Chemistry 3250
Contemporary Chemistry
Spring 2012

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1 Introduction

1.1 Course purpose and objectives

The purpose of this course is to develop professional skills for chemists. At the conclusion of this course, you should be able to do all of the following:

- Identify resources in the chemical literature efficiently.
- Write technical summaries of information received orally or in print.
- Make a technical presentation.
- Engage with ethical issues arising during professional practice in chemistry.

Time permitting, it may be possible to discuss additional aspects of professional practice. Don't hesitate to mention topics you would like to have covered.

1.2 Email

Important information will frequently be communicated to the class via email. It is *your responsibility* to keep an eye on your email during the term. This includes making sure that you do not exceed your email quota. You can check your email account status at https://www.uleth.ca/webtools/account_tools/acctstatus.

1.3 Office hours

I operate on an open-door basis: If I'm in, you are welcome to stop in to ask questions. I am also happy to meet students by appointment.

2 General expectations

I have every confidence that you will comport yourself according to the highest ethical standards. The following notes are intended to avoid misunderstandings, and should be taken in this spirit.

As usual, you are expected to conform to all Calendar policies regarding student work, including the Calendar policy regarding plagiarism [2011–12 Calendar, Part 4, section 5(a)]. All written work submitted in this course is expected to be your own work, written in your own words. This doesn't mean that you can't discuss assignments with classmates, but the moment you use words they wrote (which can happen if you, e.g., share electronic files) without quoting them properly, you are crossing a line and will be subject to the very serious sanctions for plagiarism outlined in the Calendar. Since it is often difficult to tell who copied from whom, letting another student access electronic files containing your work, or providing them with a

printout of your work, is a hazardous practice. Don't put yourself in the position of having to explain why your assignment and someone else's look suspiciously similar. By all means share your ideas generously, but keep your files to yourself.

Parts of this course will involve discussion. You are expected to engage in these discussions, and even at times to debate vigorously, but you must at all times be respectful of others. The key to debating in a professional and respectful manner is to focus at all times on the issues being discussed and to keep personal comments out of the debate. I will do my best to help you learn the difference should an occasion arise in which someone inadvertently lapses into *ad hominem* attacks or other forms of unacceptable discourse. It will be your responsibility to strive to maintain a respectful and professional tone during your discussions. However, should you be unable to do so despite warnings (note the plural) that some aspect of your behavior requires correction, be aware that such a pattern of behavior may result in discipline in accordance with the University's non-academic offence policy [2011–12 Calendar, Part 4, Section 6]. The basic rule is that a classroom should be a safe place in which to engage in intellectual debate. We must all work together to make sure that our classroom meets this standard.

You will be expected to write a number of reports during this course, some short (half a page), and some longer (a few pages). In each case, you are expected to write using full sentences and proper paragraph structure.

Extensions to published deadlines will only be granted in case of illness or other, equally serious and documentable extenuating circumstance. Contact me as soon as possible if you find yourself in this situation. Be prepared to provide evidence to support your request for an extension (e.g. a doctor's note in the case of illness). Informal evidence (e.g. the testimony of friends or parents) is not generally acceptable.

3 Course components

3.1 Library instruction

You will be trained to use SciFinder Scholar and the Web of Science. These are basic tools used to seek out information from the research literature. There will be two assignments based on the skills you will have acquired using these tools. You will also use these tools in completing your term projects.

Library instruction will be held in a computer lab in order to allow you to try the tools out yourself. These sessions will be held on **January 12**, **17** and **19** in room **E620**. It is possible that additional sessions will be scheduled later on, although none are planned at this time.

3.2 Seminars

Among other things, the departmental seminars run in our time slot. Speakers from other universities and from industry will be coming to talk to us about what they're doing. Some of the talks will be pure scientific talks, while others will discuss the practice of chemistry in industry. You are expected to participate actively in the seminars by asking questions during the question period. Your participation will be judged both for its quality (i.e. asking good questions, and not just things like "I didn't understand slide 4") and quantity. An average of one good question per seminar would get you full participation marks. (Note that simple questions are OK. They are in fact sometimes a useful prelude to asking a deeper question. It's just that, from the point of view of evaluating your participation, I want you to ask some of those deeper questions.)

For each talk, you will also be expected to prepare a **technical summary** of about half a page (typed, single spaced, with margins of no more than 1.5 in/4 cm). For these summaries, imagine that you are working for a company. Your company has paid for you to attend a scientific meeting, and expects you to collect information and bring it back so that others at the company can benefit from your trip. Your summary should answer the following questions:

- What was the main point of the talk? If the talk was a scientific talk, what kind of chemistry was the speaker discussing? (You may include chemical structures if this is helpful. The *text* of your summary should still be about half a page long.)

- Was any of the chemistry discussed of potential industrial/commercial relevance? If so, explain. (If not, you don't need to write anything about this.)

You can of course address other issues that you think may be relevant. Think about it this way: If it caught your attention, it will likely be interesting to others on the technical staff at your company. The technical staff is the audience you're writing for. These people probably have some background in chemistry, and are probably exposed to chemistry on a day-to-day basis, but may not all be chemists. Some of them may be, for example, engineers. They won't have the breadth of chemical education that you have, but they're not completely ignorant either. Tell yourself when writing these summaries that the typical background for your audience might include 2000-level organic and physical chemistry. Don't be afraid of technical details, but avoid jargon that would only be known to people who have taken senior-level courses in chemistry.

I don't want people to spend too long writing these summaries, so they will be due at the class immediately following the one at which the presentation was made (i.e. due the following Thursday for a Tuesday presentation, or the following Tuesday following a Thursday presentation). The summaries will be marked equally for content and readability. Spelling, grammar and syntax count since they affect readability. Logical organization also goes to readability.

I can't tell you how many seminars we're going to have, since people sometimes announce themselves late. I'm in the process of agreeing to times and dates with several speakers. We are all therefore going to have to be flexible with this component of the course. The scheduling of seminars may also force me to push some other deadlines back (i.e. to give you extra time). In no case will deadlines be moved forward. Although I will do my best to avoid this, it is also possible that a heavy seminar load will force me to reduce the amount of work expected in other course components. If so, appropriate announcements will be made in class. *Note that the possibility of reducing the amount of graded work in certain areas makes it all the more important that you put your best foot forward early on.*

3.3 Ethics case studies

Professional chemists, like professionals in any other field, have an obligation to conduct their work in an ethical manner. We will study some of the ways in which ethics comes up in chemical practice, and the obligations that come with the title of "Professional Chemist" (which you are entitled to after completing an accredited chemistry degree such as the University of Lethbridge's and joining the Association of the Chemical Profession of Alberta). Your evaluation for this unit will be based on three case studies. In each case, I will present the case study in class. We will have a discussion in which we try to examine different viewpoints. You will then write up and submit your opinion. Evaluation will be based on your participation in the discussion and on your written opinion.

My role during the discussions will be to moderate, and perhaps to occasionally point out angles you had not considered. I may even play devil's advocate from time to time. I will however refrain from giving my own opinion so that you can form your own without feeling that there is a "right" answer. There are no right answers in ethics although there are some wrong answers (cf. William Gass, The case of the obliging stranger, *Phil. Rev.* **1957**, *66*, 193–204).

My expectation in the discussions is that you will attempt to engage with the issue(s). This requires a certain amount of "thinking out loud", which you may find difficult at first, perhaps even embarrassing, since your first reaction may not be fully thought out. Engaging in this kind of discussion requires that you listen actively to what others are saying and react appropriately to them. An appropriate response is one which shows both thoughtfulness and respect. You must be prepared to change your mind, and must also be tolerant of different viewpoints. The mark assigned for your participation will take into account all of the above dimensions of professional discourse, as well as the quantity of your participation.

Your written opinions should contain a reasonably thorough analysis of the issues and a clear exposition of your reasoning in reaching your final conclusion. Your opinions will be marked for readability (30%), completeness of the analysis (30%) and logic (40%). It is difficult to say how long these opinions should be because the length will depend on the complexity of the case analyzed. As a rough guideline, I would think that you would need at least 1000 words to do a reasonable job of analyzing these case studies. Don't take this as a hard minimum, and don't be shy to write more if you think you need to.

After receiving my comments, you will have the option of revising and resubmitting your opinions once. You will have two weeks to resubmit from the day I return your case study. If you take advantage of this revision option, your mark for your opinion will be the average of your original mark and of your mark on the revision. Please submit both the revised and original marked versions together.

3.4 Term project

Your major project for the term will be to prepare for and deliver a presentation to the chief technology officer of your company along with other members of his/her technical staff in which you try to convince the management group to invest some resources into investigating a new technology, either to improve existing products or processes at the company, or to develop a new product which is a logical extension of the company's existing product line.

This project will unfold in stages:

1. You first have to pick a company. This should be a **real** company that sells a product whose production involves significant chemistry, or one that sells chemical services. Due to the nature of this assignment, the company should have a track record of innovation, i.e. this can't be a company that delivers routine services using only off-the-shelf instrumentation. You will turn in a brief **corporate profile** describing what the company does and how chemistry is involved in their business. You will likely collect most of the information you need from corporate web sites, although extra credit may be granted for finding other sources of information.

   No two students may choose the same company. Accordingly, as soon as you have an idea, let me know what it is. (Email is OK for this.) This will "reserve" that company for you. This will also give me a chance to check that you have chosen a suitable company. When you contact me to let me know what company you have tentatively chosen, please provide your source of information (e.g. the URL of the corporate web site).

   Note that you may *not* choose the company of any of the invited speakers listed on the course schedule on the web site as of Jan. 10 (first day of classes in this course).

2. You will search the literature for some new scientific research (published in 2006 or later) that could help your company improve an existing product or process, or develop a new one. Again, this new development has to make sense for your company. Feel free to discuss your idea with me prior to doing extensive work on your project.

3. You will prepare a one-page **briefing note** (typed, single spaced) explaining how the research you have identified could help the company. The briefing note should include appropriate references (the paper describing the research plus appropriate background). The references can go onto an extra page (i.e. the text of the briefing note should take almost all or all of the page).

4. You will update your briefing note based on my feedback. The updated briefing note will be distributed to the entire class so that your classmates can come to your presentation with some idea of what you will be presenting. This reflects common practice in industry where technical briefing notes are distributed prior to meetings at which ideas brought forward by the staff will be discussed.

5. You will make a 20 minute presentation in which you argue for your company to invest resources into investigating the scientific advance you are championing. You should indicate what level of resources you think the company should invest at this time:

   - If the company has a research and development (R&D) department, you could ask the company to have the R&D department work on developing the science into a product, or maybe just investigate the feasibility of doing so.
   - You could suggest that the company partner with the original research organization (often a university) to explore the idea further.
   - If you think the idea is basically ready to go to market, you could even suggest that the company license the technology from its inventor(s).

These are just some possible recommendations. What you will suggest will depend very much on how mature you think the technology is, and what resources your company can bring to bear.

You will make your presentation twice. The first time, your presentation will *not* be evaluated. The class (myself included) will provide detailed feedback on your presentation, and in particular on its persuasiveness. The second time, which will be at least one week later, will be evaluated. The criteria will be quality of the visuals (30%), quality of the delivery (30%) and persuasiveness (40%). The latter category will include your ability to answer questions about your idea and how it fits into the company's product line.

When making your presentation, keep in mind that the whole class will already have read your briefing note. This may enable you to spend less time during your presentation on background (although there should be some) and more time on building the argument that you are presenting the group with a good idea that should be pursued at some level.

4 Tentative deadlines

All assignments are due at 12:15 p.m. on the deadline day. The following is a list of tentative deadlines, not including the seminar technical summaries. Because of the seminars, as noted above, I may need to adjust some of these deadlines as we go. Official deadlines will typically be printed on the assignment itself, and will be posted to the course web site.

Date	Assignment
Jan. 24	SciFinder assignment
Jan. 26	Web of Science assignment
Jan. 31	Corporate profile
Feb. 14	Ethics case study 1
Feb. 28	Briefing note first draft
Mar. 6	Ethics case study 2
Mar. 20	Briefing note final version
Mar. 27	Ethics case study 3

The speaking order for your first presentations will be set by a random draw. These first presentations are tentatively scheduled for March 27–29. Your second presentation will be no earlier than one week after your first.

5 Grading

Your grade will be set as follows:

Assignment type		Weight
Library assignments		5%
Seminars		25%
- *Technical summaries*	*15%*	
- *Participation*	*10%*	
Ethics case studies		30%
- *Written opinions*	*20%*	
- *Participation*	*10%*	
Term project		40%
- *Corporate profile*		*5%*
- *Briefing note first draft*		*5%*
- *Briefing note final version*		*10%*
- *Presentation*		*20%*