



Course Number	ARCH 672.14 L02	Classroom	CBD Lab Studio
Course Name	Printing Paste		
Pre/Co-Requisites			
Instructor	Lili Yas Tayefi	Office Hours/Location	By appointment
	Email: me@lilitayefi.com		Phone: 587 664 3446
Class Dates	March 13 - 17 in person		
Instructor Email Policy			
Name and Email of Teaching Assistant(s)	?		

Course Description

Additive manufacturing with mud allows us to reintroduce traditional, sustainable local materials into our contemporary culture using design thinking and creative problem solving to address quality, cost and efficiency issues in response to the global housing crisis. ¹ This course will introduce clay printing at a prototype scale using WASP 3D printers (20x40 and 3mt at the CBDL lab). Discourse will include the processing of clay, from powder to paste to printed prototypes and firing of clay into ceramic artifacts. Students will be given digital and physical tools and knowledge to creatively solve a design problem.

Course Hours: block week (1.5 units)

Online Delivery (If applicable)

All deliverables and communications will exist on a google drive link. The [student folder](#) includes resources and submission guidelines to be explained in person Monday March 13th.

Course Learning Outcomes

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

¹ <https://www.iconbuild.com/updates/icon-delivers-series-of-3d-printed-homes-for-homeless>

1. Develop an understanding of vernacular / mud architecture, traditional and modern. And will be challenged to find innovative global solutions to small dwelling solutions.
2. Students will gain an understanding of 3D printing as a fabrication technique and how it relates at an architectural scale, they will create a catalog of printability criteria including: print layering, cantilevers, timing, structural performance, exposure to oxygen and a variety of environmental influences.
3. Students will gain an understanding of working with clay as a material, understanding optimal physical material consistency for 3D printing. How to source, mix, and utilize this material for printing with a desktop printer and extruder.
4. Students will practice informing their design work using a feedback loop from digital design and simulation to physical manifestation.
5. Students will be introduced to research methodology, parametric design thinking and logics by creating a matrix of iterative design processes showcasing the developmental timeline of their work.

Learning Resources

Required readings, textbooks and learning materials:

N/A. PDF resources and recommended websites will be given / discussed in class.

Technology requirements (D2L etc.):

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

Most current laptops will have a built-in webcam, speaker and microphone.

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	Aligned Course Learning Outcome
Participation	Attendance is mandatory for the hands - on workshop and is a significant portion to the learning outcomes.	60	All 5
Documentation and Presentation	Rigorous daily documentation of process and group presentation, discussion and critique	15	1, 2, 4, 5
Research	Applied research and problem solving during process to be presented in group setting	10	All 5
Exhibition	Presentation, speaking about work, formatting group exhibition to showcase works	5	1, 4, 5
Team work	Group based work and collaboration on all learning outcomes. Effort in participation is measured by contribution to the team's learnings.	10	All 5

Assessment and Evaluation Information

Attendance and Participation Expectations:

- All students will participate in material mixing and working hands-on
- Students will work in groups, must participate and be responsible for each of their roles.
- Clean up of space is required daily and at the end of the course

Guidelines for Submitting Assignments:

- All work will be submitted for the group of four and must be mindful of the group
- All work will be submitted on the [google drive](#)
- A blog post regarding learnings from the workshop

Final Examinations:

- There will be no final examination
- Everyone will participate in setting up their exhibition of works

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

- All work will be documented and presented in the following format: axonometric drawings, videos, physical prototypes, text.

Late Assignments:

- The deadline for submitting all work is Friday March 18th. Late submissions will miss the exhibition opportunity.

Criteria that must be met to pass: active attendance and participation in workshop, as well as documentation requirements.

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/salp-3-3.html>)

(for Architecture courses only) CACB Student Performance Criteria

Design Skills, Program Analysis, Digital Fabrication, Simulation, 3D Printing, Structural Systems, Architecture vernacular, Critical Thinking

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.).

Course Schedule Date	Topic	Assignments/Due Dates
Monday, March 13	Material workshop // Architectural Relevance // Intro to presentation requirements and work groups	Select groups, brainstorm precedence, material workshop and modeling challenge
Tuesday, March 14	Model Making // Prototyping // Daily group presentations and discussion	Workday: Prep first print files, prep material and extruders
Wednesday, March 15	Model Making // Prototyping // Daily group presentations and discussion	Workday: Print prototypes, edit models, document process
Thursday, March 16	Combining Learnings // Final Prototype	Presentations of finding thus far. Combining files. Continue printing
Friday, March 17	Presentations // Exhibition set up // Machine and course clean up	Videos of process, axonometric drawings, matrix of prototypes, presentation of learnings including applicable use cases

Indicate the following dates:

- If applicable, dates, times and locations of all approved class activities scheduled outside of regular course hours

Guidelines for Zoom Sessions

Disclaimer: this workshop may be filmed by an external party for a video presentation and publicity purposes.

Special Budgetary Requirements

Students will be required to print drawings for exhibition, mill or laser cut wood platforms to present prototypes on. All clay material and machinery is provided.

University of Calgary Policies and Supports

COVID-19 PROCEDURE FOR SICK STUDENTS: <https://www.ucalgary.ca/risk/covid-19-procedure-for-sick-students>

UNIVERSITY OF CALGARY COVID-19 UPDATES: <https://www.ucalgary.ca/risk/emergency-management/covid-19-response>

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/university-policies-procedures/accommodation-students-disabilities-procedure>

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://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>
<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

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 (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) 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 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/policies/files/policies/sexual-violence-policy.pdf>

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