



---

## Winter 2024

---

<b>Course Number</b>	ARCH 680.31 L03	<b>Classroom</b>	CBDL basement classroom D
<b>Course Name</b>	Printing Paste		
<b>Pre/Co-Requisites</b>			
<b>Instructor</b>	Lili Yas Tayefi	<b>Office Hours/Location</b>	Wednesday 1:00 to 4:00 pm, by appointment
	<b>Email:</b> ytayefin@ucalgary.ca		<b>Phone:</b>
<b>Class Dates</b>	In-person only. Wednesdays, January 10 – April 3, 2024, 9:00am to 12:00 pm		
<b>Instructor Email Policy</b>			
<b>Name and Email of Teaching Assistant(s)</b>	Arman Khalilbeigi		

### Course Description:

Additive manufacturing with mud allows reintroduction of traditional, sustainable and local material matter into contemporary culture using design solutions and innovation to address quality, cost and efficiency issues in response to the global housing crisis. This course will introduce clay, and other material investigation, 3D printing at a prototype scale using WASP 3D printers (Delta 20x40 and 3mt at the CBDL lab). Discourse will include the processing of clay, from ground extraction or powder to paste, to print prototypes and introduction to firing schedules of clay into ceramic artifacts. Students will be given digital and physical tools with design thinking skills. This is an experimental, hands-on, research heavy course, the entirety of which will accumulate a process-driven portfolio of investigation.

**Course Hours:** 3 units

### Online Delivery

All deliverables and communications will exist on a [Google Drive link](#). The student folder includes resources and submission guidelines to be explained in person Wednesday January 8th, 2024.

## **Course Learning Outcomes:**

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

1. Develop an understanding of vernacular adobe architecture, traditional and modern. Have found innovative global solutions to small scale housing solutions.
2. Students will gain an understanding of 3D printing as a digital fabrication tool and how it relates at architectural scale, defining a catalog of printability rules. And introduction to new software for g code generation.
3. Students will gain an understanding of clay and ceramic material properties, understanding optimal physical material consistencies for 3D printability. How to source, mix, and utilize this material for printing with a desktop printer and extruder.
4. Students will practice informing their design work through a feedback loop of digital design / simulation to physical manifestation and vice versa.
5. Students will be introduced to research methodology, parametric design thinking and logics by creating matrices of iterative design processes showcasing the developmental timeline of their work.
6. Students will gain visual communication skills, written and digital documentation of their work process, and gain clear publication of their work developed.

## **Learning Resources:**

Required readings, learning materials, and web resources will be provided during class.

## **Technology requirements:**

- Most current laptop with supported operating system, as well as the latest security, and malware updates
- A current and updated web browser and Google Drive account
- Download the following software:
  - Rhinoceros 7 or higher
  - Grasshopper
  - Simplify 3D Slicer
- Adobe Creative Suite - photo and video editing software
- One camera and tripod set up for the class

## **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:

Assessment Method	Description	Weight /100	Aligned Course Learning Outcome
Participation and Professionalism	Attendance and effortful participation is mandatory for the hands - on course both in class and a minimum requirement of 10 hours outside of class for a significant portion of the learning outcomes.	15	All 6
Documentation and Presentation	Rigorous weekly documentation of accumulated process with weekly group presentations to discuss and critique methodologies.	25	All 6
Research Methodologies	Applied research, rapid prototyping, implementation of design solutions and feedback during the process.	25	All 6
Exhibition / Publication	Final presentation of work accumulation (both in exhibition format, and written publication), formatting group exhibition as team o showcase works	20	All 6
Teamwork and Leadership	Group based work and collaboration on all learning outcomes. Effort in participation is measured by mature contribution to the team's learnings.	15	All 6

## Assessment and Evaluation Information

### Attendance and Participation Expectations:

- All students will participate in hands-on material work.
- Students will work in groups, with participation and responsibility for each of their roles.
- Set up and clean up of space is required daily, as per use, and at the end of the course.
- Deliverables will be made on time at the beginning of each class.
- Students are responsible for machinery and equipment usage, upkeep, safety and cleanliness.

### Guidelines for Submitting Assignments:

- All work will be submitted for the group and must be mindful of the group
- All work will be submitted on the Google Drive, prototypes to be kept for in person exhibition

### Final Examinations:

Final work will be presented in the format of reviews to an external jury.

Potential for exhibition dissemination. Everyone will participate in setting up their group exhibition.

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

All work will be documented and presented with the following format: axonometric drawings, photo collages, videos, digital screen recording simulations, physical prototypes, written text.

### Late Assignments:

Late assignment submissions will be graded with a loss of percentage per day.

### Criteria that must be met to pass:

Clear attendance and punctuality, B- or higher overall grade.

### 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)

Comprehensive Design Thinkings, Program Analysis, Digital Fabrication, Simulation, 3D Printing, Structural, Applied Research, Systems, Architecture vernacular, Critical Thinking, Iterative Design and Prototyping

## Topic Areas & Detailed Class Schedule

*Include information relevant to the class schedule, such as weekly topics, readings, and assignment due dates. For online, remote or blended courses include whether course activities are synchronous (i.e., real-time/Zoom) and asynchronous (i.e., students complete on their own time such as discussion boards, watching videos, etc.). It is recommended that important dates including the first day of classes, holidays, term breaks and last day of classes also be included.*

Course Schedule Date	Topic	Assignments/Due Dates
<i>Examples below, please adjust to fit your course dates.</i>		
Jan 8 – 12	Introduction to course, forming groups, assigned specialized topics	Precedent research
Jan 15 – 19	Material Workshop	Catalog of material recipes and presentation deliverables
Jan 22 – 26	3D Printing Workshop	Iterative prototyping and presentation deliverables
Jan 29 – Feb 2	Parametric Thinking	Combined learning project development and presentation deliverables
Feb 5 – 9	Project Development	Mid term reviews and presentations
Feb 12 – 16	Winter SAPL Block week	
Feb 19	Family Day Observed	
Feb 19 – 23	Winter Term Break	Update presentations, option to continue project development
Feb 26 – Mar 1	Research and fabrication project development	Weekly presentations
Mar 4 – 8	Research and fabrication project development	Weekly presentations

Mar 11 – 15	Research and fabrication project development	Weekly presentations
Mar 18 – 22	Research and fabrication project development	Weekly presentations
Mar 25 – 28	Documentation of final experiments	Mock presentations
Mar 29	Good Friday – University closed	
Apr 1	Easter Monday – University closed	
Apr 2 – 5	Final presentations TBD	Set up Exhibition
Apr 8 – 9	Final presentations TBD	Potential exhibition, final presentations and digital submissions due
Apr 15 – 19	Final Review week	
Indicate the following dates: <ul style="list-style-type: none"> <li>• If applicable, dates, times and locations of all approved class activities scheduled outside of regular course hours</li> </ul>		

## Special Budgetary Requirements (can be taken out if not applicable)

Students will be required to print boards for exhibition, mill or laser cut wood platforms to present prototypes on, potential to locate plinths for exhibition, and purchase materials such as clay. Machinery and firing of pieces is provided based on schedule.

## 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/](http://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