

CHEM 282 – Undergraduate Seminar: Fall 2016

Course Description:

Oral and written presentation of a subject of current chemical interest.

Learning Goals:

1. To apply knowledge of chemical and physical principles
2. To be able to read and critically evaluate the chemical and scientific literature
3. To learn to present scientific data clearly and effectively through both written and verbal communication

Lecture:

Official class time is **Thursday 4:25 - 5:40 pm**, but formal class meetings will be rare. Those that occur will be scheduled to meet in **Cook A229**, and students will be informed in advance by e-mail of the class meetings.

The class time near the end of the semester will be used as the presentation time for each student's seminar. Two seminars will be presented per 75 min class period. The location for the seminars will be **Lafayette L207**. All faculty and students in the Department of Chemistry will be invited to attend these seminars.

Text:

None

Course Instructor:

Dwight E. Matthews: Dwight.Matthews@uvm.edu 656-8114 Cook A121

Office hours:

Scheduled per student need

UVM Policy on Absences:

Religious Holidays: Students have the right to practice the religion of their choice. Students should submit in writing by the end of the 2nd full week of classes their documented religious holiday schedule for the semester if there are any conflicts with the class or laboratory schedule.

Inter-collegiate Athletics: Members of UVM varsity and junior varsity teams are responsible for documenting in writing any conflicts between their planned athletic schedule and the class (& laboratory) schedule by the end of the 2nd full week of classes.

UVM Policy on Academic Integrity:

Offenses against the Code of Academic Integrity are deemed serious and insult the integrity of the entire academic community. Any suspected violations of the code are taken very seriously and will be forwarded to the Center for Student Ethics & Standards for further investigation.

Introduction

The ability to communicate science in a clear and understandable way is a critical skill. Over the past few years you have had ample opportunity to prepare standardized scientific reports and have gained experience in writing scientific reports and in oral presentations. All of this practice is important because clear expression through writing and speaking is a prerequisite for a successful career in science. The purpose of the seminar course is to a structured opportunity to develop further your writing and oral presentation skills as a capstone experience. The remainder of the syllabus outlines the steps you will follow in this process.

Components

1. **Oral presentation.** Will occur at the end of the semester (see time table at the end) during our regularly scheduled seminar period. Two presentations will occur per seminar period. You will be expected to speak for 25 minutes. If your talk is substantially shorter, you will be penalized in your grade. You also cannot go over 30 minutes due to the constraints of the room schedule. There will be a period of 5 minutes for the audience to ask questions at the end of your seminar. The presentation will be professionally prepared and presented using Microsoft PowerPoint (or other software such as Apple Keynote).
2. **Written synopsis.** As a synopsis, the written paper will summarize the key elements of your talk. The written paper is described later and will be 5-10 pages in length. The paper is to be submitted and distributed to the faculty ahead of your talk.

1) Choosing a topic

First and foremost, the goal of a seminar should be to teach the audience something new and interesting. Answers to the 4 most common questions:

1. **Yes**, the topic you choose must be relevant to CHEMISTRY! Avoid topics that focus on applications of chemistry in other fields that don't contain significant discussion of chemistry.
2. **Yes**, everyone who attends your seminar presentation is very interested in learning new chemistry.
3. **No**, neither the faculty nor the graduate students that will listen to your talk "already know it all". Some topics that seem simple may not be.
4. **Yes**, it will be boring if your topic is overly narrow or shallow. You need to have enough breadth and depth in your material to tell a good story, *and* it needs to have enough interest for a broad range of listeners.

Chemistry should be a key component of your talk. For example, a survey of drugs recently approved by the FDA would be a poor topic. On the other hand, an in-depth discussion about the chemical basis of a disease state and how specific drugs act within cells at a biochemical level to produce a therapeutic effect would probably be well received. Overall, the guidelines for your choice of topic include the following:

1. Contain significant chemical information and be relevant to chemistry.
2. Not overlap directly with any undergraduate research you are/have conducted.
3. Provide a non-superficial, in-depth treatment of the chosen topic.
4. Be broad enough to engage the audience.
5. Be taken from the current literature. You can start with background information from a decade ago, but the topic should be relevant and have significant work being published in the last 5 years.

Suggestion: Search through current review articles for topics of interest you might want to talk about. A variety of journals only publish reviews in the general chemical field. Examples are *Chemical Reviews* and *Accounts of Chemical Research*. In addition, many sub-disciplines of chemistry have journals that publish review articles covering a specific range of topics (e.g. *Mass Spectrometry Reviews* or *Current Opinion in Chemical Biology*), and many journals periodically publish review articles within that journal.

Finding a recent review article guarantees that the topic is both (i) current and (ii) an area of active research. An older review article can work, but you need to search forward for current

relevance. However, do not base your talk on the review per se. You need to dig into the primary literature yourself.

Get help: As you begin to hone in on a topic, seek out a relevant faculty member and bounce your ideas off him/her. That faculty member can give you a quick idea as to whether he/she feels the topic would be a good one and has the depth and breadth needed.

Timeline: Do the selection of a topic as early as possible. See the last page of this document for the suggested timeline. Early is important because you can have a false start where the topic does not pan out to have the expected breadth and depth upon further work.

2) Developing the outline of the talk

The key to a good talk is good material. Good material is of general interest and relevant to your target audience. Once you have the material, the next big task is to organize the material into a format that tells a good story. Organizing that story is usually the biggest challenge. Just as you may have used outlines to develop papers you have written, you should use an outline to develop your talk. A good talk, like a good paper, or even a good book has several definable parts:

The introduction – where you introduce the topic, define its importance and relevance

1. Clearly state to the audience why they should be interested in your topic and why it is of importance. No one in the audience should ever be thinking “why do I care?”
2. Provide all the background information the audience needs before you go forward deeper into the topic.
3. It is helpful to start at a level that everyone understands, then work up adding more detailed and esoteric information.
4. The best talks are ones that teach the audience something new or expand upon their existing knowledge.
5. Often times an outline slide is placed at the end of the introduction to tell the audience in advance what topics will be covered in your talk.

The body of the talk– where you develop the various points of your story

1. How you develop the middle is up to you, but it should tell an effective story.
2. This section of the talk will be a series of points that logically develop the story. The organization of the points can be in a variety of forms. For example you could develop your story (a) chronologically, (b) from simple to complex, or (c) present several parallel points in an order that makes sense.
3. Break your talk up into paragraph form so that your logical argument grows from paragraph to paragraph, except instead of paragraphs, you are using a series of slides.

An end – where you summarize and put into perspective what you have said

1. Emphasize which of the points you made have the most importance.
2. Provide your opinion and interpretation of what is important for the audience to take away.
3. Provide a final conclusion(s).

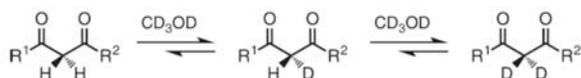
Nuts & bolts:

1. You are certainly welcome to write out your outline with pencil on paper as you develop it, but I find it much easier to use Word with the outline numbering turned on.
2. Remember, you are developing individual slides as your story. The purpose of your outline is to be *one outline point = one slide*.
 - a. Make your outline points your slide titles
 - b. Add sub-points (like this) to the outline that provide more detail

- c. Some of your slides will be bullet points; try adding sub-points to your outline that will be those bullet points
- d. Some of your slides will be tables or figures from published works. Type what you want to say (i.e. slide title) as an outline point about the data from a paper you want to present, and just below it, *cut/paste from the paper* (using the Adobe PDF Reader snapshot feature) that table, figure.
 - i. When you cite a table, figure, drawing, caption, scheme, etc. from another source, add at least an abbreviated reference to that source so that you can add it to your slides later.
 - ii. Also add the table or figure number to the outline point so that you can find it easier when you start preparing your slides.

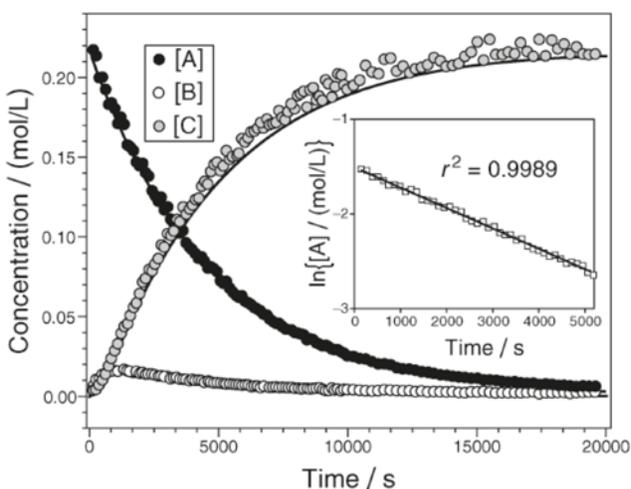
----- Example of outline points with snapshots added -----

3. Scheme of diketone – enol equilibrium [Nichols J Chem Ed 2010]



4. Time course showing kinetic data of 2H exchange for acetylacetone [Fig 1 from Nichols]

A



5. Kinetic rates determined for both diketones [Table 1, Nichols]

Table 1. Rate Constants for the First-Order Consecutive Reaction Model for the Reaction of CD₃OD with Acetylacetone and Ethyl Acetoacetate

Reagent	k_1/s^{-1}	k_2/s^{-1}	k_2/k_1
Acetylacetone	$1.6 (\pm 0.7) \times 10^{-4}$	$1.6 (\pm 0.8) \times 10^{-3}$	$10.0 (\pm 5\%)$
Ethyl acetoacetate	$3.9 (\pm 1.4) \times 10^{-4}$	$2.3 (\pm 0.8) \times 10^{-4}$	$0.58 (\pm 7\%)$

----- End of example -----

6. If you follow the above process, you will have effectively built your talk in full, slide by slide. You can move outline points around (up & down), add, delete, etc. With graphics pasted in, you can see what you are talking about.
7. **Once you have the rough draft of your talk done in outline form, you need to show it to (1) me and (2) to the faculty member who helped you hone in on your topic.** You will get important, early feedback from us.
8. At this point, your next decision is whether to redraw any chemical schemes, figures or tables.

- a. Generally, you won't have the underlying data to redraw a published figure. Figures can be pasted into PowerPoint directly from the paper at sufficient resolution.
 - i. **BIG NOTE:** There is no excuse for a grainy or blurry figure.
- b. Tables generally do better if they are retyped, or better yet, converted to a graph. Graphs are better at conveying differences between values.
- c. All chemical schemes and chemical structures should be redrawn for best clarity. Redrawing a scheme allows you to make changes, to rearrange it to fit a slide properly, or to add color to highlight portions of molecules, etc.

3) Developing and finalizing the talk and slides

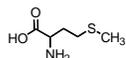
Slide content and style:

1. Although bullet points are effective, **limit their use**.
 - a. When you do use bullets, try to have graphic(s) accompany them on a slide.
 - b. Bullet points should be short. They *should not be* complete sentences or paragraphs, but they should be understandable.
 - c. You use bullet points as talking points: the audience reads the points, but you say the sentences that they would expand into.

----- Example -----

Example of Introduction Using Both Graphical Info and Bullet Points:

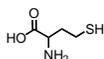
Sulfur Amino Acids (SAA)



Methionine (Met)



Cysteine (Cys)



Homocysteine (Hcy)

- Methionine
 - An essential amino acid
- Cysteine
 - Nonessential amino acid
 - Synthesis dependent methionine
- Homocysteine
 - Produced from methionine metabolism
 - Contributes S for cysteine synthesis
 - Elevated homocysteine levels correlate with cardiovascular disease risk

10/2/2015

Slide 6

----- NOTE: This example slide also illustrates the points that follow -----

2. Every slide should have a title.
 - a. Titles should state what is on the slide or what the slide is about
 - b. Titles like "Introduction" or "Data" do say what is on the slide, but they do not convey sufficient information to the audience.
3. Use a plain white background for your slides.
4. Be sure everything is legible on your slides.
 - a. Use 14-point and bigger fonts. (Note: the smallest bullet in the example is 18 point)
 - b. Leave white space on all 4 sides.
 - c. Present only one major concept per slide. Use more, not less slides.
 - d. Don't put too many words on a slide.
 - e. Don't use a myriad of colors. Stay with just a few (2-3 besides black).
 - f. Don't use **light colors**.

5. Any figure, table, result, concept, cartoon, etc. that appears on your slides that comes from another source *needs to be cited on the slide* (including material taken from web sites). Best place to do that is in the lower left corner of each slide that needs a citation.
6. Put the slide number on each slide in the lower right corner. It is helpful to the audience when asking questions later to direct their questions to a specific slide.
 - a. Normally, the default PowerPoint layout has a slide number box already in the slide master. If not, you can add (or edit) the slide number using the VIEW / Slide Master feature to add a text box at the bottom, then from within the text box add a slide number via INSERT / Slide Number.
7. Tables and figures should not be overly complicated or difficult to follow. Consider reducing the amount of information presented in a table to what is germane or use a series of slides.

Speaking points: the presentation itself

Delivering an effective seminar presentation is a practiced art. Here are some suggestions:

1. *Orient your audience to every slide.*
 - a. State clearly what is on the slide, especially with graphs, describing both the x & y axes.
2. *Don't go backwards to earlier slides.* If you need to show material again, replicate it as a new slide.
3. *Speak to your audience*, not to the screen where the slide is projected. Focus on maintaining eye contact with your audience, and do so from the front.
4. *Use the laser pointer simply and succinctly* to indicate clearly the section of interest on the projected slide that you are talking about.
 - a. Do not keep holding the laser pointer button down.
 - b. Don't swirl the pointer around on the slide. This is distracting!
 - c. If you are really nervous, you may need two hands to hold the pointer.
5. *Do not skip through slides too quickly.*
 - a. All material on your slides is important – otherwise it would not be there (right?). So if it's important, give it some emphasis.
 - b. Typically, an average slides takes ≈ 1 minute to explain. This point also suggests that your talk should not have more than about 30 slides.
 - c. If you skip through slides too rapidly, your audience will not have a chance to absorb the material. If you go through a slide too slow, you will bore the audience. Practice until you strike the correct balance.
6. If you are very nervous and have trouble facing an audience, pick two points in the rear of the room and focus on one and occasionally move to the other. Usually the nervousness vanishes once you get into your presentation.
7. *Speak clearly* and not too fast. The latter is often a manifestation of nervousness. If needed, slow down by rephrasing a point several ways, thus taking more time to get the point across.
8. *Do not use informal or colloquial language. Be precise in what you say and be specific in your language.* Examples:
 - a. When referring to a particular group of workers, do not say “they have shown” etc., but rather specify the person(s) in question, e.g., “Schmedly and co-workers have shown”.
 - b. Saying “... and then they reacted this thing with that ...” is vague. Perhaps pick out one or two specific functional groups within the molecule (preferably the one undergoing reaction) and call the compound by that name. For example “... the

beta-amino aldehyde was then reacted with a methyl Grignard reagent to give the secondary alcohol”.

- c. “The reaction went really fast” – ok, but what is fast?
 - d. “They got great data when they changed to ____” – if so, show the audience with a figure and point out what is so great.
9. Don’t assume audience familiarity with the specialized terms. All concepts and terms need to be clearly defined as you go along.
10. Be careful about using uncommon or esoteric abbreviations (e.g., PAH, ESCA) without first giving the full name at least once.
- a. Avoid use of abbreviations in slide titles.
11. Practice, practice, practice. Rehearse your talk **out loud** several times before you present in front of the audience.

Logistics before your talk:

The seminar room will be media-ready with a projection display device attached to a PC at the lectern. There will be a black/white board and probably an overhead-display device. The lectern should also have a D-Sub VGA connector for your PC.

NOTES:

1. You may present from the lectern PC, using a USB stick.
 - a. It is NOT advisable to e-mail your presentation to yourself and fetch the presentation via the PC’s web connection at the time of the talk.
 - b. The PC has a recent version of PowerPoint; it does not have Apple Keynote or any other non-Microsoft software.
 - c. If you have prepared your PowerPoint presentation on a Mac and want to present from the PC, be sure to test your presentation on the seminar room PC in advance. There can be funny symbol differences between PCs and Macs.
2. YES, you may present from your PC or Mac using the D-Sub VGA connector. However,
 - a. If you have a Mac, you need to bring your own mini-display port-to-VGA dongle connector.
 - b. If you have a new, thin PC, check to be sure it has a D-Sub connector. If it has a mini-display port, you need to bring your own dongle connector.
 - c. There is no HDMI connector. If you PC ONLY HAS an HDMI output, you will need a converter to D-Sub VGA if you want to use your PC.

Important word to the wise: Go to the seminar room and try out your presentation at least a day ahead of your presentation to confirm that you CAN OPERATE all the media and everything projects well.

Practicing Your Talk

Around two weeks before your seminar, you should be ready to do full practice runs in front of an audience. By this point you should have already gone over the talk on your own several times. You should contact the faculty member who advised you on your topic selection or your research advisor and arrange a time to present your talk to your faculty member and his/her research group. Be prepared for lots of criticism. All criticism will be constructive, so don’t get discouraged if it means substantial revision of your talk after this presentation. What you thought was very clear, may not be so to others – hence the reason do the rehearsal presentation early enough for you to have time to make substantial revisions. **The importance of giving many practice talks well before your actual seminar date cannot be overemphasized.**

4) Developing and finalizing the written paper

You will submit a written synopsis of the material in your oral presentation. Length is expected to be 5-10 double-spaced pages with 1" margins, 11-12 point font with pertinent figures and tables embedded into the text.

Your writing should be clear and grammatically correct. The synopsis should tell a story. All figures and chemical structures should be produced with appropriate software. It is recommended that you have someone (in addition to yourself) proof your text.

Title page and abstract:

The title page has (in appropriate font sizes) your talk title, your name, and date of presentation on separate lines. Leave room for the abstract to also appear on this page.

Your abstract will follow the format of abstracts in journals for review articles. The abstract should be single spaced and not much more than a half page. The abstract should succinctly summarize what is said in your synopsis and has several brief parts (1-3 sentences) in the following order: (a) introduction that includes why your topic is of interest and important, (b) introduction and brief description of each major point in your paper, (c) a summary where you comment on what is important about these points, and (d) a conclusion.

References:

Citations to the work of other that you discuss in your paper should be referenced according American Chemical Society (ACS) format, including full titles in the references. UVM Software Archive provides download of EndNote for this purpose. Examples of expected reference styles:

Journal articles:

Jørgensen, C. K., Differences between the four halide ligands, and discussion remarks on trigonal-bipyramidal complexes, on oxidation states, and on diagonal elements of one-electron energy. *Coord. Chem. Rev.* **1966**, *1* (1–2), 164-178.

Prier, C. K.; Rankic, D. A.; MacMillan, D. W. C., Visible light photoredox catalysis with transition metal complexes: Applications in organic synthesis. *Chem. Rev.* **2013**, *113* (7), 5322-5363.

Book chapter:

Matthews, D. E., Gas chromatography-combustion-IRMS (GC-C-IRMS) for carbon and nitrogen. In *Elemental and Isotope Ratio Mass Spectrometry*, Beauchemin, D.; Matthews, D. E., Eds. Elsevier: Oxford, UK, 2010; Vol. 5, pp 774-783.

Book:

Beauchemin, D.; Matthews, D. E., *Elemental and Isotope Ratio Mass Spectrometry*. Elsevier: Oxford, UK, 2010; Vol. 5.

Dissemination of your final written paper

Your grade will be based in part upon your written paper. The grade of the written portion will be determined by input from all chemistry faculty (including lecturers). You are responsible for disseminating your final written paper to all faculty by the deadline shown below. You can either print copies of your paper (in color as required) and place one in each faculty member's mailbox *or* you can send a copy of your paper by e-mail to every faculty member.

Check with the main office for a list of all faculty members and their mailbox locations or e-mail addresses if you are unsure.

Answering questions at the end of your talk:

You will most likely be asked a few questions after your talk. You should view the questions as a compliment: the person asking was interested enough to want more information. It is also a

chance to clarify any points which may have not been presented clearly. Only rarely is the questioner checking up on your knowledge. Some points:

1. Your response to questions should be thoughtful and honest.
2. Let the person finish asking the question, before you start answering!
3. Your mind may be going 10^6 /sec, and you may not have listened well or the question was poorly framed. You also may need some time to get your mind organized. **BIG TIP:** Restate the question before answering! This gives you
 - a. Some time to think,
 - b. Assures the questioner that you have the right question,
 - c. Allows the audience to hear the question.
4. If you don't know an answer to a question, don't panic. Think for a moment, then comment on what you do know.
 - a. Ask for a clarification to the question.
 - b. It may be that the question is beyond the scope of what you have spoken on, and that may be the answer.
 - c. Don't substitute lack of knowledge with a rambling answer that does not address the question – that is for politicians.
 - d. Don't be afraid to speculate, but indicate if you are doing so.
 - e. Yes, you can answer that you do not know.

Transmitting materials to/from your instructor and other faculty members

You need to transmit copies of your written outline and drafts of the paper as a Word file and drafts of slides as PowerPoint files.

If any of these files are >5-6 Mb, they may get bounced by the UVM mail server. You can send large files using the UVM big file transfer service: <https://filetransfer.uvm.edu/>.

Evaluation – how your grade in CHEM 282 is determined

The chemistry faculty that attend your presentation will provide feedback using a categorized, standard form. Each faculty member will also assign a letter grade to each category and your overall performance.

Your grade in the course will be weighted on the following factors:

- | | |
|--|-----|
| 1. Written Paper (organization, clarity, use of language) | 20% |
| 2. Content (depth of knowledge and scope) | 40% |
| 3. Presentation (slides, organization, continuity, speaking style, etc.) | 40% |

2016 Schedule

- (week 1) 08/30/16 *Class meeting in A229 at 4:30 pm:* Introductory meeting to go over the syllabus.
- (week 4) 09/20/16: *Class meeting in A229 at 4:30 pm:* Come with your preliminary search for a seminar topics. We will review your ideas.
- (week 6) 10/04/16: *Class meeting in A229 at 4:30 pm:* Meet to review your intended choice(s) of topics (be thinking of a backup). We will discuss whether you might have an appropriate topic. Also, before this date, you must have met the faculty member that is advising you, and that person must sign off on your choice as well. Copy me on the e-mail you send that faculty person thanking him/her for his/her assistance.
- (week 8) 10/18/16: *Class meeting in A229 at 4:30 pm:* Meet to discuss each person's detailed 1st-draft talk outlines. Submit to me by e-mail your talk outline a day before. I will have the outline on my PC to display to the group as you go through it.
- (week 10): 11/01/16: *Class meeting in A229 at 4:30 pm:* Good draft of your slides in to me by e-mail. We will go over the drafts in class. You should have arranged for a rehearsal time with your faculty advisor and research group for either this or the next week.
- (week 12): 11/15/16: *Class meeting in A229 at 4:30 pm:* To go over where everybody is on this schedule or not. Submit a final draft of your paper and your slides to me for review.
- (week 13): 11/21/16: Thanksgiving break
- (week 14): 12/01/16: Deadline: Papers are due into faculty e-mailboxes, and final set of slides shared with me. You should do a final rehearsal this week.
- (week 15): 12/06/16: Seminar presentations #1 & #2