

MASS MANIPULATIONS: Intersectional Potentials of Mass Timber in Post-digital Architectural Applications
EVDA 782: Senior Research Architecture Studio
Winter 2020
Instructor: Josh Taron
Location: Remote Teaching



Blake St Peter, Mono-material prototypes, Designing Out Waste Research studio, Winter 2019

COURSE INFORMATION/DESCRIPTION

MASS TIMBER AS A POST-DIGITAL DESIGN TERRITORY

Mass timber is a category of framing styles typically characterized by the use of large solid wood panels for wall, floor, and roof construction. It also includes innovative forms of sculptural buildings, and non-building structures formed from solid wood panel or framing systems of six feet or more in width or depth. Products include Cross-laminated timber (CLT), Nail-laminated timber (NLT), glued-laminated timber (glulam), dowel-laminated timber (DLT), structural composite lumber (SCL), and wood-concrete composites.¹ With advantages that include a low carbon footprint, construction efficiencies, mono-material potential, divertability-by-design, fire/life safety, and occupant well-being, mass timber is still relatively underexplored through the lens of computationally simulated building performance and digital fabrication (beyond tectonic jointing).²

This research studio will focus on the material effects of mass timber products when intersected with building performance software, robotic fabrication, addressed at an architectural scale and explored in ways that go beyond the technical – wading into notions of social application and emergent aesthetics. Modular construction, parametric design tools, and material sheds will all be explored as they relate to the production of a mass timber architectural prototypes. Students will be encouraged to enroll in the mass timber block week course (Industrial Landscapes: Mass Timber 2020).

THE CIRCULAR ECONOMY AS DESIGN FRAMEWORK

The Ellen Macarthur Foundation describes the Circular Economy as aiming to redefine growth, focusing on positive society-wide benefits by gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. The circular model builds economic, natural, and social capital and is based on three principles: 1.) Designing out waste and pollution 2.) Keeping products and materials in use 3.) Regenerating natural systems. Mass timber has the capacity to deliver on these objectives but only if we reconsider the design, construction and performance objectives of buildings themselves in fundamentally different ways. Keeping in mind the intersection between mass timber and digital design + fabrication, the studio will also orient itself toward delivering on one or more of the three aforementioned principles with an emphasis on designing out waste within the lifecycle of a building.

¹ Alberta Wood Council, 2016. Mass Timber in North America: Expanding the possibilities of wood building designs.

² Ibid

LEARNING RESOURCES

TECHNOLOGY REQUIREMENTS

Laptop as per SAPL recommended specs

Rhino

Grasshopper

Autodesk Inventor

COURSE LEARNING OUTCOMES

At the end of this course, students will:

1. Develop an understanding of mass timber products and applications
2. Develop typology-specific modular structural dimensions in mid-rise mixed-use (residential + commercial), tower and single-family
3. Develop a set of typology-specific mass timber building designs
4. Produce a publication (book) of the studio results
5. Contribute to the Year End Show (format TBD in collaboration with the SAPL SA)

ASSESSMENT COMPONENTS

PHASE 1 REVIEW:	20%	(Outcome 1)
PHASE 2 REVIEW:	30%	(Outcomes 1-3)
STUDIO PUBLICATION:	40%	(Outcome 4)
YEAR END SHOW	10%	(Outcome 5)

ASSESSMENT AND EVALUATION INFORMATION

ATTENDANCE & PARTICIPATION EXPECTATIONS: Students are expected to attend and come prepared to all studio sessions. This includes producing content necessary for discussion and contributing to individual and studio-wide discussions. Studio sessions take place using zoom links provided by the instructor.

GUIDELINES FOR SUBMITTING ASSIGNMENTS: New content is expected at each studio session based on feedback provided at prior sessions and legibly aimed toward a declared set of objectives defined by the student in consultation with the instructor.

FINAL EXAMINATIONS/REVIEW: Attendance and participation for the entire studio review is mandatory. All required deliverables must be included and presented in a way that legibly demonstrates the student's understanding.

EXPECTATIONS FOR WRITING: (<https://www.ucalgary.ca/pubs/calendar/current/e-2.html>):

Written work presented in final reviews, studio exhibitions and the studio publication should meet standards for peer reviewed submissions.

LATE ASSIGNMENTS: At the discretion of the instructor, assignments submitted after a deadline may be penalized with the loss of a grade (e.g. A- to B+) for each day late.

SCHEDULE

Weeks 1-5: Phase 1 - Initial research/Problem Definition

- Jan 13 Intro/Overview
- Jan 17 Internal Review/Discussion
- Jan 21 Desk Crits
- Jan 24 Internal Review/Discussion
- Jan 28 Challenge Development Workshop P.1
- Jan 31 Challenge Development Workshop P.2
- Feb 4 Small Group Crits – Methodology Mock-ups
- Feb 7 Small Group Crits – Methodology Mock-ups
- Feb 11 Small Group Crits – Methodology Mock-ups
- Feb 14 Internal Review

Block week #1

Weeks 7-11: Phase 2 - Project Development/Iterative Prototyping

- Feb 24 Desk Crits
- Feb 26 Desk Crits
- Feb 28 Phase 1 Final Review
- Mar 3 Phase 2 schedule development
- Mar 6 Phase 2 approach defined

Block week #2

- Mar 17 COVID issues discussion
- Mar 18 Revised Schedules Presented
- Mar 20 Project Design 10% complete – small group crits
- Mar 24 Project Design 50% complete – small group crits
- Mar 27 Project Design 75% complete – small group crits
- Mar 31 Project Design 100% complete – small group crits
- April 1 Studio 2 – peer project review session
- Apr 3 Project Representation – 33% complete
- Apr 7 Project Representation – 66% complete
- Apr 10 Project Representation – 100% complete
- Apr 14 Draft Publication Review
- Apr 16 Send publication to print/generate web PDF
- Apr 21 Final Review

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.

Student Performance Criteria

Example: "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; A4: Program Analysis; A5: Site Context and Design; C3: Structural Systems; D1: Comprehensive Design."

Media and Recording in Learning Environments

Part 1

University Calendar: <https://www.ucalgary.ca/pubs/calendar/current/e-6.html>

Recording of lectures (other than audio recordings that are pre-arranged as part of an authorized accommodation) is not permitted.

Students may not record any portion of a lecture, class discussion or course-related learning activity without the prior and explicit written permission of the course instructor or authorization from Student Accessibility Services. For any other use, whether by duplication, transcription, publication, sale or transfer of recordings, written approval must be obtained from the instructor for the specific use proposed. Any use other than that described above constitutes academic misconduct and may result in suspension or expulsion.

Part 2

The instructor may use media recordings to capture the delivery of a lecture.

The instructor will notify all students and guests in the class that the event is being recorded. If a student or guest wants to take steps to protect privacy, and does not want to be recorded, the instructor will provide the individual (s) with an alternative means of participating and asking questions (e.g., passing written notes with questions). Students cannot be penalized for choosing not to be recorded in situations where participation is part of the course. Students must be offered other ways of earning participation credit that do not involve recording.

Any video-recording would be intended to only capture the instructor and the front of the classroom.

Students/other participants would not necessarily be visible on video recordings.

University of Calgary Policies and Supports

ACADEMIC ACCOMMODATION

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; 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/. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>.

ACADEMIC MISCONDUCT

Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when: (a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work, (b) parts of the work are taken from another source without reference to the original author, (c) the whole work (e.g., an essay) is copied from another source, and/or, (d) a student submits or presents work in one course which has also been submitted in another course (although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

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.

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.

UNIVERSITY STUDENT APPEALS OFFICE: If a student has a concern about the course, academic matter, or a grade that they have been assigned, they must first communicate this concern with the instructor. If the concern cannot be resolved with the instructor, the student can proceed with an academic appeal, which normally begins with the Faculty. <https://ucalgary.ca/student-appeals/>

More student support and resources (e.g. safety and wellness) can be found here:

<https://www.ucalgary.ca/registrar/registration/course-outlines>