

Russell Richman
Teaching Portfolio

December 2007

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1. Teaching Specialization

I specialize in the area of building science with a passionate focus on sustainable engineering systems. This includes:

- fundamental building science concepts
- energy efficiency
- passive heating/cooling techniques
- policy analysis
- durability
- sustainable performance

Since building science is a catch-all subject with implications across a broad professional spectrum, there exists great potential for interdisciplinary communication. Areas that interest me include:

- environmental engineering
- mechanical engineering
- environmental science
- sociology
- policy

Teaching Expertise

Building Science

Introductory Building Science
Advanced Building Science
Sustainable Engineering
Glazing Systems
Cladding and Roofing Design

Other Subjects

Environmental Engineering
Construction Management
Solar Engineering
Introductory Structures,
Materials and Design

2. Teaching Philosophy and Assumptions

My primary assumption about learning is that everyone has the capacity to learn about any subject they desire. I believe the depth of learning depends on several factors.

- *Desire*

I use the word ‘desire’ in my primary assumption. Depending on its context, it can mean ‘need’ all the way to ‘longing’ – these are two opposite ends of the spectrum. No matter what the situation is, a student needs to feel some type of desire to learn the material s/he is studying. Whether it’s the more practical reason of “just having to pass” or the romantic notion of “being passionate about the area of study”, the teacher’s role is to recognize the desire and harness it to facilitate the optimal learning experience between student and teacher.

- *Confidence*

People are fragile when first learning a topic. At this point, the potential exists to form a mental block on the subject or a life-long passion. Confidence is built in a nurturing environment where negative stress and illusory expectations do not exist. Confidence is based on positive experiences. An engineering analogy is the concept of strings in a cable. Like building a cable, at the start only a single string exists and the cable is weak. As you add more strings the cable gets stronger and can easily accommodate failed strings (negative experiences).

- *The Subject*

I believe everything in life, even the most difficult subjects, comprise a number of simple steps. The role of the teacher is to recognize this and deconstruct the question into digestible fragments. Each student has their own level of understanding to which the complexity of the fragments must reflect. When cutting down a tree, it’s simple when you have the correct tools. But if all you have is your simple set of hands, then you may have to take down the tree one branch at a time. The teacher’s role is to identify what level of understanding the student requires when deconstructing the problem.

- *Learning*

No two people learn in the same manner. We are a diverse population and each one of us is our own unique selves. In line with this thinking I believe that people learn differently from each other. For a teacher to follow a single teaching style is professionally irresponsible. It would be similar to an ice cream parlour only serving strawberry ice cream. Both ventures will fail. I see the teacher's role is to deliver the content in several different styles that will capture a broad spectrum of learning styles.

3. Teaching Experience

Location	Courses	Comment
North Toronto Collegiate Institute (1993 – 1995)	Math (Grade 9 though 12)	I was a tutor to struggling and exceptional math students.
University of Toronto Department of Civil Engineering (1997 – now)	CIV 255 Surveying	I was a lead teaching assistant responsible for tutorial lecturing and field exercises. I designed the lectures and assisted with field exercise design.
	CIV 320 Introduction to Construction Management	I was a TA in this course. I developed and taught isolated lectures in this course.
	CIV 420 Construction Management	I was a TA in this course. I developed and taught several lectures in this course.
	CIV 575 Building Science	I was the lead TA for this course. I developed tutorials.
	CIV 1282 Case Studies in Building Science	I was a TA in this graduate course.
University of Toronto Department of Civil Engineering (2000 – now)	CIV358 Survey Camp	I have been a co-instructor and have designed and delivered a third of the course.
University of Toronto DaVinci Engineering Enrichment Program (2003-2005)	Building Science	I designed and developed this course. The course was taught to enriched grade 9 and 10 students.
	Bicycle Choppers	I designed and developed this course. The course was taught to enriched grade 11 and 12 students.
University of Toronto Faculty of Applied Science and Engineering (2004, 2006)	CIV101 Structures, Materials and Design	I was the instructor for a 100 person section of this first year introductory statics course. I designed and delivered lectures and tutorials.
University of Toronto Professional Development Centre (2004 – now)	Building Science II	I designed aspects of this course and developed its pedagogy. The course teaches building science fundamentals to practicing professionals continuing their professional education.
University of Toronto Department of Civil Engineering	CIV425Y – Design Project	I am one of six professors delivering a full-year design studio to approximately 10-15 fourth year students. I am responsible for creating the design project and mentoring my students.

4. Appraisals of Teaching

Evaluations and Comments

Evaluations from CIV101F (2004) as an Instructor

- My ratings were above Faculty and Departmental averages for every question specifically related to my teaching abilities.

Evaluations and comments from CIV575F (2004) as a TA

Letters

One unsolicited letter from a student.

Two solicited letters from students I have taught and mentored.

CONFIDENTIAL	<h2 style="margin: 0;">INSTRUCTOR COURSE REPORT</h2> <p style="margin: 0;">Department: FIRST YEAR ENGINEERING COURSES</p> <p style="margin: 0;">Course Name: 20049/civ101 Section: LEC0103</p> <p style="margin: 0;">Course Description: STRUCT.MAT.& DESIGN</p> <p style="margin: 0;">Instructor: Richman, Russell</p>	February 18, 2005																														
<p>Percentage of lectures attended:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"></td> <td style="width: 15%; text-align: center;"><50%</td> <td style="width: 15%; text-align: center;">50-70%</td> <td style="width: 15%; text-align: center;">70-90%</td> <td style="width: 15%; text-align: center;">>90%</td> </tr> <tr> <td style="padding: 5px;">Class Enrollment:</td> <td style="text-align: center;">74</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">Number Of Responses:</td> <td style="text-align: center;">44</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">%Responses:</td> <td style="text-align: center;">59</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">Department%:</td> <td style="text-align: center;">58</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">Faculty%:</td> <td style="text-align: center;">56</td> <td></td> <td></td> <td></td> </tr> </table>				<50%	50-70%	70-90%	>90%	Class Enrollment:	74				Number Of Responses:	44				%Responses:	59				Department%:	58				Faculty%:	56			
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Number Of Responses:	44																															
%Responses:	59																															
Department%:	58																															
Faculty%:	56																															
<p>Status of this course for you:</p> <ul style="list-style-type: none"> core: 43 technical elective: 0 free elective: 0 humanities/ social science elective: 0 other: 1 <p>Your expected grade in this course:</p> <ul style="list-style-type: none"> <50%: 0 50-59%: 7 60-69%: 10 70-79%: 11 80-89%: 11 >=90%: 5 <p>Identify your gender (optional):</p> <p>male: 19 female: 21</p>	<p>Your level of enthusiasm for taking this course, at the time of initial registration:</p> <ul style="list-style-type: none"> very low: 1 low: 1 below average: 7 average: 18 above average: 9 high: 7 very high: 1 <p style="text-align: right; padding-right: 20px;"> <i>Instructor average: 4.32</i> <i>Department average: 4.53</i> <i>Faculty average: 4.40</i> </p> <p>Your level of enthusiasm now that you have completed the course:</p> <ul style="list-style-type: none"> very low: 1 low: 1 below average: 0 average: 14 above average: 14 high: 11 very high: 3 <p style="text-align: right; padding-right: 20px;"> <i>Instructor average: 4.91</i> <i>Department average: 4.33</i> <i>Faculty average: 4.30</i> </p>																															
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Considering your experience with the course, and disregarding your need for it to meet program or degree requirements, would you still have taken this course?</td> <td style="width: 10%; text-align: center;">Yes</td> <td style="width: 10%; text-align: center;">31</td> <td style="width: 10%; text-align: center;">No</td> <td style="width: 10%; text-align: center;">13</td> </tr> <tr> <td>Did the instructor introduce current elements of research and development in the material delivered?</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">35</td> <td style="text-align: center;">No</td> <td style="text-align: center;">9</td> </tr> </table>			Considering your experience with the course, and disregarding your need for it to meet program or degree requirements, would you still have taken this course?	Yes	31	No	13	Did the instructor introduce current elements of research and development in the material delivered?	Yes	35	No	9																				
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	NUMBER OF RESPONSES								AVERAGES				
	[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	Med.	Ins.	Dept.	Fac.	
6. The clear and explicit communication of the goals and requirements of the course was	0	0	0	2	3	8	20	11	6	5.80	5.10	4.94	
7. The use of methods of evaluation that appropriately reflect the subject matter and provide a fair evaluation of student learning was	0	0	0	0	1	10	22	11	6	5.98	4.92	4.83	
8. The presentation of the material in an organized, well planned manner was	0	0	0	1	1	8	15	19	6	6.14	5.14	4.98	
9. The instructor's apparent knowledge of the subject was	0	0	0	0	1	4	18	21	6	6.34	5.99	5.90	
10. The clarity of explanation of the subject matter was	0	1	0	0	3	8	18	14	6	5.89	4.96	4.86	
11. The use of examples and illustrations was	0	1	0	0	2	5	13	23	7	6.20	5.29	5.10	
12. The instructor's enthusiasm and interest in the course material was	0	0	0	0	0	5	15	24	7	6.43	5.74	5.67	
13. The attention to students' questions in the classroom and the clarity of the answers was	0	0	0	0	2	5	18	19	6	6.23	5.32	5.28	
14. The instructor's availability for individual consultation either by appointment or at stated hours was	6	2	0	1	4	10	10	11	6	5.47	5.21	5.16	
15. The commitment to ensure that student work was graded fairly with appropriate feedback was	1	0	0	1	2	10	16	14	6	5.93	5.12	4.96	
16. What is your overall rating of this instructor as a teacher	0	1	0	0	1	6	17	19	6	6.14	5.29	5.16	
17. Considering the calendar weighting, the workload is	0	0	0	0	11	25	4	4	5	5.02	4.75	4.63	
18. Compared to other courses at the same level, the level of difficulty of the material is	0	0	0	3	13	16	10	2	5	4.89	4.76	4.64	
19. Extent to which this course repeats material from other courses is	2	6	7	9	13	5	2	0	3	3.24	3.07	3.31	
20. If a specific textbook was recommended, the value of it was	0	3	3	10	14	11	0	3	4	3.89	4.38	4.19	
21. The value of the tutorial was	0	1	1	1	6	15	9	11	5	5.36	4.43	4.17	
22. The value of the laboratories was	39	0	0	1	2	1	0	1	4	4.60	4.07	4.37	
23. The value of the overall learning experience was	0	1	0	2	6	20	12	2	5	5.05	4.77	4.71	
24. The relevance of this course to your professional development is	2	4	2	3	10	12	4	7	5	4.52	4.94	4.95	
25. The intrinsic interest of the subject matter is	1	1	1	5	10	13	9	4	5	4.77	4.65	4.64	
Enter the average hours you spend weekly on this course in each of the following areas:													
<u>Lectures, Laboratories and Tutorials</u>													
1	2	3	4	5	6	7	8	9	10	11 - 15	16 - 20	More than 20	
0	4	6	7	21	2	2	0	0	1	0	1	0	
<u>Assignments</u>													
0	1	2	3	4	5	6	7	8	9	10	11 - 15	16 - 20	More than 20
2	3	5	16	6	4	1	1	2	0	3	0	1	0
<u>Home Study</u>													
0	1	2	3	4	5	6	7	8	9	10	11 - 15	16 - 20	More than 20
4	8	6	5	8	6	0	1	3	0	1	0	1	1

(0 - Don't Know/Not Applicable, 1 - Inadequate, 2 - Very Poor, 3 - Poor, 4 - Adequate, 5 - Good, 6 - Very Good, 7 - Outstanding)
 Course: 20049/civ101h1 Section: LEC0103 Course Description: STRUCT.MAT.& DESIGN Instructor: Russell Richman

Evaluations and Comments – CIV575F (2004)

Dear Professor The Office of the Registrar has compiled student evaluations of the Teaching Assistants for your course submitted via CCNET. Responses are ordered by TA's name (as typed by students) and are displayed below. Ranking of TA is in the range from 0 to 7, with 7 being 'outstanding'. Each response includes student's lecture/tutorial/practical section as recorded on CCNet. Comments provided by students are unedited and displayed as is. Attached to this email is a '.csv' file containing the raw evaluation data, in case you would like to analyze it yourself. Please let us know if you have any questions or comments. Thank you very much, Office of the Registrar

CIV575H1 - BUILDING SCIENCE Course Co-Ordinator: Professor Pressnail, Kim

Email: pressna@civ.utoronto.ca

TA Name: Russ Richman Rating: 7 Evaluated By: LEC0101 TUT0101 Very helpful, clear explanations and friendly attitude. Overall, job well done :)

TA Name: both of them Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 7 Evaluated By: LEC0101 TUT0101

TA Name: richman Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 7 Evaluated By: LEC0101 TUT0101 good solutions, easy to talk to, all good things

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 6 Evaluated By: LEC0101 TUT0101 he was helpful with questions and knew the material very well

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101 Eat apple on each tutorial session. Making the suffering people jealous.

TA Name: russ Rating: 6 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 6 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 6 Evaluated By: LEC0101 TUT0101 He has been very helpful!

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101 Very knowledgeable, however not very clear.

TA Name: Russ Rating: 1 Evaluated By: LEC0101 TUT0101 too many mistakes due to carelessness in assignment solutions, the posted solutions are too sloppy and not easy to read. All this shows a non-responsible and non-professional work.

TA Name: russ Rating: 4 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 7 Evaluated By: LEC0101 TUT0101 Good

TA. Very knowledgeable.

TA Name: Russ Richman Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 4 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 6 Evaluated By: LEC0101 TUT0101 very helpful in answering questions

TA Name: Russ Richman Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 7 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russ Richman Rating: 7 Evaluated By: LEC0101 TUT0101

TA Name: Russel Rating: 7 Evaluated By: LEC0101 TUT0101

TA Name: Russel Richman Rating: 6 Evaluated By: LEC0101 TUT0101 Very helpful

TA Name: Russel Richman Rating: 5 Evaluated By: LEC0101 TUT0101

TA Name: Russell Rating: 5 Evaluated By: LEC0101

Letters – Unsolicited Letter from a Student

Robyn Waher
6095 Eldorado Ave
Niagara Falls ON
L2H 1S5

University of Toronto
Civil Engineering Department
35 St. George Street
Toronto ON
M5S 1A4

September 7, 2005

To Whom It May Concern:

My name is Robyn Waher and I am entering my third year of Civil Engineering at University of Toronto. As part of our degree requirements, we must attend a Surveying Camp during the summer. I completed this credit this past summer, in August 2005.

The reason for this letter is because I was thoroughly impressed, in particular, with one instructor's teaching methods and abilities at this camp. I normally do not do this sort of thing, but even I realized that his skills should be warranted and brought to someone's attention. This instructor deserves recognition because he made camp that much more interesting and bearable.

The instructor I am speaking of is Russell Richman; at camp we were to refer to him as Russ. Even with a simple gesture like that, a student can feel more familiar with his/her instructor because it seems as though you are on the same level as him. Russ' responsibilities were precise leveling, strata, floor plan layout and GPS. He tackled these tasks with great enthusiasm and thorough knowledge. Russ was able to communicate the goals and rules very clearly to all of the students. After all, surveying was ENTIRELY new for most of us. So any type of clarity is much appreciated and preferred because we were inclined to be confused by the process. Throughout the exercises, he was always present and attentive to answer questions and support our efforts.

I believe the most impressive aspect of his involvement at the camp was his attitude. Russ made our lessons fun and easy-going, but he also kept it in balance with authority and respect as well. It is an interesting characteristic to observe in an instructor because he had an excellent grasp for what it takes to be personable, yet respectable.

Camp is a very interesting environment because some students thrive and some do not. Students are away from home for 2 weeks and they are doing field work. Just being at a place like this could make you feel very lonely, unsure or even homesick. Russ was able to make the students feel at home and comfortable, which is by far the most important part of being an instructor in that sort of setting.

As you can tell, I was very impressed by Russ' abilities and personality at the camp. Because of him and the other instructors, it was a camp that I enjoyed so much! Some of my fellow students and I are planning to return next summer to build a class monument in commemoration of our enjoyable time.

Nothing needs to be done regarding this letter, it was only to let someone know of Russ' fine work as an instructor at survey camp.

Thank you for your time.

Very Sincerely,

Robyn Waher

Letters – Solicited Letter from a Student

May 11, 2006

To whom it may concern:

I am an undergraduate student at the University of Toronto in the Department of Civil Engineering and have just completed my second year of study. I have known Russell Richman since he was my instructor for Structures, Materials and Design in the Fall term of 2004.

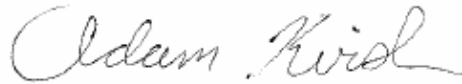
Mr. Richman was an excellent instructor whose enthusiasm for the material helped to make the course more interesting and enjoyable. He was always careful to ensure that his students fully understood the concepts presented in class. Whenever I had a question about the material covered, I always found him to be very accessible. Mr. Richman consistently found time to help me, even when I approached him outside of regular office hours. He cheerfully went over the material until I was completely satisfied that I understood the concepts. After spending two years in this department, and having worked with many of the professors, I feel that I can honestly say Mr. Richman is one of the best instructors in the Department of Civil Engineering. All of the students I have talked with agree.

I have also had the privilege of working with Mr. Richman over the past two summers as a research assistant. Mr. Richman is passionate about his work and his enthusiasm is contagious. He has helped to make the past two summers a very rewarding experience for me. I have learned a great deal from him, and have enjoyed working with him.

I would recommend Mr. Richman for any job for which he may apply. I firmly believe that he would be an asset to any organization.

Should you have any questions or wish to discuss this matter with me, please feel free to call me in the evening at (905) 822-3963.

Yours truly,



Adam Kirsh
Undergraduate Student
Department of Civil Engineering
Faculty of Applied Sciences and Engineering, University of Toronto

Letters – Solicited Letter from a Student

Christian Cianfrone
Dept of Civil Engineering
University of Toronto
Galbraith Building, Rm 105
35 St George St, M5S 1A4

To Whom It May Concern:

I am writing this letter to endorse Russell Richman, my past teaching assistant and current mentor. I was referred to Russ after inquiring about graduate students in the field of sustainable buildings. This occurred shortly after arriving at the University of Toronto for my Masters of Engineering degree in the Department of Mechanical Engineering. Russ responded to my email requesting a casual meeting, and after listening to my interests, we agreed that I would be best suited in the Department of Civil Engineering in the Sustainable Buildings Group. Russ actively assisted me in the entire process that entailed switching departments, changing my degree to a Masters of Applied Science and guiding me to winning an NSERC scholarship.

During my first semester as a graduate student, Russ was my teaching assistant for CIV575-Building Science. In the classroom and during office hours, Russ not only showed his command of the material, but also his ability to facilitate the understanding of the subject matter and the applicability of it in the real world. Working in the same office as Russ and watching him deal with his current students as Professor of the first year CIV101 course, I am able to witness his teaching ability and unique method of student interaction, which is a testament to his extensive teaching experience. As a new teaching assistant, I often find myself using the same tactics and methods that Russ exemplifies when dealing with my own students. I believe that Russ has adopted a teaching style that balances the act of delivering information and withholding direct answers in such a way that helps students come to conclusions on their own and thus grasping the information by understanding it and not just memorizing it.

It has almost been a year since Russ and I have been working in the same office together. My thesis work is in the same field as Russ' and over the years he has paved the way for several resources and methods that make my work possible. In this respect he acts as my mentor, guiding me through the necessary steps to ensure diligent and accurate research. Russ has also been my primary filter in proofreading, editing and restructuring all my applications, research proposals and conference submissions. His experience provides the necessary support required in achieving my research and career goals.

Russ has introduced to me to the field of Building Science and helped me discover my place in academia. His role as my teacher and mentor has created a positive environment to learn and work in, and has motivated me to continue in academia beyond my initial aspirations. Russ always carries himself in a professional manner, while maintaining an approachable persona to appeal to all audiences, which would make him a great teacher at any level. I hope this letter has provided insight into Russ's qualifications for the position.

Sincerely,

Christian Cianfrone
B.S., Mechanical Engineering, Cornell University
M.A.Sc. Candidate, Civil Engineering, University of Toronto
416-500-2179

5. Teaching Materials

In-class Materials

The following four pages outline three assignments I created for the following courses:

1. CIV101 (2004) as the Instructor
2. CIV575 (2005) as the head TA
3. CIV420 (2003) as the TA

The next fourteen pages outline a major project I created for the following course:

1. CIV425 (2007/2008) as the Instructor

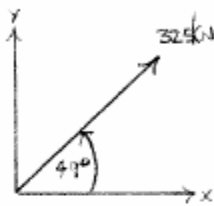
CIV101F STRUCTURES, MATERIALS AND DESIGN (SECTION E)
Tutorial Problem Set # 1

Assigned: 9-14-2006

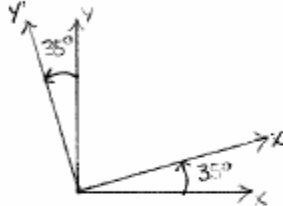
Due: 9-20-2006, 10:10 a.m.

1. Determine the components of the 325 kN force with respect to:

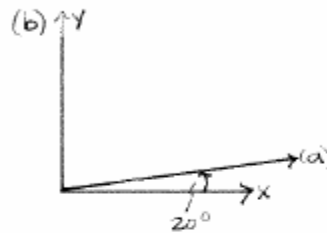
a) (x, y) axes



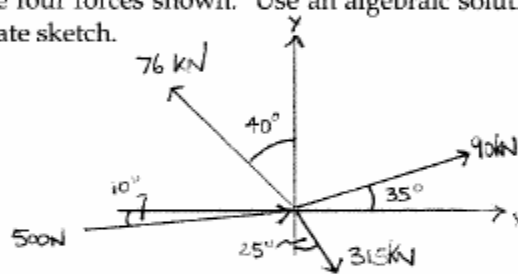
b) (x', y') axes



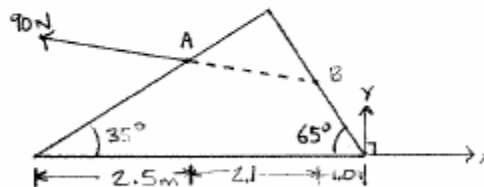
c) (a, b) axes



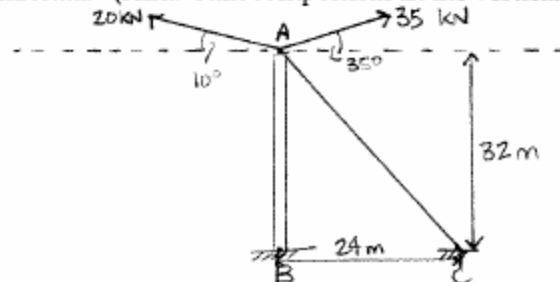
2. Determine the resultant of the four forces shown. Use an algebraic solution. Show the resultant on a separate sketch.



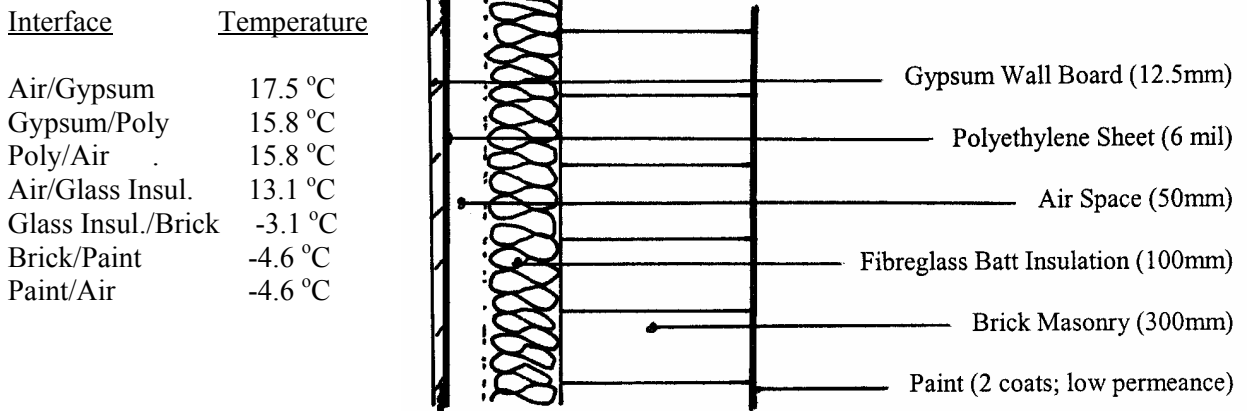
3. A line between points A and B gives the direction of the 90 N force. Determine the x and y components of the force.



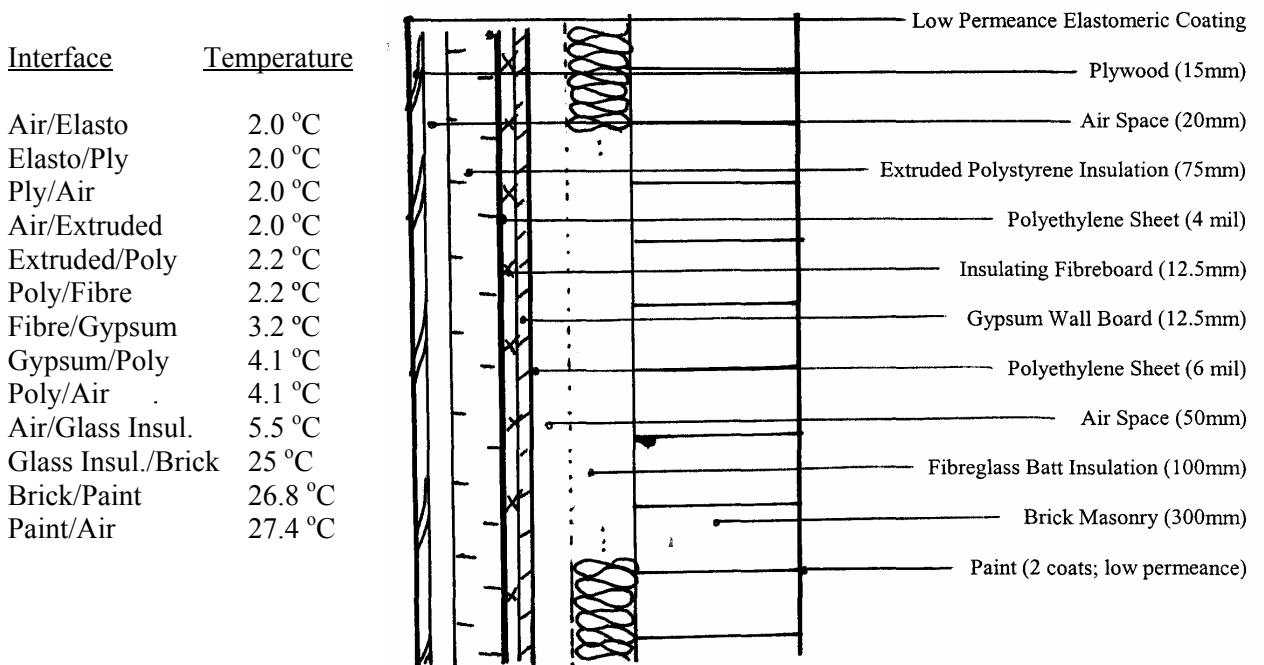
4. Two cables, which have known tensions, are attached to the top of pylon AB. A third cable AC is used as a guy wire. Determine the tension in AC, knowing the resultant of the forces exerted at A by the three cables must be horizontal. (Hint: sum components in the vertical direction.)



- 1a) A local independent grocery store recently purchased a building with a typical exterior wall assembly as shown below. Calculate and plot the relative humidity profile through the wall in February if the average indoor and outdoor conditions are respectively: 19°C, 50% R.H. and -5°C, 85% R.H. Comment on the effectiveness of the wall assembly in these conditions.



- 1b) An area of the store contains a walk-in fridge along an exterior corner. An investigation of the fridge exterior walls revealed the assembly shown below. It seems that someone installed an additional 'fridge wall' over the original exterior wall assembly. Moreover, the air barrier in this assembly seemed to be the inboard polyethylene sheet (at the extruded insulation) and the fridge was generally pressurized with respect to the exterior. Calculate and plot the relative humidity profile through the wall in August if the average indoor (fridge) and outdoor conditions are: 2 °C, 30% R.H. and 28 °C, 80%. Will there be a problem with this assembly in the summer months?



CIV 575 Building Science

Tutorial # 6

Fall, 2005

- 1c) As expected (and calculated!), the area between the extruded polystyrene insulation and brick masonry was wet. Given the information from this question and what you've learned in CIV575 up to now, briefly summarize your 'best practice' solution to be presented to the owners of the store. Keep in mind that the repair budget is slim as they are competing with a Loblaws down the road.

CIV420 Construction Engineering

Assignment #3
Assigned 03/10/31
Due 03/11/14

Group Members:

You and your partner were selected as the General Contractor on a job in a small northern Ontario town with limited transportation access. The town has a small population and limited construction supply outlets.

A considerable amount of formwork (i.e. gang forms) is required to complete the job. You have become aware of another Contractor completing a separate project in town. They are willing to sell you all their available lumber at a good price; you accept and purchase the following lumber:

- $\frac{3}{4}$ " douglas fir plywood (7 plies);
- 4" X 4" X 12' SPF (No. 2 grade), and
- 4" X 6" X 10' SPF (No. 1 grade).

After careful consideration, you decide that gang forms for a wall height of 2.8m and a form length of 4.0m require to be built. The concrete temperature is assumed to be 20°C. Design the formwork (using equations), using the above available lumber, for a concrete placement of 2.0 m/h using a crane and bucket placement technique.

In addition, you may have the opportunity to pump the concrete on this job. Due to this, you estimate concrete placement to be increased to 3.5 m/h. Design the formwork for this condition using equations. Explain how this change effects your estimate?

Please show a sketch (using a straight-edge) of one of the formwork designs (plan and elevation views).

If the weather was cooler than expected when you designed the formwork, how could you compensate for the likely concrete temperature decrease?

State all assumptions during your analysis.

Dear Student,

Re: Design Project

As you know, this term you will be responsible for the design and presentation of a term project.

The requirement for your project will be to design a building, capable of providing housing for 50 average families at a chosen site in Toronto, Canada. The objective of this project is to design your building toward the goal of net-zero impact – leaving no impact of your building on the biosphere.

The project will study both technical and social implications of your design. Depending on your specific interests, you will decide to what degree your final design addresses specific aspects of sustainable design.

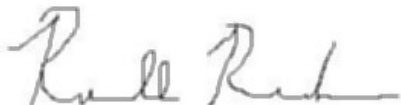
The pages contained in this package present the requirements and deliverables for your design. I have attempted to keep this project as open-ended as possible, however, given the fact that a tangible grade is required upon completion, some restraints have been introduced.

This project is intended to replace the traditional thesis within the department. As such, you should expect to work between 5 and 10 hours a week on your project until the end of term.

Please review the information contained herein carefully. I trust this is the information you require at this time. If you have any questions, you know how to reach me.

Good luck, have fun and learn along the way!

Regards,

A handwritten signature in cursive script, appearing to read "Russell Richman".

Russell Richman, M.A.Sc., P.Eng.
President
RRCL

Overview of Design Project - Requirements

Your building will be one of several similar buildings located in a City of Toronto net-zero community proposed to be constructed in Leaside, near Eglinton Avenue and Laird Avenue (map attached). The area shaded is the allowable development area proposed for your building.

Assumptions Common to All Projects

Based on only the following two assumptions, you will be required to submit a conceptual building design, outlining all systems, materials, dimensions, etc. to be continued on for a final detailed design.

1. Average family size is 3.0 persons per family¹.
2. Use 1975 required living area of 325 square feet per person².

Deliverables

The following is a list of deliverables associated with your design project. Each deliverable is outlined further in attached documentation with details on objectives, requirements and due dates.

1. Literature Review
2. Photographic Essay
3. Proposal
4. Final Design Project Report
5. Final Design Presentation
6. Final Design Poster

Global Marking Scheme

The following table provides a breakdown for contribution of each deliverable to your overall final mark for you design project.

<u>Description</u>	<u>Percentage</u>
Literature Review	5%
Photographic Essay	5%
Proposal	15%
Final Design Project Report	60%
Final Design Project Presentation	10%
Final Design Project Poster	<u>5%</u>

¹ <http://www40.statcan.ca/101/cst01/famil40.htm>

² http://www.hallidayhomes.ca/resource_docs/HH_BigIdeasSmallHomes_Paper_27-06-06_v3.pdf

CIV425Y DESIGN STUDIO – BUILDING SCIENCE & SUSTAINABLE BUILDINGS

Total

100%

Studio Work

Every second week I will meet with you on a one-on-one basis for approximately 15 minutes to discuss your progress and answer any questions. I expect you to have completed satisfactory levels of work for each meeting.

On weeks without meetings, you are expected to bring work related to your project to studio.

All rough work should be completed in a single, hard-cover laboratory style, notebook (or more, if required). You can purchase such a notebook at the book store. You will hand in your notebook(s) at the end of term for evaluation and supplementary analysis.

Your performance during studio work time, studio meetings and your notebook(s) will be the basis for this term's studio mark representing 9% of your final grade for this course.

Tentative Studio Schedule

Primary Meeting Time – Fridays 1-4 pm (Room TBD)

Secondary Meeting Time – Mondays 2-5 (Room TBD)

January 4	Design project intro
January 11	NO STUDIO (Conducted on Jan 4 th)
January 18	Studio meetings (literature review due)
January 25	Studio work time (photo essay due)
February 1	Studio meetings
February 8	Studio work time
February 15	(proposal due)
February 22	NO STUDIO – READING WEEK
February 29	Studio work time (leap year!) Proposal Presentations
March 7	Studio meetings
March 14	Studio work time
March 21	Studio meetings
March 28	Final report presentations
April 8	FINAL REPORT DUE – REPORT POSTER DUE

Literature Review

You are required to submit a literature review summarizing key literature that you find interesting and will aid in your final design. This process is necessary to get you started and heading in the correct direction.

Your literature review should include a minimum of 15 references from academic sources (journals, text books, educational web-sites). You are required to read pertinent portions of these references and comment on their applicability to your preliminary design approach.

A literature review generally summarizes the information contained in the literature with some general added information, thoughts and critical analysis contributed by the author of the review – you.

The literature review should be between 5 and 10 pages (not including reference page(s)), single spaced text, Times New Roman 12 point font, with 1 inch margins on all sides.

Remember, the objective of this document is to start your design process and show that some research has been completed. The literature review will be graded based on the following:

- Applicability of references
- Summary of key points in the literature
- Contribution(s) by you

If you have any additional questions, the internet and our library have some excellent resources discussing literature reviews and their content. I recommend the following websites as a start:

<http://www.utoronto.ca/writing/litrev.html>

http://www.unc.edu/depts/wcweb/handouts/literature_review.html

<http://library.ucsc.edu/ref/howto/literaturereview.html>

Photograph Essay

You are expected to visit site at least once and document the topography, obstructions, existing buildings, etc. through a photographic essay.

I have brought in two samples of excellent photographic essays appearing in an award winning Canadian magazine. In general, photographic essays attempt to present a story told through images often accompanied by text captions.

The purpose of your photographic essay is to visit the proposed site and get a feel for the obstacles and benefits that may act to affect your design. As such, it is recommended that you have some preliminary design ideas to use as criterion when examining the site.

The photographic essay should consist of 8 to 16 photos of the site. Each photo should include a caption explaining the picture and giving the reader an idea to its overall relevance in your essay. No more than a page of single spaced text, 12-point font Times New Roman, should be included at the beginning of the essay to outline the scope, importance and key findings of your essay. Although part of your mark for this essay will be based on it's professional layout and presentation, **you are not required to print colour photos**, as I understand every student does not have similar access to such facilities.

Remember, your photographic essay is telling a story about the proposed site. Your photographic essay will be graded using the following criteria:

- Relevance of the photos to this project
- Effect of conveying key site features
- Presentation and grammar

Proposal

You are required to submit a proposed design for your project. Your proposal will outline your global design for your building. At this point in the design project, you are expected to have completed your initial queries and review. Your proposed design should represent your final project completed to approximately 40% to 60%. As such, I expect all the major decisions, such as materials, size, form, orientation, major systems, etc. to have been researched and chosen based on order of magnitude analysis.

The intent of your proposal is to present your design and gain feedback from both me and a panel of industry experts. As such, your proposal will comprise two components: a written component submitted to me and a presentation given to a select panel of experts in the field of building science, sustainable buildings and construction.

Your final grade for the proposal portion will be equally split between the written component and presentation.

Written Component

Your written proposal will consist of a maximum of 10 pages, single spaced, Times New Roman 12-point font (not including title page and any appended data, if required). Your proposal will be graded based upon and should include the following:

- List of all materials
- List of major systems (HVAC, walls, roofing, windows)
- List of additional energy savings/efficient systems (such as wind turbines, waste water diversion, etc.)
- Building shape, form and orientation
- Chosen computer program to complete energy analysis (refer to Design Report)
- Justification of all choices presented above
- Your chosen detailed design aspects to be further analyzed and designed for your final project submittal

Presentation

You will present your global design in a 10-minute presentation, power-point format, to a panel of industry experts for critical review. A 5-minute question

CIV425Y DESIGN STUDIO – BUILDING SCIENCE & SUSTAINABLE BUILDINGS

Assigned: 1-4-2008

Due: 2-15-2008

period will follow your presentation in which you will be graded based on your responses.

The panel is interested in your global design and key aspects of your building. You should outline what you have done and why you have chosen it. Some detail may be presented, although it must be carefully placed and delivered so not as to bore your audience. Remember, they will be sitting through 3 hours of presentations. In addition to being professional and informative, your presentation should be entertaining in a way to captivate your audience and stimulate academic discussion following it's conclusion.

Final Design Project Report

Your report will present your final design in detail through inclusion of the following aspects that are listed below and described in greater detail in the following sub-sections:

- Design Summary (text component)
- Detailed Design
- Drawings
- Computer Energy Analysis
- Cost Comparison
- Course Feed Back

Design Report Marking Scheme

The following table provides a breakdown for contribution of each component to your overall final mark for you design project report.

<u>Description</u>	<u>Percentage</u>
Design Summary	40%
Detailed Design	20%
Drawings	10%
Computer Energy Analysis	20%
Cost Comparison	10%
Course Feed Back	<u>0%</u>
Total	100%

Design Summary (Text Component)

An imperative component of your final design project report is the design summary. In this summary, you will include a detailed description of the overall design (hint...working diligently on your proposal will reduce the required time spent on this portion of the summary). This description is focused on the global design of your building.

In your summary, you want to convey why specific decisions were made, using academic references and sample calculations, where applicable. Your summary should be a full-circle, with minimal holes or unexplained dead-ends. It is critical that you address each decision made and it's relative importance to the overall design.

Your summary should be no longer than 25 pages, single spaced, Times New Roman 12-point font, with 1-inch margins on all sides, including all figures, tables and pictures. This does not include the cover page or table of contents, etc. It must be stressed that you are not required to use all 25 pages. Some of the best dissertations in modern history have been completed in under 100 pages. Extraneous information used as filler will serve to reduce your final grade. Content should be included in a thoughtful, efficient manner.

Detailed Design Aspects

You are required to choose three aspects of your final design and continue to design these in detail. For example, the building envelope, roofing, waste water system, etc. As a minimum requirement, two of these aspects must be deemed technical and quantifiable. Your final list of aspects must be approved by me and be included in your proposal.

The detailed design of these components must be completed in it's entirety in the sense that a contractor should be able to take your information and construct, develop it. As such, your detailed design must be supported by calculations and/or assumptions and detailed analysis. Where applicable, detail drawings presenting your final design must be included.

Drawings

Your final design project must include, at a minimum, plan and elevation drawings showing building layout, geometry, orientation and major systems.

These drawings should be completed using a CAD type drawing program (such as AutoCAD) and in an architectural style. Final submission of these drawings should be in **half-size or 11"X17" format**.

Computer Energy Analysis

As part of your final report, you are required to complete a computer energy analysis of your building using an industry accepted software package such as eQUEST, Energy10, EnergyPLUS or any other approved by me.

Your analysis should present the energy consumption of your building in Toronto's climate or one similar. Your final value should be an energy usage per square meter of floor area in your building.

Any and all assumptions used in your analysis should be listed and verified.

Cost Comparison

You are required to research and calculate the relative increased cost of your design compared to a building of similar shape and form, using traditional materials and techniques.

Many references, such as Yardsticks or the Mean's guide can provide a square foot cost for a standard building type similar to your final design.

Your cost analysis is to calculate the incremental cost associated with your energy reducing and energy efficient design.

Once again, the final value should be a cost per square meter of floor area in your building.

Any and all assumptions used in your analysis should be listed and verified.

Course Feed Back

In a separate, sealed envelope, you will provide a one page summary of your experience in this course. In addition to any praise for this course (if any), I would appreciate you providing constructive criticism in which the course (as taught by me) can be improved.

You have my promise that I will not look at these pages until your final mark has been submitted to ROSI and cannot be altered (not that you have anything to worry about...just to ensure complete fairness for all).

Final Design Project Presentation

A twelve minute presentation of your final design in Power Point format will be given to your classmates and potentially additional university and industry members.

Your presentation should be informative, professional and outline the philosophy, merits and possible drawbacks associated with your design.

Final Design Project Poster

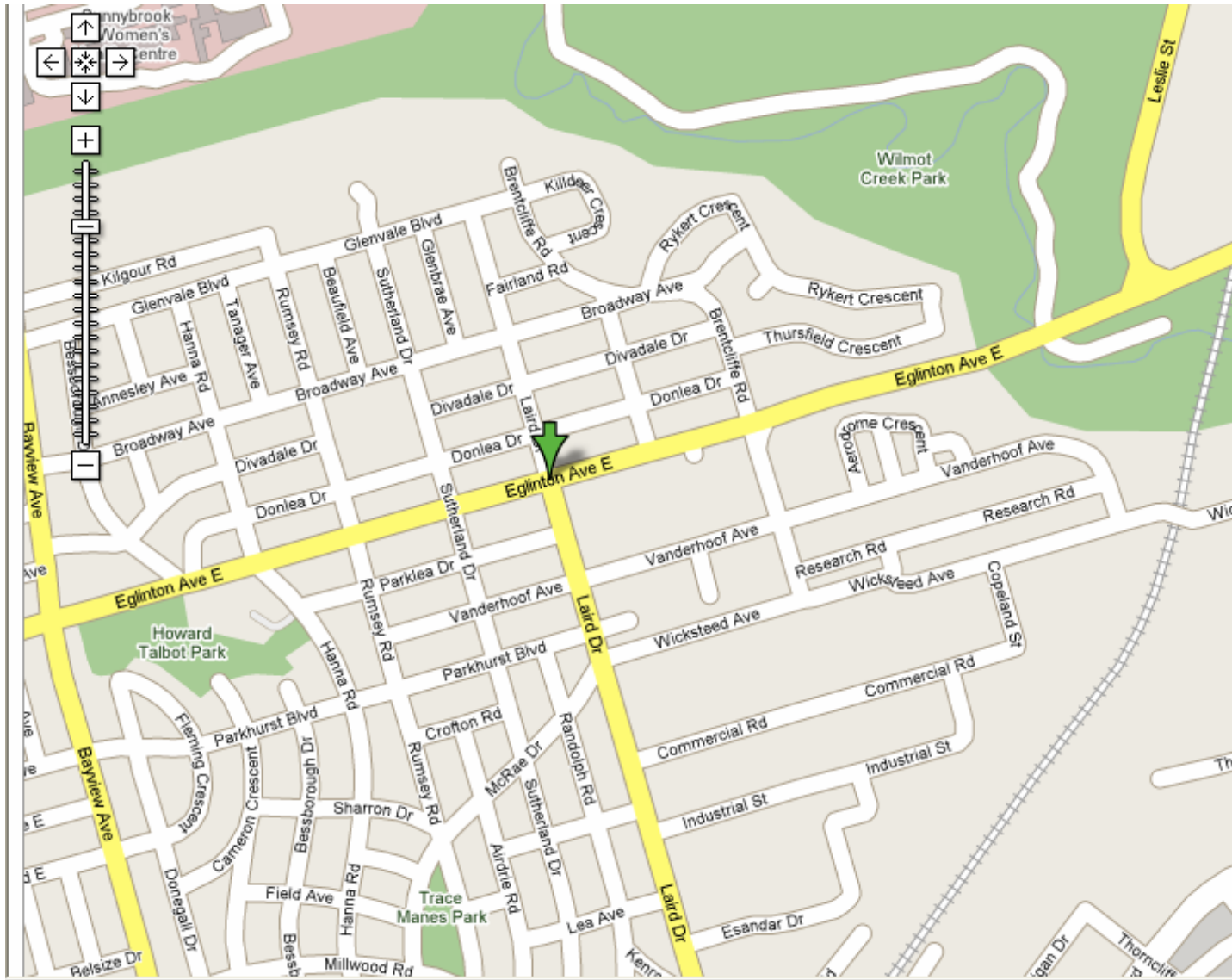
You are required to prepare a poster type presentation of your final design. This component is common across all sections of CIV425.

More information on this requirement to follow.

Area Maps

[Print](#) [Send](#) [Link to this page](#)





Course Outlines

The following four pages reproduce the course outlines from:

1. CIV101 Structures, Materials and Design
2. CIV576 Building Science and Roof Designs*

* I will propose this course to the Department at which I am hired

General Course Information:

CIV101F Structures, Materials and Design – Section C

September, 2004

Instructor: R. C. Richman, GB333, 416-978-5964, richman@ecf.utoronto.ca

TA's: Sabrina Spatari, GB319F, sabrina.spatari@utoronto.ca
Susana Saiz Alcazar, GB418, susana.saiz.alcazar@utoronto.ca

Lectures: Monday, 2-3 pm, GB248 Tutorial: Wednesday, 3-5 pm, HA403
Tuesday, 9-10 am, GB248
Thursday, 11 am -12 pm, GB248

Website for Section C: ccnet.utoronto.ca/civ101fsectionc/

Website for CIV101F: ccnet.utoronto.ca/civ101h1f/

Course Outline: See Course Content Handout

Course Schedule: (tentative)	<u>Week of</u>	<u>Content</u>
	September 6	Intro, Ch. 1
	September 13	Ch. 2
	September 20	Ch. 3 (2-D)
	September 27	Ch. 4 (2-D)
	October 4	Ch. 3 (3-D)
	October 11	Ch. 4 (3-D)
	October 18	Ch. 6
	October 25	Ch. 10 (Supplementary Notes)
	November 1	Ch. 5
	November 8	Ch. 7
	November 15	Ch. 11/12 (Supplementary Notes)
	November 22	Ch. 9
	November 29	Design, Wrap-up, Review

Grade Composition:	<u>Description</u>	<u>Marks</u>
	Weekly Tutorials (Best 9 of 10)**	5
	Bridge Design Competition (Reasonable entry)**	2
	Quiz on October 6 (50 minutes)**	5
	Mid-term test on November 3 **	28
	Final Exam	<u>60</u>
		100%

** The term work component will be normalized in each section to an average of 70% (i.e. 28/40 marks)

The quiz, mid-term test, and final examination will be “closed book”, that is, no aids are allowed except for the following **non-programmable** calculators: Casio 260, Sharp 520, and TI 30.
(continued on back)

Some Notes on Tutorials

1. Tutorials must be done **NEATLY** in pencil on one-side only of the engineering problem paper sold in pads by the Engineering Society Stores (basement of Sanford Fleming building.) A straight edge is required for **ALL** drawing lines but scales and protractors are not required (i.e. it is a **sketch**.) Sloppy work (as deemed by the TA's and Instructor) will not be accepted.
2. The tutorial problem sheet will be handed out at the end of lecture on the day before the tutorial (i.e. Tuesday). The solution (excluding the problem sheet) must include all necessary diagrams and be reasonably neat. The pages of the completed problem set including the original problem sheet as the last page **MUST** be stapled together – problem sets fastened with paper clips or by folding the corners of paper will **NOT** be accepted.
3. Completed tutorial must be handed in at the end of the tutorial session the next day (before 5:00 pm EST.) Late tutorials will normally not be assessed nor will tutorials which are incomplete.
4. The tutorials will be graded on a scale of 10 and returned at the beginning of the next week. **All or some** of the problems will be marked for each problem set. **Re-submitted** tutorials will not be accepted.
5. The best 9 out of 10 tutorial problem sets will be used to determine the term mark out of 5.
6. If you feel there exists a **blatant error** in marking, you may approach the TA's or myself. Only situations deemed '**blatant**' will be accepted for reconsideration.

Building Science and Roof Design CIV576S

General Course Information

January 2007

Required Textbook:	Hutcheon, N. and Handegord, G., <u>Building Science for a Cold Climate</u> , 1995, National Research Council of Canada, Ottawa.	
Recommended Reference Materials:	Baker, M., <u>Roofs: Design, Application and Maintenance</u> , 1980, National Research Council of Canada, Ottawa. Canadian Building Digests, IRC National Research Council of Canada. (available on-line at: http://irc.nrc-cnrc.gc.ca/cbd/cbd-e.html)	
Lecture Times	Mondays, 9-10 (GB303)	
Location:	Wednesdays, 10-12 (GB303)	
Tutorials:	Fridays, 11-1 (GB420)	
Evaluation:	Term Work (Assignments)*	10%
	Lecture Notes**	10%
	Term Test (Friday, February 23)	15%
	Term Project (due Friday, April 13)***	25%
	Final Exam	40%
Instructor:	Russell C. Richman GB333 416-978-5964 richman@ecf.utoronto.ca	
Office Hours:	Fridays, 8 am through 11 am	
Teaching Assistants:	Christian Cianfrone (christian.cianfrone@utoronto.ca) Nastasha Liebenow (liebenow@ecf.utoronto.ca)	

*Term work includes weekly assignments completed within the tutorial period. The best 4 of 5 assignment marks will contribute to the term work mark.

**Each student is required to submit two lecture notes throughout the term. Further details of this requirement will be discussed during the introductory class.

***Term projects will be completed in groups of 2 (graduates) and 3 (undergraduates). The project consists of an oral presentation (10%) and a written component (15%). All students must contribute equally to each component in order to receive full credit for the project. Further details to be discuss during the introductory class.

Building Science and Roof Design CIV576S
Course Outline
January 2007

Week	Topic
Part I – The Fundamentals	
1 (Jan 8-12)	Review of Building Science Fundamentals: <ul style="list-style-type: none">• Heat and moisture flow• Moisture management• Advanced psychrometrics
2 (Jan 15-19)	Introduction to Roofing Systems <ul style="list-style-type: none">• Characteristics, defining qualities, materials
3 (Jan 22-26)	Roofing Materials <ul style="list-style-type: none">• Mechanics, material science and properties
Part II – Roofs In Service	
4 (Jan 29-Feb 3)	Conventional Systems
5 (Feb 5-9)	Inverted Systems
6 (Feb 12-16)	Specifications
7 (Feb 19-23)	Reading Week – no class
8 (Feb 26-Mar 2)	Mechanisms of Deterioration and Their Control
Part III – Roof Design	
9 (Mar 5-9)	Roofing Details and Their Importance
10 (Mar 12-16)	Roofing Design
11 (Mar 19-23)	Roofing Design
12 (Mar 26-30)	Case Studies
13 (Apr 2-6)	Project Presentations
14 (Apr 9-13)	Project Presentations/Course Review

6. Distinctive Features of Teaching

Just as the building envelope filters and relies on the interior and exterior environments, teaching is a two-way street between the students and the instructor.

- Whether teaching adults or children, I always learn something and use this to improve my teaching.
- I strive to obtain the “eureka!” moment when students “get it.”
- Traditional engineering learning is “lecture style” learning. I like to introduce aspects of problem-based learning and “tool using” to provoke independent thinking and creative problem solving.
- Having taught for a relatively long time (for someone my age in my field), I’ve had the ability to experiment with many teaching styles to many different audiences. I bring alternative teaching methods into the typically standard engineering lecture (e.g. group lecture work, demonstrations, practical problems (with no apparent solution)).
- I bridge theoretical problems with practical applications.
- I tailor each session to the audience (whether its adults or high school students).
- I provide a nurturing environment that breeds confident learning.
- I am engaging using a variety examples, anecdotes, humour and practical examples to highlight deep theoretical questions.
- I Have fun with concepts. Approach traditional difficult engineering concepts from non-traditional angles.

Teaching doesn’t end in the classroom or when the final exam is conducted. I keep in touch with past students to continue down that ‘two way street.’

Teaching opportunities are all around us. I challenge my students to figure out everyday situations using fundamental concepts (e.g. how that tree is standing up or why that snow is still present when no snow exists anywhere else)

7. Professional Development

Programs Completed

Prospective Professors In Training (PPIT) Program

Faculty of Applied Sciences and Engineering

University of Toronto

December, 2006 to May, 2007

A graduate level certificate program for Ph.D. students to facilitate the development of essential skill sets outside the realm of research.

The program consisted of ten seminars over two academic terms.

Experienced engineering professors from the Faculty of Applied Science and Engineering offered seminars in the following topics:

- Effective lecturing
- Course design and grading systems
- Classroom management
- Collaborative learning and group work
- Research agenda and grant proposals

Courses Taken

THE500 – Teaching in Higher Education
School of Graduate Studies, University of Toronto
January to April, 2006

A graduate level course in graduate and undergraduate university teaching for upper level Ph.D. students about to finish their doctorates.

The course met for two hours each week for thirteen weeks.

Master teachers from the University of Toronto offered sessions in the following topics:

- Course design
- Marking and evaluation
- Interactive lecturing
- Web based instructional support
- Presentation skills
- Sensitivity to student issues including equity, learning problems and life problems

Course activities included:

- Microteaching sessions
 - Videotaped and critiqued a 15 minute teaching session. Students taught a topic to a small group of fellow THE500 classmates and an expert evaluator/facilitator.
- Writing about teaching issues
 - I wrote on: the positive role of a teacher, university support strategy and the relation between teaching, research and consulting.
- Reading in the scholarship of teaching

MIE3002 – Engineering Teaching and Learning
Department of Mechanical and Industrial Engineering
University of Toronto
September to December, 2006

A graduate level course which studies teaching and learning in engineering.

The course meets for two hours each week for thirteen weeks.

Topics were covered included:

- Curriculum: educating undergraduates at a research university
- How people learn: learning styles and what influences learning
- Course design
- Learning objectives
- Assessment and evaluation

Course activities included:

- Completions of a Teaching Material Portfolio
 - I applied learned concepts to materials already created for a course that I taught.
- Weekly readings in the subject of engineering education

Future Plans

I have aspirations to further myself as a teacher. In the upcoming years, I plan to engage in the following activities:

- Attend workshops
- Study teaching literature
- Mentor with an experienced pedagogical innovator
- Applying the content I've learnt

8. Teaching Related Activity

I believe strongly in extra-curricular activity to create balance and effective learning. This theory also transfers to teachers. I commit to the following activities during my personal time:

- Elementary school classroom volunteer
- Baby sitter
- Field trip volunteer
- Ski instructor
- Hockey instructor
- Tutor