

Dalhousie University School of Architecture
ARCH 3207.03 Fall 2024 Course Outline

B1 Building Technology

Dates and other outline details are subject to change.
They will be updated in Brightspace but not in this pdf.

QUICK REFERENCE

Instructor:	Emanuel Jannasch	Office: B106A
Office Hours:		Walk-in or by appointment
email:		jannasch@dal.ca (preferred)
if need be:		text/call (902) 225-4717
Assistants (TA's):	Jackson Senner (M5) Claire Wilson (M5)	jc510942@dal.ca mr469780@dal.ca (TA studio locations posted on map in West Studio)
Class Times & Rooms:	G109 (Design Building) 2135 seminar suite B015 auditorium	Mondays at 2:30 – 5:30 (Sep. 9 and 23, Oct. 21, and Nov.25) Mondays at 2:30 – 5:30 (All other Mondays) Thursdays at 9:30 – 12:30
Web Site:	Brightspace	https://dal.brightspace.com/d2l/home/338308
Required Texts:	Allen and Iano Allen and Iano	<i>The Architect's Studio Companion</i> (Wiley) <i>Fundamentals of Building Construction</i> (Wiley) Both are free to all Dal users at Sexton Library.
Additional:	Various	Any required readings will be posted, free, to Brightspace
Recommended:	Tregenza and Wilson Francis D.K. Ching Sandaker et al. Michael Ashby	<i>Daylighting</i> (Routledge) <i>Building Construction Illustrated</i> (Wiley) <i>The Structural Basis of Architecture</i> (Routledge) <i>Materials and the Environment</i> (Butterworth-Heinemann)
Studio & Lab:	Materials	Students sharing purchases and salvaging materials can spend less than \$50.00; you may opt to spend more.
	Hand tools	Students are encouraged to begin building a kit of light hand tools; base your purchases on in-class discussion.
SLEQ:	Combined B1 Session	December 6
Student Services:	Central Listing of Links	https://studentlife.dal.ca/category/health-and-wellness.html
TERM SCHEDULE:	For ease of location, the schedule is on the last page of this outline.	

ACADEMIC DETAILS

Calendar description

Through hands-on and observational exercises this course develops a tacit understanding of architectural materials and their behaviors. Readings and quizzes build an explicit understanding of associated terminology, quantities, and theory. B1 Technology thus supports the study of building envelope in B2, structural design in B3, and environmental systems in B5.

Transfer credit

B1 students who have already met 80% of the course learning objectives may be granted an exemption from Arch 3207. If you're interested, please gather outlines from other relevant courses and contact Emanuel. About equal weight is given to the three areas of content on the one hand and to fundamental skills on the other.

Additional qualifications

This course and many others involve working with and around a variety of materials. All Dal architecture students must therefore complete Dalhousie's [online WHMIS course](#) that sets out the latest Workplace Hazardous Materials Information System. Please do so in the first four weeks of term. Many students have WHMIS certification from other organization but Dalhousie recognizes only its own course.

Students must also complete the Skills Tutorials scheduled for the early weeks of the term. Details will be posted on the landing bulletin board.

Format

This is a lecture course with some studio and field assignments.

Time commitment

In balancing time between your courses and other commitments, you should allot a total of about 9 hours per week for this course, totalling roughly 90 hours outside of lecture and quiz time. Grading components are distributed fairly evenly through the term, helping you build a steady rhythm of work.

COURSE CONTENT

Topic Areas

Three modules introduce three areas of building technology, mainly through the lens of materials.

Materials, Construction, and Performance

Which materials and products are suitable to what parts of a building under what conditions? This module introduces the basics of materials science and some important ways of working with masonry, wood, and metals.

Sun, Light, and Climate

How does the sun generate different climates on different parts of the globe? How do we bring the richness and beauty of daylight into our architecture – while protecting ourselves from too much sun? How can we avoid glare and other lighting dysfunctions? This module covers solar geometry and the rudiments of daylighting design.

Architecture in (and of) Nature

How can the form and physiology of plants and animals inform architecture? How can we design buildings and settlements to engage productively with the surrounding ecosystem? In our search for answers, we look to various schools of biomimetic and systems thinking.

Learning Objectives

A broad field like architecture involves a huge volume of factual knowledge, of which we can directly transmit only a tiny fraction. The primary learning objectives of this course are the skills and ambitions you need to build your own knowledge base, and to apply what you learn to simple architectural scenarios. These are skills and aspirations that will serve you in other courses and in other pursuits. The course should help you

- 1. Commit to learning and using technical terms and expressions in**
 - answering oral and written questions
 - writing informative captions and annotations
 - working with instructor and TA's
- 2. Explore technology ideas through drawings and models by**
 - making simple technical drawings according to a class style guide
 - using sketch models to study and develop technological aspects of architecture
 - Expressing technology ideas in cogent and articulate diagrams.
- 3. Discover materials and methods by designing and making small physical objects through**
 - direct manipulation of plaster, clay, and other materials
 - safe use of hand tools, jigs, molds, handheld power tools, and low-hazard stationary tools,
 - knowledgeable application of various mechanical fasteners and adhesives
- 4. Work with quantities, both numerically and graphically**
 - to size flows and reservoirs of water
 - to evaluate glazing arrangements
 - to roughly size structural members from tables
- 5. Search out examples of course content in the world around you**
 - draw situations freehand in your notebook; captioned and/or annotated
 - draw freehand sections analyzing and speculating on observed conditions
 - take photographs placing conditions in (just enough) context.
- 6. Experiment with technology options in the context of design projects**
 - generate a variety of responses to simple briefs
 - experiment with course content through personal design studies
 - develop technology aspects of Design Studio projects

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 that are noted on the "Accreditation" page of the School of Architecture website: <https://tinyurl.com/dal-arch-spc>.

Meeting the CACB criteria

In accordance with the Canadian Architectural Certification Board's student performance criterion C2, this course provides the opportunity to develop

"an understanding of the basic principles used in the appropriate selection and application of architectural materials as it relates to fundamental performance, aesthetics, durability, energy, resources, and environmental impact".

- **Architectural Materials** are understood to include the physicality of site and context as well as building materials.

- **Fundamental performance** covers a wide range of mechanical and optical behaviors and various permeabilities. Response to fabrication and construction processes is an especially important area of performance.
- **Aesthetics** includes the ways in which materials impinge on our senses, and also how the production, selection, and working of materials can bear cultural meaning.
- **Durability** primarily means resistance to various kinds of degradation, but the idea also raises issues of weathering and patination, as expressive aspects of building, and of maintenance and repair as human and social aspects of building endurance.
- **Energy, resources, and environmental impact** are addressed together under the heading of sustainability and through the lens of life-cycle analysis.
- **Basic principles used in the selection of materials** include research and experiment as well as evaluation, comparison, and judgement.
- **Basic principles used in the application of materials** include productive juxtaposition and composition of materials as well as their plastic, subtractive, and additive manipulation. Material qualities and behaviors depend on internal structure and grain making this an underlying topic throughout the course.

ASSESSMENT

Architectural competence, like musical competence, is mostly developed through practice and feedback. Accordingly, the mark for this course is built up of several small marks. Eliminating major, intense deadlines should help de-stress your term. Nonetheless, if the majority of students suggest changing due dates to avoid some other deadlines, we can consider that. Very roughly, you can budget about one hour of out-of-class and Lab time per percentage point of grade-weight.

Five Assessment Components

Please look under Brightspace > Assignments for further details as descriptions/instructions are opened to view.

6 labs, totaling

30%

The form of weekly labs and the relationship between team and individual marks will vary. Where labs call for specific materials or other preparation, these will be announced in good time.

3 quizzes, totaling

24%

These emphasize terminology and factual knowledge. They consist of multiple choice, fill-in-the-blanks, and other easy-to-mark questions. You get to take them twice: once individually and once in a team. Your own mark will be an average.

Journal

20%

This is entirely individual work. It combines some strongly suggested content with work of your own, so the content demonstrates your initiative, determination, and focus. With your design tutors advice, you should copy journal pages as part of your B1 portfolio.

3 submissions associated with design projects

18%

- Team or individual work, or combined: varies with design project.

Miscellaneous Contributions

8%

- Questions asked and examples brought forward for the class
- Impromptu in-class exercises
- Potential reflection of peer review.

Format and other assignment details

Each assessment component is described in greater detail on Brightspace under Assessments > Assignments. These outlines include rubrics or checklists that set out grading criteria.

Submission of work

As a rule, you will submit work both physically (in 2d or 3d form) and digitally in a .pdf file. Details vary with the assignment. Digital work to be submitted on Brightspace; physical work as instructed in the assignment brief.

Marks and Grades

Numerical marks will be given by TA's under the supervision of the Instructor. They will be posted to Brightspace at the earliest opportunity. Accumulating grades will be converted to a letter grade (tinyurl.com/dal-grading) in the Brightspace spreadsheet according to the Dalhousie undergrad system. These term grades may be adjusted by the instructor and are not final until approved by the School.

Feedback

Written feedback will be brief and generally refer directly to rubrics. Students are encouraged to discuss this feedback with TA's and the Instructor to reach a more detailed and nuanced understanding of the work. Grades accumulate steadily to give an ongoing sense of standing.

Team and individual work

Architectural practice is collaborative, so in preparation for that you'll be doing a fair amount of work in teams of 4 or 5. Care is taken to make the teamwork agreeable and productive; for example you and your classmates will help make the teams as equitable as possible. Evident fairness between teams enables us to keep teams consistent, and this gives time for effective patterns of collaboration to develop.

Integration with other courses

Three of the exercises in this course are designed to complement or support your work in Design, and work for the two courses may be reviewed together. However, only work assigned in the technology course will be graded in the technology course.

COURSE-SPECIFIC POLICIES

Attendance

There is no attendance requirement *per se*. However, there are in-class assessment components that reward attendance.

Absences

- Both in-class and out-of-class assignments involve teamwork and peer evaluation, so please discuss any absences with your team as well as with Emanuel, pre-emptively where possible.
- Where individual components of team work cannot reasonably be made up through individual work, and if legitimately missed and documented in a Student Declaration of Absence, the grading component may be dropped and the term grade pro-rated.

Late work

If you need to use a Student Declaration of Absence, submit it as a Brightspace assignment and notify the three TA's and Emanuel by email. If you run out of SDA's, if your situation is not covered

by SDA's, or if your difficulty concerns the last assignment of the term, please get in touch with Emanuel. Late work not discussed or declared may be penalized 5% per 24 hr. weekday and/or part thereof.

Plagiarism

- No plagiarism software is used in this class beyond ordinary search engines.
- It is expected that students will make creative use of architectural and technical precedent, and that sources will be credited (tinyurl.com/dal-arch-writing).

Lecture notes and recordings

- It is hoped that a team student volunteers will help record lectures for posting to Brightspace. Other recordings are discouraged.
- Lecture slides and/or notes will, as a rule, be posted to Brightspace.
- Some lectures will include handouts; some of these to be completed during the lecture and handed in at end of class.

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. If you have particular interests or issues you'd like to discuss, here's a link to our [EDI committee webpage](#).

Emanuel's own commitment

The institutionalized pursuit of architectural technology tends to reflect the assumptions of the industrialized world and the methods and biases of the Enlightenment. In addition to embracing a wider membership and serving more communities, our academy and profession might also try to learn from building cultures and subcultures outside their current range. Arch 3207 will take steps in this direction.

UNIVERSITY POLICIES AND RESOURCES

This outline is written in accordance with Dalhousie's [Syllabus Policy](#).

This course is governed by the academic rules and regulations set forth in the University Calendar and the Senate.

See the School's "Academic Regulations" page (tinyurl.com/dal-arch-regulations) for links to university policies and resources regarding:

- Academic Integrity
- Accessibility
- Code of student conduct
- Culture of respect
- Diversity and inclusion
- Student declaration of absence
- Recognition of Mi'kmaq territory
- Work safety
- Services available to students, including writing support
- Fair dealing guidelines (copyright)
- Dalhousie University Library

SCHEDULE OF TOPICS AND DELIVERABLES

Wk.	Day	Dates	Topic	Due and %
0	Mon	2-Sep	LABOUR DAY	
	Thurs	5-Sep	ORIENTATION	
1	Mon	9-Sep	INTRODUCTION - course, teams, drawing	
	Thurs	12-Sep	Lecture 1 - Masonry, Concrete, Earth	
2	Mon	16-Sep	<i>Lab i Stability and Span</i>	Lab - 6
	Thurs	19-Sep	Lecture 2 - Building with Wood	
3	Mon	23-Sep	QUIZ A MATERIALS & BEHAVIORS	Quiz - 8
	Thurs	26-Sep	Lecture 3 - Metals in Architecture	
4	Mon	30-Sep	TRUTH AND RECONCILIATION	
	Thurs	3-Oct	Lecture 4 - Structural Details	
5	Mon	7-Oct	<i>Lab ii Cantilever Brackets</i>	Lab - 6
	Thurs	10-Oct	Lecture 5 - Research in Materials and Methods	
6	Mon	14-Oct	THANKSGIVING	
	Tues	15-Oct	ELEMENTS REVIEW	Project -6
	Thurs	17-Oct	Lecture 6 - Building and Climate	
7	Mon	21-Oct	QUIZ B SUN, LIGHT, AND CLIMATE	Quiz - 8
	Thurs	24-Oct	Lecture 7 - Solar Geometry	
8	Mon	28-Oct	<i>Lab iii Armillary Sphere</i>	Lab - 6
	Thurs	31-Oct	Lecture 8 - Working with Light	
	Fri	1-Nov	CASE STUDY REVIEWS	Project -6
9	Mon	4-Nov	<i>Lab iv Richness of Light</i>	Lab - 6
	Thurs	7-Nov	Lecture 9 - The Forms of Life	
10	Mon	11-Nov	FALL BREAK	
	Thurs	14-Nov		
11	Mon	18-Nov	<i>Lab v Surface Geometry</i>	Lab - 6
	Thurs	21-Nov	Lecture 10 - Water in Architecture	
12	Mon	25-Nov	QUIZ C SUSTAINABILITY	Quiz - 8
	Thurs	28-Nov	Lecture 11 - Boundary and Interface	
13	Mon	2-Dec	<i>Lab vi Art and Logic of Enclosure</i>	Lab - 6
	WEDS	4-Dec	Exhibition and Review	
14	Mon	9-Dec	REVIEW WEEK	Project -6
	Thurs	12-Dec		