

ARCH 362: Structures for Large Buildings

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Class: Tuesdays, 9:00 am
Tutorials: Wednesdays, 7:00 pm

This course is intended to advance the student's understanding of large building structures, including how a building's structure behaves under various loading conditions, the composition of various common, as well as unique, structural systems, and the various considerations that play a role in determining an appropriate structural solution.

Topics Covered (not necessarily in this order)

1. Design: the design process and the role of the structural engineer, Limits States Design—strength versus serviceability, design codes and standards, loads on structures, tributary area concepts
2. Materials
 - a. Properties of Reinforced Concrete: Historical perspective, properties of cement, composition of concrete, additives, strength, creep and shrinkage, reinforcement, concrete design overview, masonry
 - b. Structural Steel: Historical perspective, properties and behaviour, steel design overview
 - c. Timber: brief recap of ARCH 276
 - d. Etc.
3. Form and forces, load paths
4. Structural systems
 - a. Gravity framing systems: materials and types of systems, appropriateness of application (including architectural/mechanical/electrical considerations and their effects on structural behaviour)
 - b. Lateral load-resisting systems
 - c. Tall Buildings
 - d. Foundations: overview of shallow and deep foundations
5. The role of failure in design; case studies

Textbook/References

No specific textbook is required for this course. Some course notes will be provided and all other material will be presented in class.

Suggested resources:

The Architect's Studio Companion: Rules of Thumb for Preliminary Design by Edward Allen and Joseph Iano, 2011

Form and Forces by Edward Allen, Wacław Zalewski, 2010

Building Structures Illustrated: Patterns, Systems, and Design by Francis D. K. Ching, Barry S. Onoué, Douglas Zuberbühler, 2008

Understanding Steel Design, An Architectural Design Manual by Terri Meyer Boake, 2011

Simplified Engineering for Architects and Builders by James Ambrose and Patrick Tripeny, 2010

Course Evaluation

Minor Assignments*: 15%

Major Assignments:

1. Building Structure Case Study: 10%
(Groups; done in conjunction with ARCH 392)
2. Studio project structure schematic design: 10%
(Done in conjunction with ARCH 392)

Mid-term exam (week of February 9th): 30%

Final Exam (date & time: TBD): 35%

*Minor assignments: A number of assignments will be assigned in class over the course of the term. They will normally be due the following class or tutorial, though this may vary depending upon the material covered and the scope of the assignment, along with consideration of due dates for other courses.

Late work: Assignments submitted late but within two days of the due date will receive half marks. Assignments submitted after that will be reviewed but the student will not receive any marks for it.

The Fine Print

Academic Integrity: 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/academic-integrity/ 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/academic-integrity/] 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.

Turnitin.com: Plagiarism detection software (Turnitin) will not be used to screen assignments in this course. The only work from which one could plagiarize for this course is your classmates', and that's just not a good idea. If identical assignments are submitted, they will be marked together and stapled together, with the resulting mark split between the offending students.