

University of Waterloo School of Architecture
Arch 671: Comprehensive Building Design
TECHNICAL REPORT
Fall 2019

Course instructor - John McMinn
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Class runs: Wednesday 9:30-11:30 Ward Room

COURSE DESCRIPTION

Students will investigate and report on technical issues as they relate to the development of the comprehensive building project in the parallel Design Studio. Innovation and integration in architectural design will be stressed, with respect to structure, building envelope, environmental systems, health and life safety, movement systems, site planning and the integration of information technology.

COURSE STRUCTURE

This course is planned as a support to the work of your design studio, with the intent to help you find the technical means to develop an architectural design that fascinates and inspires you. In addition, there are fundamentals about ways of putting buildings together that are important to understand and gain a mastery of, so lectures and seminars in the first phase of the course will cover these areas, with the aim of enabling your studio design project to be developed in detail with a comprehensive understanding and description as all aspects of your design, including the elements mentioned above: structure, building envelope, environmental systems, movements systems, as well as health and life safety, site planning and the integration of information technology. The Design Studio focuses on timber and masonry as primary materials of construction for the studio design proposal, and the Technical Report course will reflect this focus, with research on reference projects and their technical resolution via a seminar format in which students will research and present key precedent buildings and material assemblies, as a way of informing the Design Studio course work.

The term will be organized in two primary parts:

- A. involving lectures and seminars discussing inspirational architecture and its technical development as well as building fundamentals.
 - B. involving the development of detailed technical report that includes detailed drawings of your design studio project as well as technical specification of materials and their assembly as a building ensemble.
- Also included in the Technical report, in conjunction with your studio course, will be an assessment of the approach to sustainable or green building systems, with a focus on passive environmental design, and including advanced systems particularly related to building envelope and mechanical systems. Determination of a green building design and assessment system will be discussed and utilized in conjunction with your technical report assignment.

SCHEDULE

Wk 1-2 Inspirational architecture and the technical means of its resolution

Wk 3-4 Building fundamentals

Wk 4-7 Lectures/seminar on materials and systems in support of the studio program

Wk 8-12 Workshops on technical development of your studio design project

EVALUATION

The grade assessed will be based on: Seminar presentations 10%, Technical Drawings (65%), Written Report (15%), Comprehensive Sustainable Building Evaluation (10%).

Grading in the report will be based on completeness and clarity of writing and adherence to the outline provided.

The building must be designed to meet a minimum LEED Gold or other equivalent standards. Additional grade points are possible for meeting a higher assessment standard - Ex. LEED Platinum. If using LEED, the LEED spreadsheet MUST include a short PARAGRAPH for each credit explaining why you did or did not claim this credit. No calculations are necessary, just a good explanation.

[Link](#) to the base document for the written portion of the submission.

[Link](#) to the LEED excel spreadsheet - using the LEED V4 system.

[Link](#) to the LEED V4 Reference Guide

Access to other assessment systems and their support documentation will be available as required.

Seminars – Student presentations (10% - both seminars) Max presentation time 10 minutes.

SEMINAR 1 - Week 2

Working in pairs, students will research and present a minimum of two inspirational projects, one whose primary materials are made with timber, and another whose primary materials are masonry.

Project may be either contemporary (21st century) or modern (20th century) architecture, or they may be historical architecture.

SEMINAR 2 – Week 4

Working in pairs, students will research and present a minimum of two technical reference reports choosing from various forms of modern (20th century) or contemporary (21st century) material system assemblies, focused on timber and masonry construction techniques.

You will be provided a template format to fit your presentation to, conforming to an 8.5x11 paper size landscape format. Presentations will take place both as digital slide presentation and as hard copy 8.5x11 hand-ins to be assembled into a reference book format to be used in class, and together with sample technical drawings from your technical report assignment as a take away course book, assembled at the end of the term.

For the drawing breakdown: (65% total)

Structure 10%

Skins/Envelope Design 10%

Energy Efficient Design Strategies 10%

Environmental Systems and Services: HVAC, Acoustics, Lighting 10%

Life Safety & Barrier Free Design 10%

Environmental Site strategies 5%

Presentation quality 10%

It is assumed that you will be using the same basic set of drawings to submit to Arch 691 Design Studio. The information required for the Technical Report component should be layered on the studio submission materials. It will be critically important that your basic design strategies for the studio project support the technical strategies.

Due Date: to be determined. Submitted on LEARN.

Late Penalties:

Projects or assignments submitted after the due date or due time will be penalized 5% per calendar day of lateness, with no maximum.

Sample Report:

Copies of past students' Technical Reports are provided for you to look at in order to understand the nature of the expectations of the submission.

Do NOT copy the detailing as it is likely to be quite different from what you are using given the change in building type: [copy of a Technical Report](#) , [Sample 2](#) , [Sample 3](#) , [Sample 4](#) .

RECOMMENDED REFERENCES:

In addition to the texts used for your Structures and Building Science classes last term and this term: CMHC Best Practice Design Guides.

Wood Frame	link
BC (Humid Climate!) Wood Frame	link
Precast	link
Curtain Wall	link
EIFS	link
Brick - Steel Stud Backup	link
Brick - Concrete Block Backup	link
Healthy High Rise	link
Fire and Sound Design	link
Flashing	link
Bakor - Air Barriers	link

The National or Ontario Building Code.

Allen, Edward. Architect's Studio Companion.

Allen, Edward. Fundamentals of Building Construction: Materials and Methods.

Allen, Edward. How Buildings Work. Oxford University Press, New York, 1995. ISBN 0-19-509100-0. A comprehensive general book with an appropriate title. Includes all aspects.

Salvadori, Mario. Why Buildings Stand Up. WW Norton & Co, 1994, ISBN 0393306763. A must for the architect who wishes an overview of systems, shapes and materials used for building structures.

Gordon, J.E. Structures: Or Why Things Don't Fall Down. Penguin Books, 1978. An interesting, informative, and still remarkably technical read. This book is more materials based and slightly more technical than Salvadori's.

Brand, Stewart. How Buildings Learn. A very influential book that thoroughly describes the life cycle of buildings in a case study approach. Excellent review of how building professions are not doing their jobs.

Stein, Benjamin and John Reynolds. Mechanical and Electrical Equipment for Buildings. John Wiley & Sons.

Lechner, Norbert. Heating, Cooling, Lighting. John Wiley & Sons, Toronto.

Brown, G.Z. Sun Wind and Light. Very good book on environmental design. Lots of info on daylighting.

ACADEMIC INTEGRITY AND AVOIDANCE OF ACADEMIC OFFENSES

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check www.uwaterloo.ca/academicintegrity/ for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity [check www.uwaterloo.ca/academicintegrity/] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, www.adm.uwaterloo.ca/infosec/Policies/policy71.htm. For typical penalties check Guidelines for the Assessment of Penalties, www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

Appeals: A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.

Note for Students with Disabilities: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term. Once registered with OPD, please meet with the professor, in confidence, during my office hours to discuss your needs.