Civil Engineering

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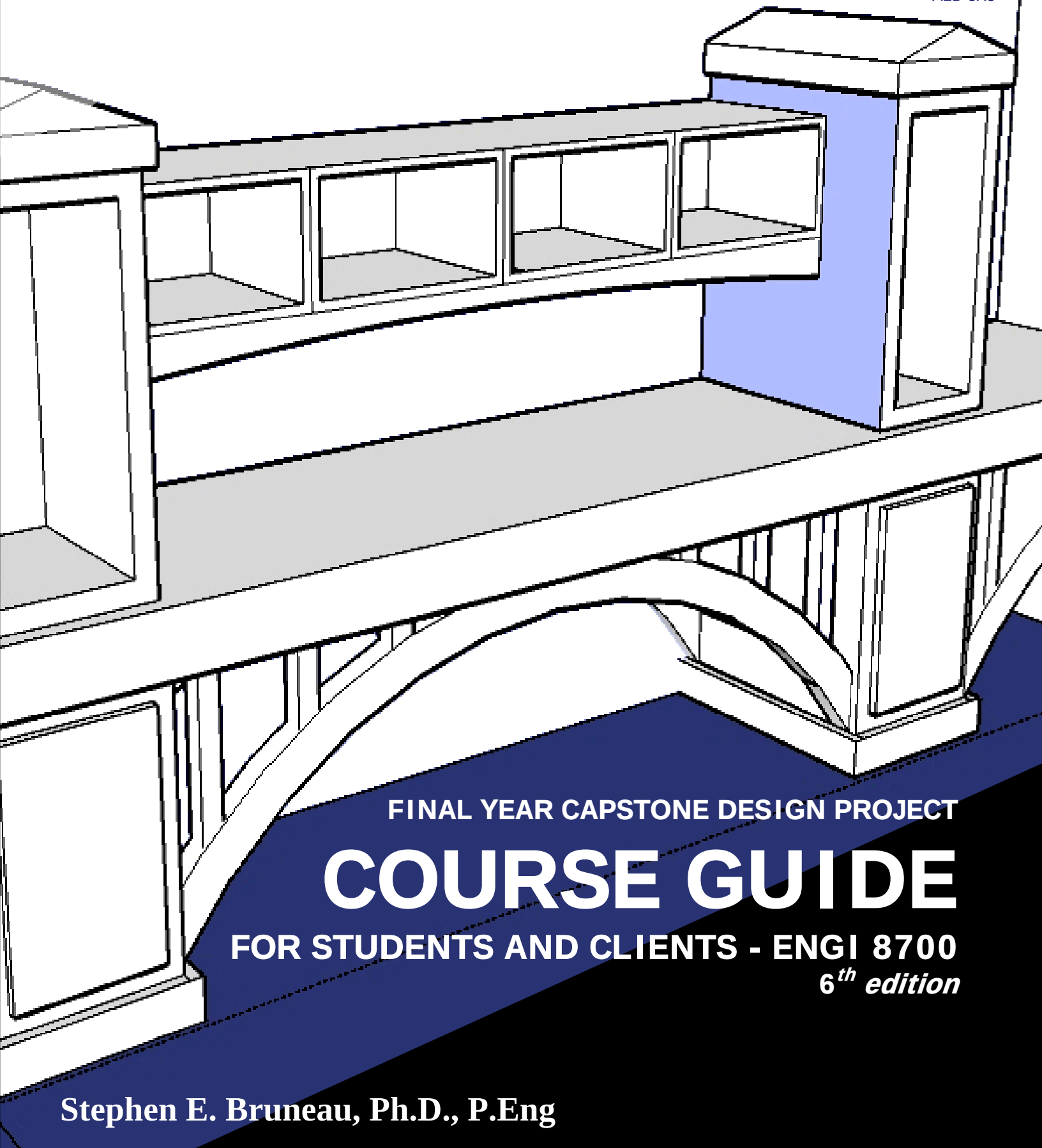

FINAL YEAR CAPSTONE DESIGN PROJECT

COURSE GUIDE

FOR STUDENTS AND CLIENTS - ENGI 8700

6th edition

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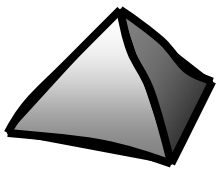
Acknowledgements

The author would like to acknowledge the contributions made by others in the development of the ENGI-8700 curriculum. Prof. Hesham Marzouk, Prof. Leonard Lye and the late professor Prof Wally Campbell, former instructors of the course were instrumental in its development and delivery over the years, and must be credited with its past and ongoing success.

For more information

This guide has been prepared for use in the senior civil engineering design course ENGI-8700 offered through the Faculty of Engineering and Applied Science at Memorial University. For general information about this course or others offered at Memorial the university calendar may be consulted online at www.mun.ca Further resources are available on the Faculty website: www.engr.mun.ca and the instructor's website for the course: www.engr.mun.ca/~sbruneau/project



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COURSE INTRODUCTION

Description of Civil Engineering

Civil Engineering deals with the design and construction of the built environment in which people live. Virtually all spatially large infrastructure is considered part of the civil discipline; including roads, buildings, bridges, water supplies and sewage disposal systems. The latter elements are said to have saved more lives and improved living standards for more people than any other achievement in human history. Today many sub-disciplines exist under the civil banner as the breadth and complexity of the built human environment expands rapidly. Environmental, geotechnical, structural, transportation, water resources, materials, coastal, surveying, urban planning and construction engineering are the primary branches of civil engineering today.

Course Summary

The project course ENGI-8700 Civil Engineering Design runs from the first or second week in January to the end of the semester usually the first week of April – a span of approximately 13 weeks. The course is one of five that the students take in their eighth and final academic semester of the undergraduate bachelor of engineering co-op program at Memorial. There is an instructor for the course with the responsibility of arranging projects, clients, class meetings, guest lectures and presentation forums. Some project management instruction and guidance is also provided by the instructor though it is not possible or desirable to be intimately involved in any one, or all projects. The instructor must objectively evaluate all students individually and as a group according to the rules described in this *Course Guide*. The client interacts directly with the course instructor on all administrative matters but otherwise follows the schedule of activities as listed in the Course Timeline of this Guide.

Purpose of the Course

The civil engineering design course ENGI-8700 is intended to expose students to, and educate them in, the professional practice of design and creative solving by civil engineers in society. Students in their final semester before graduation have the theoretical and academic foundation required to practice but require exposure to, and mentoring from, those with experience. In this way the course repeats an age old tradition of apprentice-like contact education, providing continuity and knowledge transfer across generations.

Method of Delivery

The students participating in the course are placed in groups of four that compete for projects offered by practicing civil engineers from the community. The students are essentially viewed as “consultants” to the practicing engineer “client” as it is the desire to approximately simulate a typical commercial undertaking. After the matching process the student consulting groups prepare a detailed execution plan for their client in which tasks are identified, persons and resources are assigned and a schedule is proposed. Regular weekly meetings with the client and course instructor, and the requirement for personal and group record keeping help keep the projects on track. The two significant course milestones include the mid term progress report and presentation, and the final report submission and presentation. Feedback from clients contributes towards the awarding of the Wally Campbell Prize for best project, and the CSCE prize for best project presentation.

Evaluation

ENGI-8700 is focused on professional practice and not specialization, thus the student's accommodation of clients and their collegial respect for the course objectives and all participants will reflect positively on their overall course evaluation. Students are evaluated on both an individual and group basis, for written and presented materials, and, in their professional conduct throughout the semester. Professional conduct includes punctuality, participation, communication, objectivity, discipline, reliability and other desirable traits, and is judged by clients, instructors, faculty advisors and peers.

Use of this Guide

This *Course Guide* is to be used as a common reference document for both students and clients. It lists the course requirements, milestones, deliverables, rules, expectations, and marking scheme. It describes the unfolding of events chronologically and the rationale behind them. It is also intended as a reference for student deliverables as samples and templates of common forms and documents are provided. All clients and students are to be given a copy of this guide prior to the commencement of the course.

COURSE TIMELINE

The timeline for ENGI 8700 is provided in the table below. In addition to the activities noted in the table are regular class meetings, group meetings, guest lectures and field trips. Students are required to participate in these also. Details of the schedule will be finalized within the first week or two of the term when all other course and lab assignments are known.

Activity Timeline for ENGI 8700

(slightly varies with calendar year to year)

Timeline	Instructor Activity	Student Activity	Client Activity	Faculty Activity
Months and Weeks Prior	Determine appropriate type and number of projects. Approach prospective clients, confirm client participants and collate project descriptions. Confirm schedule, book rooms and refreshments etc	Provide list of sub discipline interests	Provide written project description and student requirements	
Week 1	kickoff meeting - review schedule, deliverables, expectations, group selection and client projects. Next meeting - Prequalification, whereby students prequalify projects by selecting from amongst a limited number of interview slots per client.	Student grouping announced or selected, groups prequalify clients, groups develop Statement of Qualifications (SOQ)		
Week 2	Forward SOQs to clients, Chair match night, announce matching results, give instructions.	**Submit SOQs, attend match night (interviews, matching & first meeting with client)**	Review SOQs, Attend match night (briefly present project, interview and rank groups, have first meeting with matched group)	Attend Match night presentations as guest and observer
Week 3	Regular meeting with student groups, Chair business meeting	Project work commencement, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 4	Regular meeting with student groups, Chair business meeting	**Submit work plan**	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 5	Regular meeting with student groups, Chair business meeting	Project work, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 6	Regular meeting with student groups, Chair business meeting, Liaison with clients	Project work, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 7	Attend Progress Report Presentations (optional) Provide feedback to instructor	**Term break, submit progress report, give presentations**	Attend Progress Report Presentations (optional) Provide feedback to instructor	Help those groups working within specialization and requesting assistance.
Week 8	Regular meeting with student groups, Chair business meeting	Project work, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 9	Regular meeting with student groups, Chair business meeting	Project work, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 10	Regular meeting with student groups, Chair business meeting	Project work, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 11	Regular meeting with student groups, Chair business meeting	Project work, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 12	Regular meeting with student groups, Chair business meeting	Project work, meet client, meet instructor, attend business meeting	Regular meeting with students	Help those groups working within specialization and requesting assistance.
Week 13	Chair final presentations, Select prizes, Read and grade project reports.	**Submit final report, final presentations, Group binders**	Attend final presentations, provide feedback to instructor, Select Prize winners	Attend final presentations, provide feedback to instructor, help select Prize winners

DESCRIPTION OF COURSE ACTIVITIES

Prior to Semester:

Student Survey - Optional

If students are to be grouped by the instructor according to specialization interests they will be surveyed towards the end of academic term 7 to obtain an indication of their interests and preferred sub-disciplines for the term 8 ENGI 8700 projects. Students will be requested to identify in order of preference three sub-disciplines from the following list:

- Environmental
- Geotechnical
- Structural
- Transportation
- Water resources
- Materials
- Coastal and Ocean
- Project Management and planning

Student Grouping: Option 1 - Instructor Selection

Just prior to the commencement of the semester, students will be arranged into groups by the course instructor in consultation with other professors. The groupings are made on the basis of individual's expressed interests, and, track record according to the knowledge of the professors. After group lists are announced at the start of the term there is an opportunity for students to appeal the selection and change groups for well-founded reasons. This practice of group selection has proven to be the least troublesome and most efficient for participating students and course instructors, though not always the more popular choice.

Student Grouping: Option 2 – Student Selection

An alternate approach in which the students are given the opportunity to group themselves may be the preferred selection process for any one year. In this case the students must consult amongst themselves and finalize their arrangements by the second class of the semester. Those dissatisfied with the process or outcome must seek the assistance of the instructor by that time as the instructor reserves the right to make changes to groupings.

Project Solicitation

In the months leading up to the commencement of the course the instructor solicits for the participation of clients from the community. Interested clients usually identify an ongoing commercial project, often one in the proposal, planning or early development phases that would be suitable for offering. Suitability is based on the topic, level of complexity, access to required information and resources, confidentiality, and in some instances location and imposed scheduling constraints. The client search and selection is finalized once the number of confirmed participants matches the number of student groups proposed. Each client then prepares a brief outline of their project and the requirements or responsibilities of the student groups. An effort is made to offer projects covering a range of civil disciplines that reflect the scope of student interests and the current demands of society.

Commencement of Course:

Kickoff meeting between instructor and students

The course is assigned one regular lecture slot and one afternoon lab slot and so at the first opportunity at the outset of the term the class first meets the instructor and student groups are announced. This is followed by a summary of the client projects, the schedule for the semester and a review of this, the *Course Guide*.

Students meet and plan Interview strategy

Subsequent to the kickoff class, student groups meet for the first time amongst themselves as "consultants". Typically they discuss their individual interests and the apparent strengths of their group. At this time groups may appoint members temporarily into the positions of Chair and Secretary. Groups would then review all client project submissions and identify those that most interest them and agree on a strategy for obtaining client interviews. A strategy is required because each group will be required to select interviews with exactly one half of the clients in a procedure described below. This approach recognizes the interest of some groups to specialize yet preserves the uncertainty of success in a particular area, and therefore the need to be flexible.

Student Groups Selection of Preferred Clients

The interview schedule is developed by the students in a classroom exercise called "the Prequal" (client prequalification). The procedure for the Prequal is illustrated in the chart at right. For the first round of interviews student groups select their preferred clients. The order in which groups make their selection is determined randomly in the first round but is then reversed in the second round and so on. In this way, latter groups in one round must choose from amongst the few remaining clients for that interview time slot, but in the next round are free to choose from the many available. As selections are made group names are entered until the interview schedule is complete. Note that if there is an odd number of rounds then for the last, the order

Selection of Client Interviews " The Prequal "

Illustration of Class Procedure

Interview	Time	client 1	client 2	client 3	client 4	client 5	client 6	client 7	client 8	client 9	client 10
Round 1	8:00 PM	C	H	J	D	B	G	A	E	F	I
Round 2	8:10 PM	H	G	D	A	C	J	I	F	B	E
Round 3	8:20 PM	etc	. . .								
Round 4	8:30 PM			. . .							
Round 5	8:40 PM										

Round 1 Order

Pick	Random*	Choice
1st	Group B	client 5
2nd	Group H	client 2
3rd	Group J	client 3
4th	Group A	client 7
5th	Group I	client 10
6th	Group C	client 1
7th	Group F	client 9
8th	Group E	client 8
9th	Group D	client 4
10th	Group G	client 6

* The order shown is for illustrative purposes only, use straws for actual order

Round 2 Order

Pick	Reverse*	Choice
1st	Group G	client 2
2nd	Group D	client 3
3rd	Group E	client 10
4th	Group F	client 8
5th	Group C	client 5
6th	Group I	client 7
7th	Group A	client 4
8th	Group J	client 6
9th	Group H	client 1
10th	Group B	client 9

Round 3
Same order as Round 1

Round 4
Same order as Round 2

Round 5
New Random Order

Finalize trading

of group selection should be randomized again. During this process some trading of clients and time slots may be carried out provided there is a consensus amongst all students affected by the proposed change.

This procedure is a deviation from normal industry bidding practice but is necessary to reflect the need for students to have some level of influence in the matching process while preserving the necessity for all clients to have the same number of interviews. Though not always the case in the commercial world, in this course all clients and all groups must be matched. Respect for the time and effort of the volunteer client group and the need to expedite the typically drawn out practice of prequalification point to the need for this measure. Reiterating, ENGI-8700 is focused on professional practice and not specialization, thus the student's accommodation of clients and their collegial respect for the course objectives will reflect positively on their overall course evaluation.

Preparation of Statement of Qualifications (SOQ)

After the interview schedule is fixed each student group will prepare a "statement of qualifications" (SOQ*) for their consultancy. This document may now be tuned according to the projects and clients with whom they will be meeting. The intention is to inform and impress by calling attention to the groups' superlative qualities, while tactically aiming at the project(s) most desired by the group. Groups are also encouraged to develop their own group websites for communication, clarity and convenience of the instructor and clients.

An electronic version of all SOQs will be sent to the specific client group by the instructor prior to interviews. A hard copy should also be hand delivered by each group to each client at the time of interviews. It should not exceed 10 pages and may take the form of a corporate brochure (example in appendix). It will be important to state the qualifications of each member, the group strengths, its mission statement and any other information relevant or otherwise desirable to communicate to prospective clients. Note that it is common for groups to develop a brand and logo but it is not appropriate for these groups to use identifiers such as Inc., Ltd or other extensions that have distinct and serious legal meaning. Best practice would be to identify oneself using terms like 'partnership', 'group', 'consultants' or other.

* In industry, a company writes an SOQ that might make them the best company for providing specific services or materials, or to attract investors. Nonprofit corporations may write an SOQ in order to show their charitable abilities, business plan and mission statement. Additionally, a statement of qualifications may include things like company history, tax identification number, contact information and may also summarize the organization's different departments or number of employees. An SOQ from a contractor might include references to past projects, as well as listing the contractor's experience.

Match Meeting with Clients

Traditionally, an evening in the second week of the semester is set aside for the final matching process. It is during this evening that student consultancies must impress their prospective clients because it will be the duty of the clients at the end of the evening to discuss and finalize the matching of groups. This match meeting proceeds according to the generic agenda shown below.

GENERIC AGENDA - Match Meeting

CIVIL DESIGN PROJECT ENGI 8700

Date: To be announced (will be in January, week 2 of winter semester)
Location: Memorial University, S.J.Carew Building (Engineering), Board Room Fourth Floor EN 4006
Attendees: Instructor, Discipline Chair, Teaching Assistants, Senior Civil Class, Volunteer Clients

Time	Activity		
6:30	Setup		
6:45	Clients arrive		
6:50	**Welcome, Introductions, Announcements, Explanation**		
7:00	Presentations	Client 1	Project Title
7:05		Client 2	Project Title
7:10		Client 3	Project Title
7:15		Client 4	Project Title
7:20		Client 5	Project Title
7:25		Client 6	Project Title
7:30		Client 7	Project Title
7:35		Client 8	Project Title
7:40		Client 9	Project Title
7:45		Client 10	Project Title
7:50*	**Break for snack and prep for interviews**		
8:00	Interviews	Round 1	
8:10		Round 2	
8:20		Round 3	
8:30		Round 4	
8:40		Round 5	
8:50	**Clients submit ranking to instructor**		
9:00	Social with food and drinks		
9:15	Clients and Instructors Meet		
9:30	**Final Matching Announced**		
9:30	Casual time and plan first client meeting		
10:00	End		

* Note that food will arrive at 7:50 so it is the norm that some people snack at this time while others prefer to wait until after the interviews are complete

At the outset of the meeting, clients introduce themselves and present their project to the entire class in a series of brief 5 minute presentations. This activity is followed by the breakout and interview process. At the time and in the order in which students have pre-arranged each interview between client and student group will take place. After 8 minutes the groups will move on to their next interview, and so on until all five rounds are complete. Clients are then asked to privately submit their preferred ranking of groups, and vice versa as the group ranking may be required in the event of a tie. The form below enables an orderly collection of all group and client rankings for the matching procedure.

General Match Night Ranking Form for both clients and students

ENGI.8700
SEB sbruneau@mun.ca 709 864-2119

this is the form that every group gets on match night and fills out when interviews are finished

YOUR GROUP/CLIENT NO: ☐

YOUR GROUP/CLIENT NAME: _____

YOUR NAMES: _____

_____

_____

_____

Ranking. Place the NUMBER of each party in the blank space opposite the rank.

	rank	Group/client NUMBER and NAME
Highest preference	***1 st***	
↓	***2 nd***	
	3 rd	
	4 th	
Lower Preference	***5 th***	

FYI

this area will be filled out by instructor prior to match night

Student Group Number / *Student Group Name*	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Students								

Client Number / *Client Name*	Client 1	Client 2	Client 3	Client 4	Client 5	Client 6	Client 7	Client 8

Following the completion of the forms is a time for socializing with food and drinks, while the course instructor sorts and tabulates form data and commences matching. The procedure for the matching process is illustrated and described below on the form that will be used by the instructor to finalize matches. A private meeting is then held with clients to discuss and finalize the matching, followed by an open announcement of the results. Student groups must meet briefly with their newly assigned client and arrange for a kickoff meeting, often at the client's place of work. This concludes the match night.

Match Night Ranking Procedure

ENGI.8700

SEB sbruneau@mun.ca 709 864-2119

MATCH RESULTS		Client 1	Client 2	Client 3	Client 4	Client 5	Client 6	Client 7	Client 8
All ranks from all clients	*1*								
this area to be filled by instructor after all interviews complete and rank forms	*2*								
	3								
	4								
	5								

MATCH RESULTS		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
All ranks from all students	*1*								
this area to be filled by instructor after all interviews complete and rank forms	*2*								
	3								
	4								
	5								

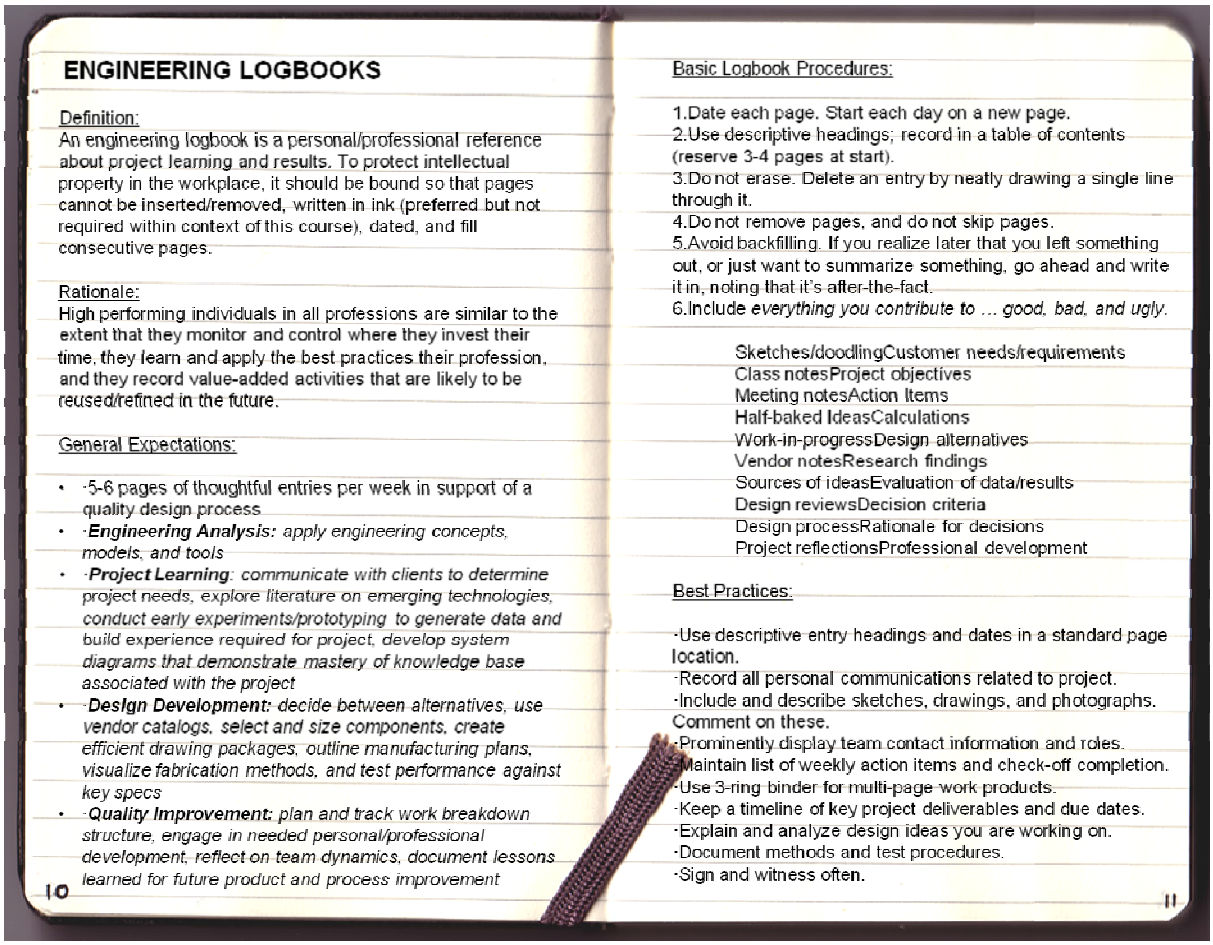
FINAL MATCH	Client 1	Client 2	Client 3	Client 4	Client 5	Client 6	Client 7	Client 8

IMPORTANT !	***step***	
Procedure for matching	1	View client table row 1 - give unique matches first by giving clients the student groups they rank as #1
	2	If a tie exists between clients then go to the student ranking and they decide which client gets them.
	3	Write the immediate matches made into FINAL MATCH row below rank tables, then:
	4	As soon as a client has been matched - remove it from all student ranking lists and bump up rank orders
	5	As soon as a student group has been matched - remove it from all client ranking lists and bump up rank orders
	6	If there is only one group left in a client rank list - then they must be matched together
	7	If groups remain unmatched goto step 1
	8	Check results for obvious errors and then announce to all clients and students

Project Phase

Student Logbook

All students are to maintain a work journal or logbook in which hours, tasks, milestones or other important notes or dates. This document *must be hand written* and will be subject to periodic review by the instructor and/or teaching assistant, prior to its submission at the end of the term. The frequency and length of entries in the journal must be consistent with the work executed and reflect properly the purpose of the journal – to assist in the executing and organizing of future activities while preserving present and past actions for reference and record. One should avoid superfluous writing, detailed notes, or vague structure, aim to have entries that are concise, consistent and accurate. Note that typically, journal entries are made at the end of each day and not on-the-fly unless circumstances require it. A minimum of one and maximum of two organized hand written pages per week should convey all the necessary information. Additional guidelines for keeping an engineering logbook are illustrated below.



Group Meetings

Group meetings are informal meetings arranged between group members to strategize, work on tasks, and arrange client meetings or for other logistical or management reasons. In this way it is expected that each group member meet at least twice a week with some or all other members of his or her group outside of regular lecture slots or client meetings. Though minutes are not formally required for these meetings, notes in the journal should reflect the salient points and outcomes.

Client Meetings

Unless special circumstances arise it is expected that student groups will meet with their client on a weekly basis at the place of work of the client or some other mutually agreeable location. The client is expected to spend at least one hour per week with the student group; however, more or less time may be necessary from time to time depending upon the activity, schedule, availability or urgency of the meeting. Student groups will prepare a one page meeting agenda and will forward this to the client one day prior to their scheduled weekly meeting. This action has the twofold benefit of organizing the items of discussion prior to meeting thereby making better use of the time made available by the client, and, the memo serves as a gentle reminder to the client of the upcoming meeting. The instructor should also be copied on all of the agendas and is to be invited to attend any or all meetings or presentations related to the course. The instructor need not be noted as a participant as his role is that of an impartial observer. Minutes from the previous meeting (one page maximum) will also be attached each meeting agenda. Following this practice through the term every group will have produced at least 8 or more meeting agendas and associated minutes fulfilling part of the course requirement and forming part of the individual submissions at the end of the term. The following is a brief guide to preparing a meeting agenda and minute preparations:

Meeting Agenda

The meeting agenda gives purpose and direction to a meeting by letting participants know in advance what is to be discussed. Creating and following an agenda is the best way to make efficient use of time and avoid sidetracking or grandstanding. It is the duty of the meeting chair to make sure the meeting achieves its goals and the agenda is followed. The chair must ensure that everyone gets an opportunity to participate as they should, and must do so in an impartial and gently assertive manner. Agendas are often prepared by the meeting secretary in consultation with the chair, and are created and distributed sufficiently in advance to give notice and time to prepare while also serving as a gentle reminder of the meeting schedule. Common elements of a good meeting agenda are:

a. Meeting start time
b. Meeting End Time
c. Meeting Location
d. Expected Participants
e. Topic Headings
f. Slight explanation for topics that are not self-evident

g. Indicate the desired duration of each topic
h. Indicate the person(s) most closely associated with a topic if applicable.
i. Topics often included in meeting agendas:
    1. Review of minutes and action items from previous meeting
    2. Correspondence and administrative housekeeping
    3. Progress reports, committee reports, group reports . . .
    4. Key topics which may include questions, proposed actions, round table discussion
    5. Other Business (opportunity to discuss things not on the agenda)
    6. Summary of action items
    7. Scheduling of Next meeting

Meeting Minutes

Meeting minutes are very important. Not only do they help to serve participants as reminders of discussion items, decisions, outcomes and actions; they are also considered legal documents by auditors, and courts of law. In the instance of this project course the minutes of client meetings will be taken by the meeting secretary, written up and circulated to all participants for corrections, additions or deletions, prior to being presented at the next meeting. Sufficient information should be given in the minutes to describe in point form the topics discussed, and how and what decisions were made.

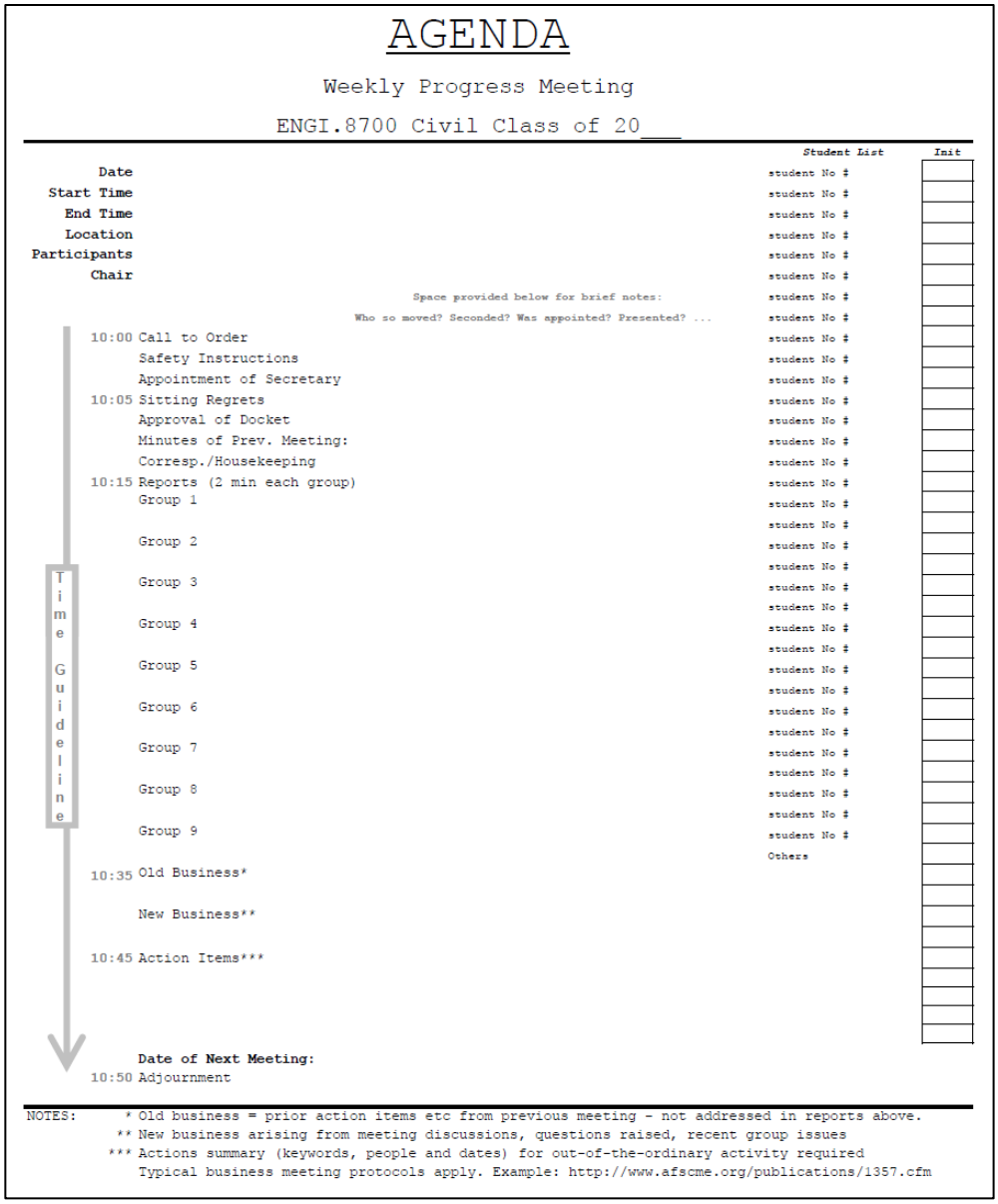
Instructor Meetings and Classes

The course instructor will meet with the whole class during the first assigned regular lecture slot of the week for a progress meeting. This class will be run as a “board” meeting in which the instructor chairs, a secretary is assigned for minute taking, a representative from each group provides an update of past and future group activities/progress/problems, actions are noted and assigned and new material relevant to the course is presented. The format for the progress meeting is presented in the generic agenda shown.

This meeting will provide an opportunity for general project instruction, clarification of requirements, schedule reminders, questions, troubleshooting, sourcing of materials or resources and other housekeeping matters. The second and third lecture slots of each week will be used for assigned group meetings with the instructor, and instructional lectures including guest lectures. The assigned lab slots will be used as optional group meeting times, guest lecture slots and instructor meeting times.

A lecture series has been developed to provide students a refresher on the engineering design process, plus technical writing, presenting, engineering ethics and professional practice. It is intended that the students utilize these resources in the execution of duties throughout the course and in the final preparation and presentation of group projects. Select lecture notes are provided in the Appendix of this guide.

A teaching assistant is also available to assist students and may help with software or other resource requirements. This assistant will also be asked by the instructor to perform some of the review of project binders, plans and reports. Some questions or concerns arising during the meeting may require extra time for which the scheduling of a private meeting with the instructor may be necessary. It will be the responsibility of the student group to formally request this with the instructor. Groups are discouraged from making frequent and arbitrary contact with the instructor and client outside of regular class and meeting slots as this may be viewed as shirking responsibilities, or, be a demonstration of impatience.



AGENDA

Weekly Progress Meeting

ENGI.8700 Civil Class of 20___

Date
Start Time
End Time
Location
Participants
Chair

Space provided below for brief notes:
Who so moved? Seconded? Was appointed? Presented? ...

10:00 Call to Order
Safety Instructions
Appointment of Secretary
10:05 Sitting Regrets
Approval of Docket
Minutes of Prev. Meeting:
Corresp./Housekeeping
10:15 Reports (2 min each group)
Group 1
Group 2
Group 3
Group 4
Group 5
Group 6
Group 7
Group 8
Group 9
10:35 Old Business*
New Business**
10:45 Action Items***

Time Guideline

Date of Next Meeting:
10:50 Adjournment

Student List

student No #
Others

Init

NOTES: * Old business = prior action items etc from previous meeting - not addressed in reports above.
** New business arising from meeting discussions, questions raised, recent group issues
*** Actions summary (keywords, people and dates) for out-of-the-ordinary activity required
Typical business meeting protocols apply. Example: http://www.afscme.org/publications/1357.cfm

Guest Lectures

In addition to class meetings, the course instructor often arranges for guest lecturers during the semester. Some will be arranged in cooperation with other courses as matters of common and general interest will be covered. Consideration is given to topics that are relevant to the professional practice of engineers, thus invited guests may speak on topics such as corporate governance, taxation, environmental sustainability, ethics and community, project management, professional affiliations (PEGNL and CSCE for example) and other. Attendance at these talks will be considered mandatory and it will be expected that individual journal entries will reflect participation.

Faculty Advisors

Students, individually or as a group, should solicit the advice or support of a faculty member other than the instructor, particularly one with a specialization relevant to their particular project or task. The intention is to spread out the course instructor's workload and to allow the instructor

to remain somewhat objective for evaluation purposes. In addition by gently delegating some supervisory responsibilities, students may obtain an alternate view on design approaches - a healthy practice for the overall experience of the students. It is important that students make an effort to act and work independently and so meetings with faculty advisors should be planned and necessary.

Site Visits

Students are strongly encouraged, when possible, to carry out site visits when their project involves civil infrastructure or is specific to a certain location. Many important design considerations and constraints are learned from visiting a site and engineers must be aware of all these prior to engaging in the design process.

Models

Students may also elect to construct a physical model of their project - when it is obvious that doing so will assist in the design and presentation of work. Without exception computer models in the form of design drawings and/or renderings are expected.

Budget and Reimbursement

A small budget exists for the project course to cover some supplies, services and travel – according to typical university claim policies. Costs for document preparation *are not* eligible and any expense or item for which a reimbursement is desired must be approved by the faculty business officer – main office, and the instructor prior to purchase.

Course Administration and Troubleshooting

If irreconcilable and significant problems arise between group members, or between students and the client it is imperative that the instructor be notified as soon as possible. As an alternate the civil discipline chair may be contacted, but involving some other faculty member or external person is strongly discouraged. If after some time the problem is still not resolved and the student or group is dissatisfied with the efforts of the instructor and discipline chair then students are to see the Associate Dean for undergraduate studies. This action must be reserved for only the most extreme circumstances and must be viewed as a highly unlikely matter of recourse. Establishing respectful communication in a professional and timely manner is usually the key to mediating and reconciling differences.

Reporting

Work Plan

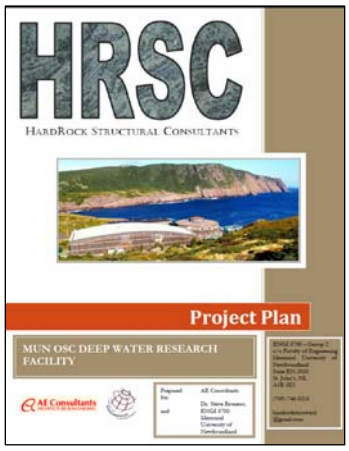
Approximately two weeks after match night student groups are to submit a work plan. This plan will have been developed in agreement with the client and should follow the guide illustrated below and clearly stating the following: The project requirements and its division into tasks and sub-tasks, the assignment of people and resources to each task element, the schedule for

GUIDE for WRITING an engineering PROJECT PLAN ENGI.8700 Term 8 Civil, MUN

- The entire project plan should be limited to 20 pages or less, be clear and concise and contain all relevant information for the instructor and client to understand what, when and how the group plans to execute the project.
- Preferred Formatting: Arial Font, 12 pt, single spaced, w/10mm indent, no spacing between paragraphs, double space around headings and subheadings, 20mm margins all round (except left if binding requires more), header and footer at 16mm, spiral binding preferred.
- Develop figures, tables or diagrams where they can improve understanding, decrease clumsy descriptions.
- The following is an outline intended as a generic guide for the writing of an effective project plan. It may not be crucial that all elements are rigorously followed as some project circumstances may dictate otherwise.

Length	*Element*	*Components/notes*
1 page	**Cover**	Student names, client names, date, project title, location, course and instructor
1 page	**Letter of Submittal**	Written to client, describes what this document is. Instructor is cc.ed.
1 page	**Table of Contents**	
1 page	**Project Description:**	A few paragraphs w/ picture, map or figure
1 page	**Statement of Project Requirements:**	A few paragraphs with bullets if fitting
Approx 10 pages	**Methodology:**	▪ Approach, overview of start to finish incl. major divisions of effort ▪ Group organization, roles, meetings ▪ Client interaction and role ▪ Design principles to be applied (synthesis using best practices or . . .) ▪ Proposed cost estimating strategy and level of accuracy ▪ Desired outcomes ▪ Reporting and Deliverables ▪ Troubleshooting
	Tasks:	▪ Primary tasks usually 6 to 8 of these ▪ Subtasks: Sufficiently focussed for an individual effort or very concentrated period ▪ Allocation of personnel for each task ▪ Estimated duration of tasks (range if necessary) ▪ Resource Requirements for each task, i.e.. Documents Software Site Visit Client supplied data Other
1 chart 1 page	**Schedule**	▪ Rendering of entire project with major tasks and important milestones clearly marked. ▪ Brief description of key points, method for tracking ▪ How it will be used, enforced, modified, reported
1 or 2 pages	**Costs**	▪ Associated with the execution of the project course, not the clients project ▪ Models, Site visit, supplies, tests . . .
	Deliverables	▪ Hardcopy docs, softcopy pdf, website if applic. Delivery mode to client&instructor
	Risks	▪ Vulnerabilities/risks in project execution (problem obtaining certain data, client travel .)
New page	**References**	Books, reports, notes, personal comm., resources were cited in the document.
New page	**Appendix**	SOQ
Back page	**Rear Cover**	Contact Info for group, client, instructor.

executing these tasks and other project milestones, a statement of the desired outcome(s) of the project, and a statement of the outside risks or vulnerabilities of the project (problem obtaining certain data, etc). The entire project plan must be limited to 20 pages or less, be clear and concise and contain all relevant information for the instructor and client to understand what, when and how the group plans to execute the project.



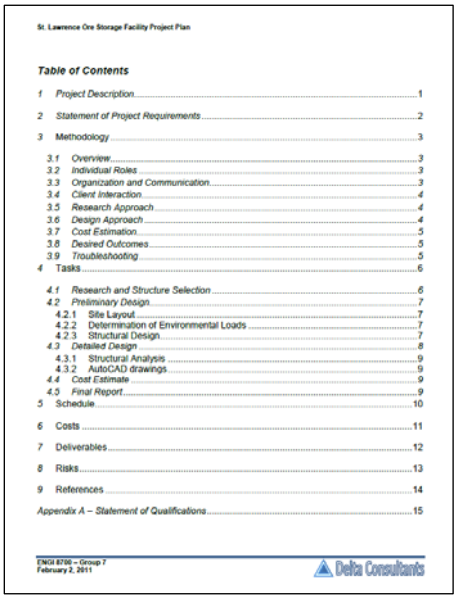

St. Lawrence Ore Storage Facility Project Plan

Table of Contents

ENGI 8700 – Group 7
February 2, 2011
Delta Consultants

Weekly Progress Reports

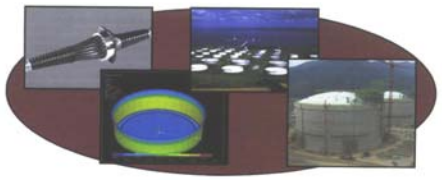
Every week following the submission of the work plan groups are to prepare, describe and submit progress reports during the class business meeting. One student from each group will come forward to present the report for that week, alternating group members throughout the term. These must be concise and clearly state the status of all major past, present and future tasks, provide an updated schedule (usually stands alone as the 2nd page of the two-page report), include any or all changes and importantly restate the targets for the coming week(s) . The document is limited to two pages yet must convey a clear understanding of project status, issues, achievements and plans (example in appendix). It is also important to include all group and client names and contact information on every report. Professional presentation and conduct are expected. Presentations may be taped for review and instructional purposes.

Final Report

There are no other scheduled submissions until the due date for the final report. The final report is to be a reader-friendly professional document limited in length to 100 pages of letter-sized paper – it must stand alone as a complete report with appendices under separate cover or scroll. A sample cover and table of contents from a group report is provided on the next page for reference. Professionals are paid to solve problems and to deliver the solutions in a clear and concise, albeit complete manner. This course intends to help students to practice this way, and to discourage padding documents with unnecessary text and superfluous claims and workings. Clean writing, good grammar, avoidance of excessive stylizing that distracts from the contents, these are the traits of professional writing.

The groups will be required to formally present their report to the student groups, clients and other faculty during and end-of-term presentation finally. Awards will be announced at that time for the best project and the best presentation as selected by clients and faculty.

ACIES
Advanced Civil Engineering Services



Crude Oil Storage Report
Prepared for SNC-Lavalin

Prepared by:

ACIES April 2, 2007

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ACIES April 2, 2007

ACIES April 2, 2007

List Of Appendices

Presenting

One of the elements of ENGI 8700 that separates it from other courses is the necessity for students to present their work orally to their peers, clients, attending faculty and others. This requirement takes place twice during the semester – at the time of the mid-term progress report and at the end of the term when final reports are due. The practice is to have all members of a group proceed to the front of the class and deliver a 15 minute presentation with a few minutes for questions. Usually electronic media are used with students taking turns presenting elements of the work and controlling the visual aids.

The presentation is for some a dreaded exercise as it is common for some people to have a debilitating fear of public speaking. Others glide through the exercise with comfort and poise and then there are those who enjoy listening to themselves speak publicly whether they have anything to say or not. Often firms will call upon a certain few individuals to deliver a variety of presentations because they are good at it – in this way, others who are not, don't have to. This is not always the case however, and when special topics or occasions arise that require a particular individual to present they must know how to do so whether they enjoy it or not. For this reason it is important in ENGI 8700 that everyone learn how to, and practice presenting.

Many resources and guides are available for speech and presentation preparation and delivery, and the instructor will provide materials on this during the semester. The following highlights some common elements of effective presentations that should be considered by students:

Purpose:
The purpose of a presentation is to tell the audience what they need or want to know. A common flaw is to forget this and try and tell the audience everything that you know.

Preparation:
There is no substitute for being prepared - nervousness and anxiety are relieved (not eliminated) through preparation alone. Always prepare thoroughly by knowing your material, the message, the venue, the timing, the audience. Never go into a presentation without having made at least one practice run with someone attending. You or your practice audience will immediately realize the weak links in the material, flow, look and feel. Remind yourself of the purpose of the presentation, edit it, improve it and go through it again.

Perception:
Show the audience that you are honored to be there and that you are enthusiastic about your topic and their impression of it. This means dress respectfully and act professionally, remember to speak clearly towards the audience, don't read to them, be a good listener, make eye contact and smile at least a few times. On average an audience gets the message you are delivering by the way you sound and how the whole thing looks – only about 10% of your message will be received by what you say.

The Most Effective Format of Presentation
Introduction: set the tone and the theme
Motivation opening: tell them why to listen; lift your visor
Outline of agenda: help them to understand and picture the structure of your material
Present your basic idea: explain the whole idea first so whatever further explanation comes next can be hung from the framework you create right at the beginning
Content – section by section: begin to break into segments; present each segment with its details
Recap each section: build in a recap at the end of each section before you finish and go on, for reinforcement and additional clarification
Make transitions to next section: let everyone know you're about to go to a new topic; this makes your outline structure continuously clear
Wrap-up: at the end of all the components, wrap up by restating the whole idea, hitting the major points
Conclusion: finish memorably with a grand finale – bringing together all the elements of your presentation by reviewing the highlights and restating your major argument. Ref. Jan Noyes "The Presentation Tipster"

The chart at right gives some tips on presentation format in general. Follow these in spirit but be mindful of the need to have all members participate in the time allotted.

DELIVERABLES

Group Submissions

The following items are to be submitted to the instructor according to the term schedule, one hard copy per group and under separate cover:

	Item	Length	Type
1.	Statement of Qualifications (SOQ)	10 page limit	paper & pdf
2.	Project Work Plan	20 page limit	paper & pdf
3.	Weekly Progress reports	2-3 page limit each	paper
4.	Final report	100 page limit	paper & pdf
5.	Report appendices	discretionary	discretionary
6	Copy of final report presentation	40 slide limit (15 mins)	pdf

Notes:

- These documents may make reference to, and build on, materials from previous documents but must not contain redundant copies of prior submissions.
- Electronic (pdf) copies requested MUST be submitted by email as a single file no greater than 4Mb. The file name MUST include group name, number and document title.
- All members of each group must sign items 2, 3 and 4 above, prior to submission.
- Clarity and legibility are important for evaluation.
- Submitted copies will be graded and reviewed with groups but kept by the instructor.

Group Project Binder

Although they will not be graded, student groups are strongly encouraged to keep a project binder, or alternatively, a project website containing the following items under tabs:

1) Personal resumes
2) Group Statement of Qualifications
3) Project Description as provided by client
4) All meeting agendas (one page per meeting)
5) All meeting minutes (one page per meeting)
6) Project Plan as submitted
7) Progress reports as submitted
8) The Final Report
9) And, the Final Report presentation (small slides).

Groups are advised to create the binder or website in the first week of classes and add materials as work progresses, keeping the binder in an accessible location for all group members. In this way individuals will have unlimited access to all the important group documents throughout the term, and will ultimately have a complete project binder for future reference. Other notes collected during the term from class meetings, guest lectures, workings etc should be kept under separate cover.

COURSE MARKING SCHEME

Marks will be assigned by the instructor with input from clients, faculty advisors and teaching assistants, according to the following distribution:

Group Statement of Qualifications	5%
Student Logbooks	5%
Project Plan	20%
Progress reports and Presentations	10%
Final Report and Presentation (50/10 split)	60%
	100%

Evaluation will be based on:

- the technical competence and communication skills demonstrated through written and oral presentations,
- student participation and professional conduct in meetings with clients, the instructor faculty advisors, and other course participants,
- Individual effort contributed to the project, and, to some degree the comprehension, analysis and interrogation of the designs presented by other groups.

The form below, or one like it, will be used as a guide for the instructor when reviewing submitted work and while attending presentations. Not all categories are relevant for all activities, nor are all activities thoroughly covered by the form, but adequate space is provided for notes and rigorous adherence may not be necessary.

GENERAL Review Form - ENGI 8700

To be used as review guide for the following:
Project Plan, Progress Report, Mid-Term Presentation, Final Report, Final Presentation

Memorial University
Faculty of Engineering and Applied Science
Civil Engineering Design Course 8700

Group: _____
Client: _____
Project title: _____
Event or Doc. _____

Date _____
Reviewer _____

Abbreviation	*Description*	Weight low - high	Evaluation 1 - 10	Reasons and Comments
INTRO	Introduction and clear statement of purpose and deliverables			
CONTENTS	Identification of report or presentation contents			
METHOD	Statement of Methodology and description of Overall Approach			
TASKS	Description of tasks incl. persons, resources, analysis			
SCHEDULE	Presentation of a clear and realistic schedule with milestones			
COSTS	Development of budgets, and cost estimates			
ACTIONS	Identification of key future action items and associated effort			
RESULTS	Results of analysis and design work			
QUALIFIERS	Overview of assumptions, constraints, qualifiers, cautions			
CONCLUSIONS	Closing comments, conclusions, recommendations, acknowl.			
APPEARANCE	Professional appearance, organization, communication			
TECHNICAL	Technical competence			
	totals			

COMMENTS

CLIENT GUIDELINES

A commitment to serve as a client is a commitment to :

1. *Offer a real engineering design challenge* with clear objectives stated prior to the commencement of the semester. The project should not be overly sensitive (controversial) or proprietary in a way that restricts the students presentation of results to faculty or other client participants.

2. *Write a paragraph* describing the project and a second paragraph describing the responsibilities of the students (see form below).

3. *Review the "Statement of Qualifications"* of approximately five "pre-qualified" student "consultancies" prior to interviewing them

4. *Attend the Match Night*, a two hour plus, kickoff meeting and social event in which clients present their projects to the class (5 minutes total) followed by 10 minute interviews with prequalified student groups, a social time with food and drinks and a closed meeting to finalize the matching of student groups with clients.

5. *Meet with the student groups once a week* at a location and time of convenience to the client and respecting the school schedule of the students

6. *Provide appropriate, high-level direction*, information, resources and approvals for the students to execute the work as requested in offer stated at the outset of the course

7. *Serve as a professional role model* and mentor to the students at all times

8. *To attend the final presentation* of all student groups and to nominate a group for the CSCE prize for best project presentation. The Wally Campbell award for best project will be awarded by faculty after careful review of all submitted materials. It is not requested that clients participate in this exercise, though they are welcome to do so if interested.

Key Rules and Guidelines for Clients:

- The project definition and the responsibilities or requirements specifically identified by the client for the student group must remain unchanged from the outset of the course. The form attached below indicates the required input from the client prior to the commencement of the term. Only in extraordinary circumstances and when there is a consensus amongst students, client and instructor will a design project or the stated goals of the group be formally changed after the commencement of work. Though this rigidity does not always reflect the true nature of commercial work, it is the requested condition for this course.

- The project and work requirements of the students needs to be technically challenging but realistic in scale as the project must be fully completed in less than 12 weeks.

- The primary client contact must be a practicing professional engineer. Others persons from the client organization are also welcome to participate in the project supervision as

resource people or facilitators, but the primary mentor and chief contact must remain a practicing engineer.

- Interaction with the students must be consistent with typical professional engineering standards of practice. For instance, one might consider putting aside cell phones, calls and other business for the one hour meeting with the students so that proper attention may be given. Keep in mind that the client is a professional role model and mentor to the group and the long lasting impressions will reflect your actions and not your words.

- Respect the meeting agenda that the students have prepared and allow it to run its course. Corrections can be made to the next one if errors were made in the present.

- If errors are made in work or if professional indiscretions are obvious then attempt to be constructive by offering helpful feedback. Noting problems without offering advice or direction may only worsen the problems by lowering morale.

- Contact the instructor immediately if there are significant problems. Please do not communicate significant problems through the student group. And lastly,

- Always respect the need for the instructor to follow the actions of student groups and to discuss the workings of projects. The instructor has the responsibility at the end of the day to grade the students for their work. Please ensure that the instructor is welcome to any or all meetings with student groups if matters related to the course project are to be discussed.

Client Project Submission Form

Civil Engineering Design Course ENGI - 8700
Memorial University
Faculty of Engineering and Applied Science
St. John's NL, Canada A1B 3X5

To be submitted to Instructor: Stephen Bruneau, sbruneau@mun.ca, 864-2119

CLIENT

COMPANY _____ address _____

Client Engineer _____ phone _____ email _____

Alternate Contact _____ phone _____ email _____
(at least one P.Eng)

Proposed Project Title

_____

Description of Project

_____

_____

_____

_____

Requirement of Student Group

_____

_____

_____

_____

COMMENTS, CONDITIONS, RESTRICTIONS QUESTIONS

_____

_____

_____

_____

_____

AWARDS

THE WALLY J CAMPBELL AWARD

In honor of the pioneering and much-enjoyed civil engineering professor Wally J Campbell, this award is presented to the project group that formulates the best overall project report. This is judged according to the demonstrated understanding of the challenges, the degree to which they have been met, the manner in which the work was carried out, the ingenuity, quality and reliability of the work, and the clarity of reporting.

In the photo at right taken in 1998 the large plaque in the background of this picture commemorates all the past winners of this award and resides in the Civil Engineering Senior Design Homeroom, known as the Civil Room, located on the second floor of the S. J. Carew Building, room EN-2050

THE CSCE PRIZE

This prize is presented to the group with the highest quality presentation and final summation. To be judged on presentation day at the end of the semester, judges will be evaluating the clarity and quality of the material presented, the manner in which it is delivered and the overall appearance of the material and presenting group. The manner in which questions from the floor are answered, the poise, professionalism and enthusiasm of the group will be contributing factors to the selection of the winner.

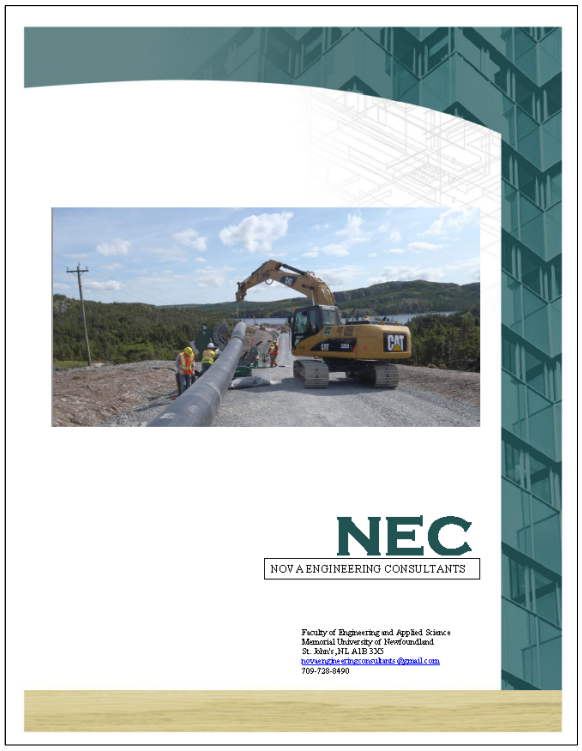
In the photo at right the 1998 CSCE prize is awarded to the winning group by the CSCE representative and course instructor.

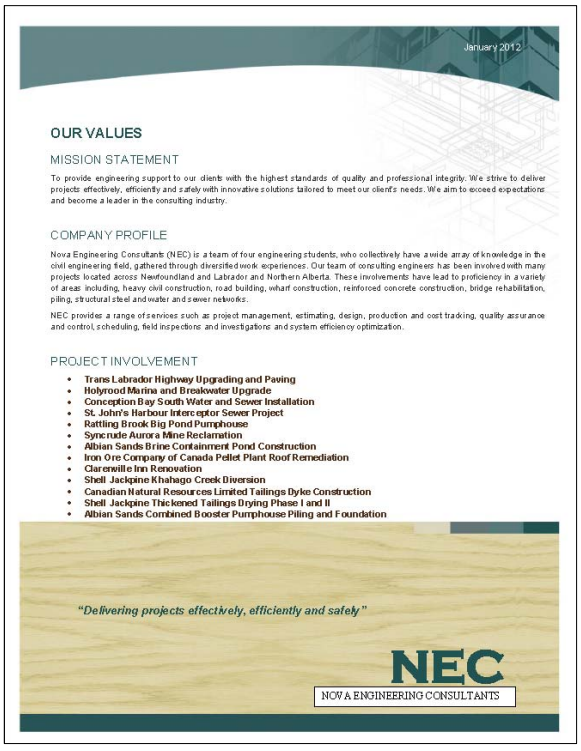
Appendix A – Lecture Series for ENGI-8700

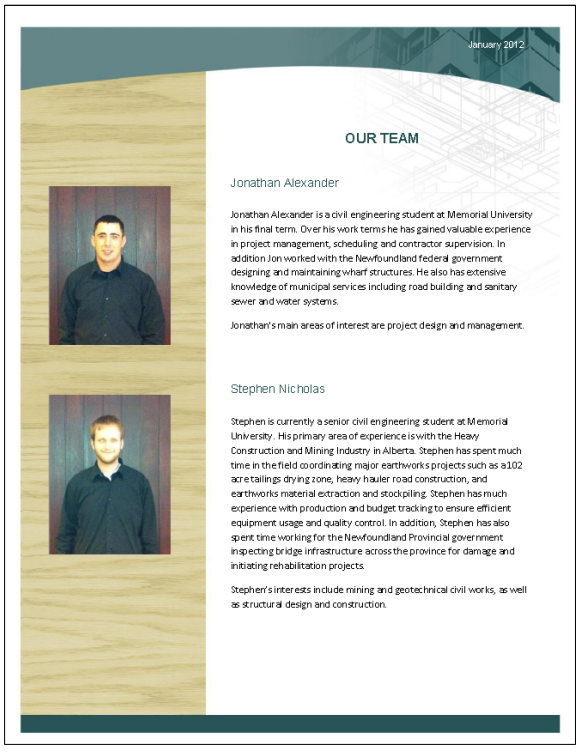
Selections of the following concepts are described and referenced in the lecture series:

1. Communication
2. Technical Documents
3. Presentations
4. Technical Writing Basics
5. Report Graphics
6. Ethics
7. Case Studies
8. Duties of the Professional Engineer to the Public
9. Duties of the Professional Engineer to the Client
10. Duties of the Professional Engineer to the Profession
11. Ethics in the workplace and at University
12. Plagiarism
13. Engineering Seal
14. Iron Ring
15. Engineering Design
16. Evolutionary Design
17. Innovative Design
18. Best Practices
19. Design Requirements
20. Design Process
21. Design Skills
22. Decision Making
23. Design Documents
24. Engineers in Business
25. Proprietorship, Partnership, Incorporation
26. Shareholders, Boards
27. Business resources for Entrepreneurs
28. The Business Plan
29. Intellectual Property
30. Sustainability

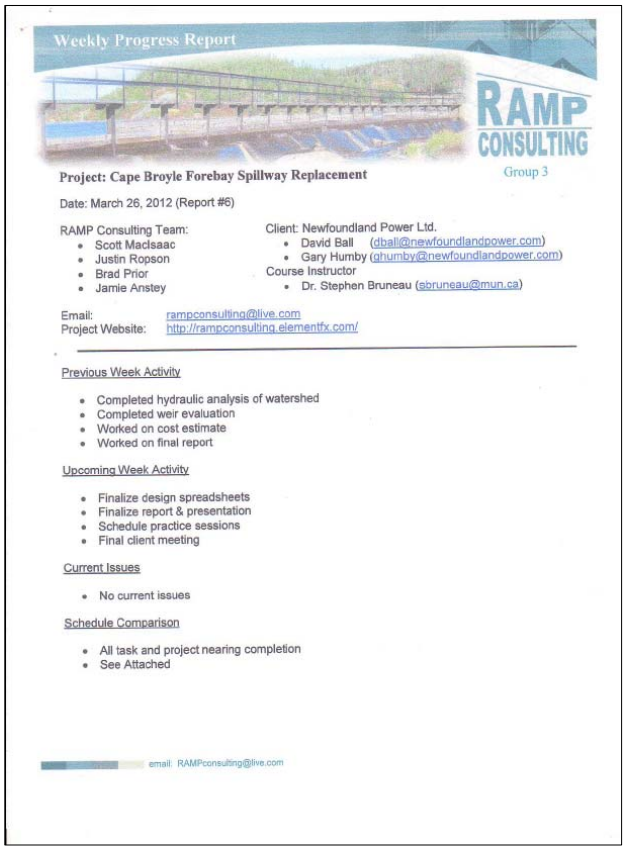
Appendix B – Sample Statement of Qualifications (SOQ)







Appendix C – Sample Weekly Progress Reports



Weekly Progress Report

RAMP CONSULTING

Group 3

Project: Cape Broyle Forebay Spillway Replacement

Date: March 26, 2012 (Report #6)

RAMP Consulting Team:
- Scott MacIsaac
- Justin Ropson
- Brad Prior
- Jamie Anstey

Client: Newfoundland Power Ltd.
- David Ball (dball@newfoundlandpower.com)
- Gary Humby (ghumby@newfoundlandpower.com)

Course Instructor
- Dr. Stephen Bruneau (sbruneau@mun.ca)

Email: rampconsulting@live.com
Project Website: http://rampconsulting.elementfx.com/

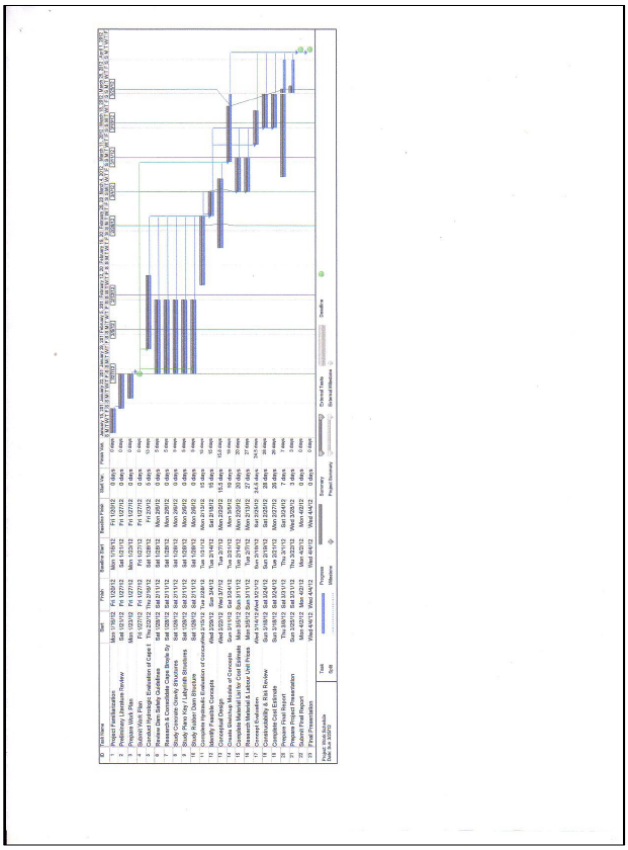
Previous Week Activity
- Completed hydraulic analysis of watershed
- Completed weir evaluation
- Worked on cost estimate
- Worked on final report

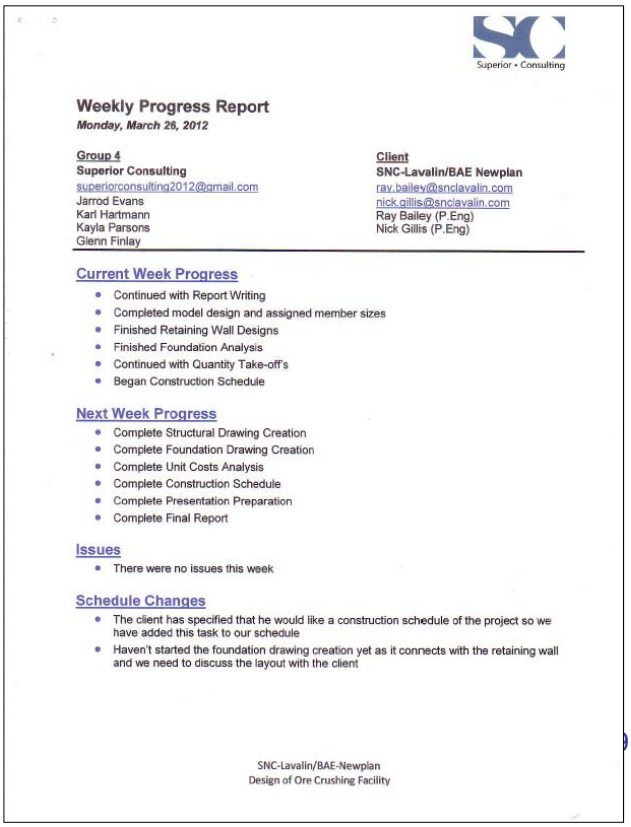
Upcoming Week Activity
- Finalize design spreadsheets
- Finalize report & presentation
- Schedule practice sessions
- Final client meeting

Current Issues
- No current issues

Schedule Comparison
- All task and project nearing completion
- See Attached

email: RAMPconsulting@live.com





Superior • Consulting

Weekly Progress Report

Monday, March 26, 2012

Group 4
Superior Consulting
superiorconsulting2012@gmail.com
Jarrod Evans
Karl Hartmann
Kayla Parsons
Glenn Finlay

Client
SNC-Lavalin/BAE Newplan
ray.bailey@snclavalin.com
nick.gillis@snclavalin.com
Ray Bailey (P.Eng)
Nick Gillis (P.Eng)

Current Week Progress
- Continued with Report Writing
- Completed model design and assigned member sizes
- Finished Retaining Wall Designs
- Finished Foundation Analysis
- Continued with Quantity Take-off's
- Began Construction Schedule

Next Week Progress
- Complete Structural Drawing Creation
- Complete Foundation Drawing Creation
- Complete Unit Costs Analysis
- Complete Construction Schedule
- Complete Presentation Preparation
- Complete Final Report

Issues
- There were no issues this week

Schedule Changes
- The client has specified that he would like a construction schedule of the project so we have added this task to our schedule
- Haven't started the foundation drawing creation yet as it connects with the retaining wall and we need to discuss the layout with the client

SNC-Lavalin/BAE-Newplan
Design of Ore Crushing Facility