

Structures for Architects II

COURSE OUTLINE

EVDA 619 H(3-0)

Winter 2012

Course Hours and Location:	Tuesday	12:30 - 1:50 (Room 2160)
	Friday	12:30 - 1:50 (Room 2160)

Course Manager and Instructor:	Geoff Kallweit	338-5863 gkallwei@ucalgary.ca
Teaching Assistant	Wayne Schaap	wpschaap@shaw.ca

Introduction

The purpose of this course is to present the basic principles of structural behaviour, emphasize the fundamental prerequisites for structural adequacy, and develop an understanding of rudimentary analysis and design procedures. A working understanding of structural analysis and design will be built on the qualitative understanding developed in Structures I and augmented through integration into students' comprehensive studio projects. Students are expected to gain a basic understanding of the technical design process as well as develop a more advanced intuitive sense for structural adequacy.

Objectives

1. To learn about structures and the physical principles that govern their behaviour.
2. To establish an understanding of how loads flow through a structure and the fundamental means of supporting them.
3. To develop quantitative analysis and design procedures for basic structural elements.
4. To develop a vocabulary for communicating and understanding the structural elements frequently used in architectural design.

Teaching Methodology

This course is divided into two major portions: the first half will include lectures and assignments intended to develop the technical skills used in conceptualizing and sizing structural systems, the second half will focus on the integration of structure into the architectural design concept and on structural system concerns. Material will be presented through lectures, discussions, assignments, and critiques. As site visits are considered to be an essential component of the course, **attendance at site visits is mandatory**.

Presentations and discussions regarding students' comprehensive design studio projects are encouraged and will be used as practical demonstrations of course learning objectives.

Course Content

- 1 Structural Systems**
 - a. Recap of Structural Element Types
 - b. Recap of System Characteristics
 - c. Discussion of Failure Modes

- 2 Structural Analysis**
 - a. Forces and Loads
 - b. Statics
 - c. Internal Stress Diagrams
 - d. Load Path Determination

- 3 Structural Design**
 - a. Beam Design
 - b. Column Design

- 4 Structural Integration**
 - a. Primary, Secondary, Tertiary, etc. Structure
 - b. Integration into Architectural Designs

Evaluation

The course evaluation will be based on the assignments completed during the term. There will be no final examination. Assignments will be judged upon:

- Accuracy of solutions.
- Responsiveness and relevance to specifics of assignment.
- Clarity of physical and textual presentation.
- Clarity of analysis.
- Quality of integration of structural system within design (assignments 6&7).
- Overall quality of work.

Note: A passing grade in assignments 6 & 7 is required in order to pass the course as a whole.

Course assignments will be weighted as follows:

Assignment	Topic	Percent of Total Grade
1	Bridge Design	10
2	Statics	10
3	Shear and Moment	10
4	Beam Sizing	10
5	Column Sizing	10
6	Primary System Design	25
7	Design Integration	25
	TOTAL	100

Grading Scheme

A+	90-100%	C+	66-69%
A	85-89%	C	63-65%
A-	80-84%	C-	60-62%
B+	76-79%	D+	56-59%
B	73-75%	D	50-55%
B-	70-72%	F	0-49%

Required Reading (to be available in the UofC Bookstore)

Ambrose, Janes; Tripeny, Patrick	<u>Simplified Engineering for Architects and Builders</u> Wiley, 2010 (11 th Edition), ISBN: 9780470436271
Millais, Malcolm	<u>Building Structures: From Concepts to Design</u> Spon Press, Taylor & Francis Group: 2005, ISBN: 0415336236

Recommended Reading

Ching, Francis D.K.	<u>Buiding Structures Illustrated</u> Wiley Trade Publishing, 2009, ISBN: 9780470187852
Salvadori, Mario	<u>Why Buildings Stand Up</u> W. W. Norton, 2002, ISBN: 0393306763
Gordon, J.E.	<u>Structures, or Why Things Don't Fall Down</u> Penguin Books, 1991, ISBN: 0140136282

Notes

1. Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor.

2. It is the student's responsibility to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 403-220-8237 (<http://www.ucalgary.ca/drc/node/46>).

Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.

3. Plagiarism - 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 (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),(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. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.

4. Information regarding the Freedom of Information and Protection of Privacy Act and how this impacts the receipt and delivery of course material (<http://www.ucalgary.ca/secretariat/privacy>)

5. Emergency Evacuation/Assembly Points (<http://www.ucalgary.ca/emergencyplan/assemblypoints>)

EVDA 619 SCHEDULE - Winter 2012

Week	Date	Topic	Assignments Given	Assignments Due
1	T Jan 10	Recap of Elements and Systems	Assn 1, Assn 6, Assn 7	
	F Jan 13	Assignment Work		
2	T Jan 17	Forces and Loads, Statics	Assn 2	
	F Jan 20	Statics Cont.		
3	T Jan 24	Internal Stresses	Assn 3	Assn 2
	F Jan 27	Internal Stresses and Load Paths		
4	T Jan 31	Beam Design	Assn 4	Assn 3
	F Feb 3	Beam Design		
5	T Feb 7	Column Design	Assn 5	Assn 4
	F Feb 10	Column Design		
6	T Feb 14	Primary System Choices		Assn 5
	F Feb 17	Bridge Breaking Day		
Feb 19-26 Reading Week, No Classes				
7	T Feb 28	Structural Robustness and Efficiency		
	F Mar 2	Desk Crits		Assn 1
8	T Mar 6	Desk Crits		
	F Mar 9	Site Tour (TBD)		
9	T Mar 13	Presentations and Discussion		Assn 6
	F Mar 16	Presentations and Discussion		
10	T Mar 20	Assignment Work		
	F Mar 23	Synopsis		
11	T Mar 27	Desk Crits		
	F Mar 30	Desk Crits		
12	T Apr 3	Desk Crits		
F Apr 6 Good Friday, No Lecture				
13	T Apr 10	Desk Crits		Assn 7
	F Apr 13	Desk Crits		
Apr 16-20 Final Studio Reviews				
Note: All assignments are due at the end of class and must be handed in at that time. Late assignments will be penalized at -5% / 24 hours.				