www.iheartblob.com/>

Technology requirements (D2L etc.):

- A computer with a supported operating system, as well as the latest security, and malware updates;
- Unity, Rhino/Grasshopper, Maya or Blender, Speckle, Discord;
- Oculus Quest 2 VR headset;
- A high-performance video card, preferably compatible with Oculus Quest 2 (<https://www.meta.com/help/quest/articles/headsets-and-accessories/oculus-link/meta-quest-link-compatibility/>);
- Webcam (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Broadband internet connection;
- Student IT resources;
- Computer specs as per SAPL recommendation;

Workshop Safety Training Requirement

If a course requires the use of the SAPL workshop, students must complete all online University of Calgary safety courses, the online Trajectory safety training course, as well as in-person workshop training and a grade of pass on the final evaluation project, to be granted access to the SAPL workshop. This training is offered once a year, around the start of the Fall term and has a completion deadline.

Additional Classroom Conduct and Related Information

Guidelines for Zoom Sessions in Online Classes

Students are expected to participate actively in all Zoom sessions and to turn on their webcam. Please join our class in a quiet space that will allow you to be fully present and engaged in the Zoom sessions. Students must behave in a professional manner during the session. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment

Assessment Components:

Individual outcomes: 40%

Group project: 50%

Attendance and Participation: 10%

Assessment and Evaluation Information

Attendance and Participation Expectations: Students are required to attend all classes and complete all assignments provided in class, while also making a meaningful contribution to their group project

Guidelines for Submitting Assignments: As per accompanying instructions in class

Final Examinations: N/A

Expectations for Writing (<https://www.ucalgary.ca/pubs/calendar/current/e-2.html>).

Late Assignments: To be accepted at the discretion of the instructor. If accepted, each day delayed will lead to a letter grade loss.

Criteria that must be met to pass: Completion of daily assignments is mandatory. All individual and group submissions must be completed by each student to pass the course. Each group shall be given the opportunity to rate members based on level of contribution, that may affect the individual grading outcome.

Grading Scale:

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.99	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript

The School of Architecture, Planning and Landscape will not permit the Flexible Grade Option (CG Grade) for any course offered by the School.

<https://www.ucalgary.ca/pubs/calendar/current/f-1-3.html>

CACB Student Performance Criteria (for Architecture courses only)

The following CACB Student Performance Criteria will be covered in this course at a primary level (other criteria will be covered at a secondary level): A2: Design Skills; A3: Design Tools; A5: Site Context and Design; A8: Design Documentation; B1: Critical Thinking and Communication; B3: Architectural Theory.

Topic Areas & Detailed Class Schedule

All scheduling, timings, and dates above are subject to change as the block week progresses.

Course Schedule Date	Topic	Assignments/Due Dates
Monday Nov 6	Introductions, Theoretical Discussions, Introduction to Unity, Metaverse tools	World building in Unity
Tuesday Nov 7	Introduction to Virtual Reality development and creating applications for Oculus Quest 2	Continue world building and create connectivity to Oculus Quest VR
Wednesday Nov 8	Introduction to Metaverse development; Working session for students	Continue world building and create your own Metaverse; Group project
Thursday Nov 9	Working session for students	Group project
Friday Nov 10	Student work showcase	Group project due

University of Calgary Policies and Supports

[ACADEMIC ACCOMMODATION](#)

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-accommodation-policy>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>. Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to their instructor (contact information on first page above).

SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/.

ACADEMIC MISCONDUCT

Academic Misconduct refers to student behavior which compromises proper assessment of a student's academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

For information on the Student Academic Misconduct Policy and Procedure please visit: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-policy>

Additional information is available on the Academic Integrity Website at <https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

COPYRIGHT LEGISLATION:

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy>) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy (<https://www.ucalgary.ca/pubs/calendar/current/k.html>).

INSTRUCTOR INTELLECTUAL PROPERTY

Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

SEXUAL AND GENDER-BASED VIOLENCE POLICY

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/legal-services/university-policies-procedures/sexual-and-gender-based-violence-policy> .

UNIVERSITY STUDENT APPEALS OFFICE

If a student has a concern about a grade that they have received, they should refer to Section I of the Undergraduate Calendar (<https://www.ucalgary.ca/pubs/calendar/current/i-3.html>) which describes how to have a grade reappraised. In addition, the student should refer to the SAPL's Procedure for reappraisal of grades

OTHER IMPORTANT INFORMATION

Please visit the Registrar's website at: <https://www.ucalgary.ca/registrar/registration/course-outlines> for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk