

Dalhousie University - School of Architecture

ARCH 5222.03: Wood in Architecture

Summer 2024

Instructor: Emanuel Jannasch

Classes: Tuesdays 9:30 to 12:30; Room: B102

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Office hours: drop by or make an appointment.

Brightspace site: TBA

ACADEMIC INFORMATION

Calendar Description

This course investigates aspects of timber from forest ecology and lumbering through the tools and methods used in diverse building cultures to contemporary developments in mass timber and least-energy form. The course balances hands-on experience with research and design and draws on a variety of formal and informal information sources.

Additional Course Description

Week by week we look at nine ways to use wood in architecture. Each area of application draws on different background information: the material complexity and diversity of wood, its wide range of physical properties, its behavior in juxtaposition with other materials, the ecology of growth, harvesting, and carbon, and precedents from different building cultures and subcultures. In 8 or 10 classes we can look at only a few points on the surface of this vast field, so the term project is an opportunity for students to pursue one topic in more depth.

Rationale for the Course

Architects use wood for its strength-to-weight ratio, thermal resistance, sensory qualities, workability, sustainability, and historical resonance, among other properties. But the material complexities of wood and the depth of timber cultures mean that mastering timber design is a career-long project. This course builds on our undergraduate introduction to wood and lays a foundation for timber-related thesis work. Furthermore, some architectural practices have established expertise in timber design, and many more are looking to build knowledge, in part through hiring. The course should benefit graduates aspiring to work in either context.

Learning Objectives

Students successful in this course will

- Make use of many repositories and sources of knowledge.
- Envision and analyze timber configurations and details for performance and buildability
- Select timber by species, group, and grade – and factors outside the commodity systems
- Bring a variety of timber precedents to discussions and to projects
- Formulate design responses to social and cultural difference
- Define cogent personal design intentions and pursue them with consistency and integrity.

Class Format(s)

The course comprises lectures, shop tutorials, reviews, discussions, and possibly, optional field trips.

Integration with Other Courses

The term project may support a student's current design studio but not so closely that the trajectory of one interferes with the other. One item of work may only be submitted in two courses if the respective instructors and the student are clear which aspects are to be evaluated in what course. Students presenting work in two courses must get permission from both instructors at the earliest opportunity.

Weekly Hours for all Course-related Activities

Students should devote an average of 9 hours to this course per week, including class time. The ten weeks of the course indicate 60 out-of-class hours. Assignment weights suggest spending about 6 hours on each of the three short projects and 30 hours on the term project, leaving an hour or two a week for reading and open-ended research. A requirement in each project is to log time spent against associated accomplishments. Tracking your hours can help you

- allocate the time needed to achieve a grade you're happy with
- get things done early in the term to make end-of-term space for other courses, if you wish,
- refine your time-management skills generally.

Schedule

Wk.	Tues.	Topic	Due	(Interim for Term Project)
1	May 7	Integrating Wood with Steel		(area of interest)
2	May 14	Joinery		(outline)
3	May 21	Traditional Frames and Log-Work	1. <i>Steel-Wood Connection</i>	
4	May 28	Compass Timber		(progress report)
5	June 4	Splitting, Bending, and Lashing	2. <i>Wood-on-Wood Joint</i>	
6	June 11	Wood Interiors and Stairs		(progress report)
7	June 18	Cladding and Weathering	3. <i>Least-Weight Form</i>	
8	June 25	Prospects for Mass Timber		(progress report)
9	July 2	Inventiveness in Light Wood Framing	SLEQ's	
10	July 9	Exhibition and Review	4. <i>Term Project</i>	

Lectures in the first 5 weeks are sequenced to support the initial exercises. Weeks 6 through 9 may be re-ordered to provide more timely support for the term projects chosen by students.

Required Reading

Any required readings will either be freely available online or posted to Brightspace.

Required Equipment, Materials, or Software

Resources will vary with students' project intentions. Students should be aware of [East Coast Specialty Hardwoods](#) in Burnside Industrial Park and [Halifax Specialty Hardwoods](#) in Bedford.

Additional Expenses for Students

Students are encouraged to use found and salvaged materials wherever possible.

Additional Tutoring or Academic Support

Regan Southcott is available for consultations online or in the shop. He can be reached at Regan.Southcott@dal.ca

ASSESSMENT

Components and Evaluation

Name	weight	scope
1. Steel-Wood Connection	15%	individual
2. Wood-on-Wood Joint	15%	individual
3. Least-Weight Form	15%	individual
4. Personal Project	35%	individual or team
5. Class Contributions	10%	individual, partly based on team contributions
6. Quizzes on Readings	10%	individual grade supported by team work

Group Work

There are no required group assignments. However, it is recommended to complete the first three exercises in parallel with a partner or two, simply to help one another record progress. In-class activity and the quizzes may involve teams but will be assessed individually. With the instructor's permission, students may collaborate on the term project, with all team-members receiving the same mark.

Assignment Outlines

Detailed handouts will be provided on the date of assignment, expanding on the summaries below.

Prescribed Hands-On Exercises

For each exercise, students choose a project from a list of options. The scope of the list ensures that each iteration of the course covers a broad range of conditions collectively, and so that over time a comprehensive and excellent set of examples will be developed for the school.

Evaluation will give roughly equal weight to 1. correctness of application, 2. efficacy and safety of process, and 3. crispness of work, clarity of diagrams, cogency of explanation. The explanation includes a table of hours spent and things accomplished.

Selected physical demonstrations will remain as exhibits in the wood shop. Photo-documentation, diagrams, and textual explanations will accumulate, credited, in a class handbook.

1. Connecting Wood with Steel

Build a set of sample connections showing how threaded fasteners and/or other connective components function and how they are installed. Provide diagrams, illustrations, and brief explanations. The demonstration might simply compare different kinds of wood screws or it could involve machine screws and specialty nuts, for example or even steel structural members like tie rods or struts. Some hardware will be made in our shops.

2. Wood-on-Wood Joint

Build a demonstration wood joint using magnets, flexible materials, and other devices to show how they fail and how to proportion them not to fail. The joints modelled will not employ hardware but may potentially involve glue. Explain graphically how the joint would vary to exploit the capacity of hand tools, routers and jigs, and CNC.

3. Least-Weight Form

Build a portable container or other functional artifact by means of splitting, bending, and lashing. Grown forms such as knees, forks, and sweeps may also be employed. Objects could include but aren't limited to baskets, boxes, cribs, chairs, or cradles.

Use the simplest of tools. Limited joinery may be permissible but avoid any glue or hardware. Use green wood and roundwood wherever possible, of the most appropriate species available.

4. Term Project

- Week 1 Commit to one of the topic areas suggested by the lectures, or to another area approved by the instructor.
- Week 2 Bring a project defined within this area. A) set a goal or pose a question that can be pursued through designing and probably making something. B) sketch out the relevant state of the art: what others have theorized or made in a similar vein. C) Suggest how the project will advance or test the state of the art. In a 30-hour project this is not likely to be paradigm-shattering but do identify a small point or two. Bring a record of hours spent.
- Week 4 Bring (at least) a summary of research findings and describe how these have sharpened your project. Bring a record of hours spent.
- Week 6 Bring (at least) some preliminary design or production work, and a record of hours spent.
- Week 8 Bring (at least) some advanced design or production work, the beginnings of some testing or analysis, and a record of hours spent.
- Week 10 Present your completed project in roughly ten minutes per student, including a reflection on hours spent.

Work will be evaluated in phases

- 10 Project statement with respect to area of interest, goals, and methods
- 20 Review of the state of the art.
- 30 Thoroughness of Investigation
- 30 Completeness and clarity of documentation
- 5 Cogency of Conclusions
- 5 Quality of abstract

5. Class Contributions

Attendance is expected but not evaluated per se. What will be evaluated are contributions to in-class discussions. These could take the form of questions or positions that show some evidence of engagement with required or suggested readings as set out at the end of the previous class. This is not a bonus mark for extroversion. All students are expected to make room for and elicit ideas from their classmates. 2d or 3d expressions of engagement with the readings are of course welcome.

Components that are Required but Not Assessed

Students need to be up to date on all the School of Architecture's safety qualifications as early as possible in the term.

Criteria and Standards for Assessment

Assignment handouts will include rubrics. To the extent possible, these will address questions of inventiveness, initiative, and critical perspective as well as more straightforward areas of achievement.

Feedback

The instructor will provide basic feedback through the Brightspace rubric forms and through in-class reviews. Students are encouraged to seek more detailed responses through one-on-one discussion.

Mid-term Standing

By Week 6, students will have received grades on 30% of their work and interim feedback on their term project and class contributions.

Assignment Format

First exercises include a small (but large scale, say 1:1 or 1:2) material project, a series of captioned photos recording the design and making process, and a written reflection of maximum 300 words. Term projects will include research, 2d and 3d design work, and a written account of the investigation: question, method, results, and evaluation.

Submission of Assignments

Physical and graphic work should be brought to class for pin-up. PDF documents comprising text, images, and photos should be printed for in-class and uploaded to Brightspace.

Guidelines for Citing Sources

The School standard is Chicago Manual of Style: Author-Date Style.

Chicago quick guide: <https://tinyurl.com/quick-author-date>

Chicago full guide: <https://tinyurl.com/full-author-date>

University Standards for Individual Assignments (Undergraduate and Graduate)

A+ (90–100%), A (85–89%), A– (80–84%): Considerable evidence of original thinking; outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.

B+ (77–79%), B (73–76%), B– (70–72%): Evidence of grasp of subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.

C+ (65–69%), C (60–64%), C– (55–59%): Evidence of some understanding of the subject matter; ability to develop solutions to simple problems.

D (50–54%): Evidence of minimal familiarity with the subject matter; minimal analytical and critical skill.

F (0–49%): Little evidence of understanding of the subject matter; weakness in analytical and critical skills; limited or irrelevant use of the literature.

Numerical grades for each component will be converted to a final letter grade.

In this class, *original thinking* is understood to transcend or take thoughtful issue with the rubric checklist. There can be no instructions for achieving originality. “Outstanding” does not mean answering to a checklist, but standing out from the class as a whole.

University Standards for Graduate Courses

Assignments may be given any percentage grade or letter grade from the grade scale above. For a graduate course, a final grade below B– will be recorded as an F.

POLICIES

Course-Specific Policies

Late Assignments

Due Dates and Late Submissions

Deductions for late submissions encourage time management and maintain fairness among students.

	Nominal Due Date	Is a late assignment accepted on the basis of SDA?	what is the deduction per weekday?*	Is there a final due date for a late submission?	What happens after that?
Steel-Wood Connection	May 21	yes	3%	May 31	receives 0% and no comments
Wood-on-Wood Joint	June 4	yes	3%	June 14	receives 0% and no comments
Least-Weight Form	June 18	yes	3%	June 28	receives 0% and no comments
Term Project	July 9	no	n/a	July 6	receives 0% and no comments

* For example, if an assignment is evaluated at 75% before applying a 3%-per-weekday deduction, it would receive 72% for being 1–24 hours late; 69% for 25–48 hours late; etc.

Note: The following University or School policies take precedence over course-specific policies:

- No late assignments are accepted after the last day of weekly classes (the Friday before review week).
- With a Student Declaration of Absence (maximum two per course), an assignment may be submitted up to three weekdays late without penalty. An SDA cannot be used for the final assignment.
- With a medical note submitted to the School office, a course assignment (including a final assignment) may be submitted more than three weekdays late without penalty. The number of weekdays depends on how long you were unable to work, as indicated in the medical note. If more than one course is affected, you should consult with the Undergraduate/Graduate Coordinator to set a new schedule of due dates.
- A student with an accessibility plan allowing for deadline extensions does not need to submit an SDA.

Academic Integrity

The instructor may use common search engines to check sources of text and images.

Lecture Notes

The instructor will provide lecture slides and occasionally notes. If the class agrees, students may record lectures or class activities on the understanding that recordings will be shared via Brightspace.

CACB Student Performance Criteria

The BEDS/MArch program enables students to achieve the accreditation standards set by the Canadian Architectural Certification Board. They are described at <https://tinyurl.com/cacb-spc-2017> (pages 14–17). This Dalhousie ARCH course addresses the CACB criteria and standards noted on the "Accreditation" page of the School of Architecture website: <https://tinyurl.com/dal-arch-spc>.

Faculty Policy

Equity, Diversity, and Inclusion

The Faculty of Architecture and Planning is committed to recognizing and addressing racism, sexism, xenophobia and other forms of oppression within academia and the professions of architecture and planning. We, the faculty, are working to address issues of historic normalization of oppressive politics, segregation, and community disempowerment, which continues within our disciplines today.

Emanuel's Addendum

Our conventional pursuit of architectural technology tends to reflect the assumptions and values of the industrialized world and the methods and biases of the Enlightenment. In addition to embracing a wider membership and serving more communities, the academy and profession might try to learn from building cultures and subcultures outside our current ken. Arch 5222 takes steps in this direction.

University Policies and Resources

Territorial Acknowledgement

Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.¹

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." <https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect. As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. (read more: http://www.dal.ca/dept/university_secretariat/academic-integrity.html)

¹ For more information about the purpose of territorial acknowledgements, or information about alternative territorial acknowledgements if your class is offered outside of Nova Scotia, please visit <https://native-land.ca/>.

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation.

If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion please contact the Student Accessibility Centre:

(https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro.

the Student Success Centre in Truro for courses offered by the Faculty of Agriculture (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view.

Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). (read more:

<http://www.dal.ca/cultureofrespect.html>)

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. (read more:

https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

Fair Dealing policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html)

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work, and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate

method. (Read more:

https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html)

Student Use of Course Materials

These course materials are designed for use as part of the ARCH5222 course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may violate Copyright law.

Additional University Policies, Guidelines and Resources for Support

Dalhousie courses are governed by the academic rules and regulations set forth in the University Calendar and the Senate. You can find them here: <https://tinyurl.com/dal-2021-22-regs>.

NB: For up-dated links please see:

Centre for Learning and Teaching

LMS Home Page

Dalhousie Academic Support Page

University Policies and Programs

Important student information, services and resources are available as follows:

Important Dates in the Academic Year (including add/drop dates)

Classroom Recording Protocol

Dalhousie Grading Practices Policy

Student Absence Declaration

Grade Appeal Process

Sexualized Violence Policy

Scent-Free Program

Learning and Support Resources

General Academic Support – Advising (Halifax and Truro)

Student Health and Wellness

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond)

Indigenous Student Centre

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803).

Black Student Advising Centre

International Centre

South House Sexual and Gender Resource Centre

LGBTQ2SIA+ Collaborative

Dalhousie Libraries

Copyright Office

Dalhousie Student Advocacy Services

Dalhousie Ombudsperson
Human Rights and Equity Services
Writing Centre
Study Skills/Tutoring
Faculty or Departmental Advising Support

Safety

Biosafety
Chemical Safety
Radiation Safety
Laser Safety

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Timber Engineering

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