Winter 2018 Chemistry 222 with Dr. Michael A. Russell

CH 222, Mt. Hood Community College, Gresham, Oregon, USA 97030

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Office Hours: MW 8 AM, M 10 AM - 12, W 12 and By Appointment only 12 M 10-12 W

Required Materials:

"Chemistry" by The OpenStax College (978-1-938168-39-0),

available here for free: http://mhchem.org/text/OpenStaxChem.pdf

The Chemistry 222 Companion (Lab Manual, Problem Sets, etc. in MHCC Bookstore)

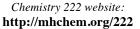
Scientific calculator (such as the TI-89, ClassPad 330, etc.)

Bound Laboratory Notebook (Must have by first day of lab)

Five (5) Scantron Sheets for exams (50 Questions on each side)

Safety goggles for lab

iClicker 2 (ISBN 978-1429280471) Recommended for Lecture





<u>Course Description</u>: This course offers the fundamental basis of chemistry for science, pre-professional, chemistry and engineering majors. This second term covers molecular bonding and properties, gases, liquids, solids, physical states and changes of state, solutions, kinetics, and nuclear chemistry. *Prerequisites*: RD090, WR090 and MTH020, each with a grade of "C" or better, or placement above stated course levels; and CH221 with a grade of "C" or better.

<u>Course Philosophy</u>: To be successful, students enrolled in a 200 level chemistry course should complete all assignments before coming to class, attend classes regularly, participate in discussions, and think critically. Homework assignments represent the *minimum* requirement for understanding the principles of chemistry. It is assumed that A and B students will perform enough *unassigned* exercises to master key concepts. I encourage questions in this class, and I expect a considerable amount of work. If you contact me by email, I will respond to you normally within 24 hours; phone messages will be acted upon as soon as possible.

The Honor Principle: All students will be expected to behave with the highest moral and academic integrity while enrolled in this class. Plagiarism, cheating or sharing information on tests or laboratory reports, disruptive behavior, and other related offenses will be dealt with according to the directives stated in the current *Mt. Hood Community College Student Guide*.

| Grading: | Midterm Exams (2 total, 130 points each) | 260 points | 26% of total points |
|----------|--|-------------|---------------------|
| | Quizzes (6 total, lowest quiz dropped, 20 points each) | 100 points | 10% |
| | Lecture Final Exam | 180 points | 18% |
| | Laboratory Final Exam | 100 points | 10% |
| | Class Presentation | 100 points | 10% |
| | Problem sets, worksheets, lab notebook, reserve CP topic | 60 points | 6% |
| | Nine lab experiments (20 points each) | 180 points | 18% |
| | Lab Completion Bonus | 20 points | <u>2%</u> |
| | Total points: | 1000 points | 100% |

<u>Tentative grading distribution:</u> A: 90-100% B: 80-89% C: 65-79% D: 55-64% F: less than 55% Opportunities for extra credit are available and explained in the "Extra-Credit Guide" handout.

Exams and Quizzes will be held in the recitation portion of lab. No make-up quizzes will be given. If you need to miss an exam due to illness or personal emergency, call and leave a message to ensure a make-up exam. Failure to call results in a failed exam. Note that **cell phones are not allowed as a calculator substitute**, and using a cell phone results in an immediate grade of zero. Each student will give a **Class Presentation** this term. For more information, see the "Class Presentations FAQ" handout.

<u>Laboratory Safety and Etiquette</u> rules can be found in the lab packet for this course and on the website. Information regarding <u>lab</u> <u>reports</u>, the mandatory <u>lab notebook</u>, the <u>lab completion bonus</u> and <u>missed lab sessions</u> can be found in the lab packet and on the course website as well. Lab reports must be submitted as hard "printed" copies for full credit.

<u>Problem Sets and Worksheets</u>: We will be using problem sets found in the CH 222 Companion, available at the bookstore. All problems should be attempted prior to class (we will be discussing them during recitation), and arriving late to a problem set session will invoke a point penalty. Nameless or late problem sets and worksheets will also receive a point penalty. Details regarding problem set and worksheet grading will be discussed during the first recitation of the term.

Note that **sessions may be recorded** to maximize the learning resources available to the student population. See the "College Information" guide on our website (found under "Class Information") for more detail.

"What's Due This Week" Schedule for CH 222 Winter 2018

Problem Sets and **Labs** are found in the **Chemistry 222 Companion** and on our **website** (http://mhchem.org/222)

Dates given below represent **laboratory sessions** that generally meet in AC 2501 and move to AC 2507.

| Week 1 | <u>Dates</u> 1/9 - 1/11 | <u>Lab Assignment</u> <u>Begin</u> "Titration of Water Soluble Copper Salts" <i>and</i> "Linear Regression" <i>Labs</i> - goggles required Introduction <i>to the course</i> |
|-----------|--------------------------------|--|
| 2 | 1/16 - 1/18 | Begin "Lewis Structures" Lab Due: Problem set #1 Chapter 7 Labs due: "Titration of Water Soluble Copper Salts" and "Linear Regression" (Lab #1) Take Quiz #1 |
| 3 | 1/23 - 1/25 | Begin "Valence Bond and Molecular Orbitals Lab" Lab Due: Problem set #2 Chapter 8 Lab Due: "Lewis Structures" (Lab #2) Take Quiz #2 |
| 4 | 1/30 - 2/1 | Begin "Organic Chemistry" Lab Due: Problem set #3 Chapter 20 Lab Due: "Valence Bond and Molecular Orbitals Lab" (Lab #3) Take Quiz #3 February 2, 9 AM: Last chance to reserve a Class Presentation compound |
| 5 | 2/6 - 2/8 | EXAM #1 - Chapter 7, Chapter 8 and Chapter 20; bring scantron, calculator, pencil Begin "Molar Mass Determination of a Volatile Liquid" Lab - goggles required Lab Due: "Organic Chemistry" (Lab #4) Worksheet Due: "Exam Prep I" |
| 6 | 2/13 - 2/15 | Begin "Solids" Lab Due: Problem set #4 Chapter 9 and Chapter 10 (10.1 – 10.2) Lab due: "Molar Mass Determination of a Volatile Liquid" (Lab #5) Take Quiz #4 |
| 7 | 2/20 - 2/22 | Begin "Molar Mass Determination by Freezing Point Depression" Lab - goggles required Due: Problem set #5 Chapter 10 and Chapter 11 Lab due: "Solids" (Lab #6) Take Quiz #5 Due: Class Presentation Rough Draft Paper February 23: Last day to drop or change grade status |
| 8 | 2/27 - 3/1 | EXAM #2 - Chapter 9 – Chapter 11; bring scantron, calculator, pencil Begin "Kinetics - Iodination of Acetone Part I" Lab Lab Due: "Molar Mass Determination by Freezing Point Depression" (Lab #7) Worksheet Due: "Exam Prep II" |
| 9 | 3/6 - 3/8 | CLASS PRESENTATIONS - Final paper due at presentation Lab Due: "Kinetics - Iodination of Acetone Part I" (Lab #8) |
| 10 | 3/13 - 3/15 | Due: Problem set #6 Chapter 12 and Chapter 21 Take: Quiz #6 Begin "Kinetics - Iodination of Acetone Part II" Lab |
| 11 | 3/21 3/20 or 3/21 | LECTURE FINAL (8:45 AM, AC 1303, date tentative; Take Home Final and "Final Exam Prep" worksheet due; bring scantron, calculator, pencil) LAB FINAL Times to be announced, meet in AC 2505 - goggles required, bring: calculator, pencil, Lab Notebook, "Kinetics - Iodination of Acetone Part II" (Lab #9) |

All dates subject to change, especially during finals week.

Attendance during all laboratory sessions is mandatory. Attendance during class lectures is recommended.

Class lectures generally meet at 9 AM in AC 1303 on MWF.

Getting Started in Chemistry 222

Welcome to Chemistry 222! I am glad to have you enrolled in CH 222! Here are some hints on how to get started in the class:

- First, **know that I am here to help you succeed in this class**. If you have any questions, please email me (mike.russell@mhcc.edu), give me a call (503.491.7348) or stop by my office (AC 2568) during office hours. I normally respond to student inquiries within 24 hours on email, and I return calls the next time I am in my office.
- All relevant assignments (problem sets, papers, etc.) as well as assessments (quizzes, exams, etc.) will be due / occur during recitation (the beginning of your lab period.) If this is a **hybrid** or **web-based (H1)** class, we will only meet "face to face" during the lab period. All other students will meet "face to face" during both the lab period and during the lecture periods.
- The "What's Due This Week" Schedule for CH 222 located on page 2 of your syllabus lists all the problem set due dates, assignment deadlines, labs performed, exam/quiz dates, and related information for this term. You can plan your term by referencing this handout.
- Next, **join the** *mhchem* **mailing list** if you are not already a member. *mhchem* is a mailing list for students in CH 221, CH 222 and CH 223 at Mt. Hood Community College. Over the course of the year, you will receive various pieces of information, events, announcements, and more via *mhchem*. If you joined *mhchem* last term, you do not have to re-subscribe.

To join *mhchem*, send your Web browser to the following address:

http://mhchem.org/mhchem

Enter your **email address** and **name**, and then press the **Subscribe** button; after confirmation, you will be a part of *mhchem*.

• The Chemistry 222 website is worth exploring. The Chemistry 222 website has a host of learning opportunities waiting for you. You can download and/or print copies of the syllabus, lecture notes, labs, quiz answers, and more; plus there are opportunities for extra credit available. To get started, send your web browser to

http://mhchem.org/222

You should see the CH 222 website on your screen.

- Check out the **Chemistry 222 Chapter Guides** by selecting "**Chapter Guides**" from the upper left hand corner of the CH 222 website. The Chapter Guides offer a detailed approach for studying the course material through a series of lessons. **Read Lesson Zero**, the "Intro to the Chapter Guides System," to understand how they work.
- Start thinking about a **Class Presentation Topic**. You will be giving a five minute presentation this term on a **compound**, and you must reserve your compound choice with me. A written paper also accompanies the presentation on your compound. To reserve your compound, send your web browser here:

http://mhchem.org/cp222

The "Class Presentations FAQ" (available in the syllabus or here: http://mhchem.org/cp222info) has more information.

- Obtain the **Chemistry 222 Companion** from the **MHCC Bookstore** (http://www.bookstore.mhcc.edu/) *or* the **CH 222 website**. The "Companion" contains all the problem sets, labs, lecture notes, and more that you will need this term.
- The Chemistry 222 Textbook is free and legal to download from our website: http://mhchem.org/text/OpenStaxChem.pdf
- Finally, some "fun" things: you can **join the Discus Chemistry Board** and start participating in the discussions for Chemistry 222 (and receive extra credit! Instructions found here: http://discus.mhchem.org/). You can also follow this class through both **Twitter** (http://twitter.com/mhchem) and/or **Facebook** (http://facebook.com/mhchem add me as a "friend").

Again, welcome to Chemistry 222! Let me know if I can make your learning experience better in any way, and I look forward to working with you this term!

Dr. Michael Russell (mike.russell@mhcc.edu, 503.491.7348, AC 2568)

Staying Connected in Chemistry 222 This Quarter

Success in Chemistry 222 often depends on staying connected with the flow of the course... here are some suggestions on how to be aware of what is happening each week:

- Above all else **join the** *MhChem* **email mailing list**. The email list sends out messages about once per week informing you what will be due, links to handouts, and more. To sign up, go to **http://mhchem.org/mhchem**
- Facebook fans can stay connected by befriending "MhChem Mhcc Russell" on Facebook. This "Facebook friend" will include links to all of the podcasts, quiz answers, and MhChem messages sent each week. To request friendship, go here: http://facebook.com/mhchem (Note that Facebook messages can be sent to your cell phone if desired... ③)
- Fans of **Twitter** can stay connected by following @mhchem. New podcasts, quiz answers, and *MhChem* messages will be sent to Twitter, keeping you up to date and informed about class activities. To follow, go here: http://twitter.com/mhchem (*Note* that Twitter messages can be sent to your cell phone if desired... ©)

Additional Syllabus Materials for Chemistry 222 Available on the Internet

Some or all of these materials might prove useful to you in our class. All of them are available on the Chemistry 222 website under "Class Information".

To access these materials (and more!), go to our website (http://mhchem.org/222) and select "Class Information" from the upper left corner. Additional materials include:

- The "How to Join the Chemistry at MHCC Podcast" guide, which includes step-by-step instructions for joining the class lecture Podcast for this quarter. It also gives information on accessing closed-captions, when available.
- The Extra-Credit Guide a helpful guide containing some of the extra credit options available to you in this course
- The **Discus Guide** a visual step-by-step guide that helps the new user join the Discus discussion board with tips on how to post comments, etc.
- Learning Outcomes for CH 222 a list of "what you will learn" this quarter
- MHCC College Information key information that you, as a student at Mt. Hood Community
 College, might wish to know, including the Student Code of Conduct and Internet Privacy
 Policy
- A **Printable Periodic Table** this periodic table from Webelements.com will certainly be useful in this course, and you will be able to use this type of periodic table on exams and quizzes.

In addition, the website has a plethora of other "goodies" which may be of assistance to you throughout this quarter... feel free to browse, and if you have questions, please do not hesitate to contact me.

Have a great quarter! Peace,

CH 222 CLASS PRESENTATIONS FAQ

FAQ = Frequently Asked Questions

When: March 6 (Tuesday), March 7 (Wednesday) or March 8 (Thursday)

What: A chance to share knowledge with your classmates and the MHCC community

Who: Everyone enrolled in CH 222 (All Sections)

What topic should I pick?

For CH 222, the topic will be **compounds**. Pick a compound you find interesting and write a report on the topic. Since there are millions of compounds, every student must pick a different compound. **Reserve** your compound using the online form at http://mhchem.org/cp222

Once your compound has been chosen, begin researching interesting information on the compound using the library, internet, etc. You will be preparing a paper on the compound and presenting your work to the class in a short (five minute) presentation.

If you need to change your class presentation topic after the fourth week of class for any reason you will be penalized 20 points; hence, it's best to reserve a compound early and start researching promptly. Also, if you still have not reserved a compound by the end of the sixth week, you will be penalized 20 points for tardiness.

What should I know when writing the paper

Prepare a paper that is at least **five full pages** of text on your reserved compound. Diagrams, pictures, and other graphics are wonderful, but you will need five full pages of writing for complete credit.

The paper should include a separate **cover sheet** with the title of your presentation and your name. The paper must be neat, typed, referenced, and interesting to read; spelling and grammar will count. The paper must use a **"reasonable" font and font size** (Times New Roman, Arial, etc. with size 12 or less); in addition, use **1" margins or less** (*I will measure!*) and **no more than "one and a half" spaced type** (less than double spaced.) If unsure, ask the instructor.

The paper should also include a separate page at the end with a **list of references**. References within the paper and at the end should adhere to the "Class Presentations Citation Guide" (found here: http://mhchem.org/cg) For an example paper, see: http://mhchem.org/expaper

What is a peer reviewed scientific article?

An important aspect of this assignment is to ensure scientific relevancy. To this end, find two peer reviewed scientific articles published within the last ten years that include a reference to your compound. Include the abstracts of these papers with your final Class Presentation paper.

How do I find my two peer reviewed scientific articles?

A sure-fire way to access peer-reviewed scientific articles is through the MHCC library's article databases. Go here (http://libguides.mhcc.edu/chem), click on Find Articles near the top, then select either ScienceDirect College Edition or Academic Search Premier, then search for your topic. (*Note:* Academic Search Premier may require "SmartText Searching" under "Search Modes and Expanders" for best results.) If you are off-campus, you will see a log-in page that asks you for your last name, MHCC ID number, and your PIN; the default PIN is your 10-digit phone number, including the dashes.

Once you conduct a search for your presentation topic, you will likely have a mix of citation/abstract-only and citation/abstract + full-text (whole article) results. The library can always request articles that are not available in full-text through Interlibrary Loan, and the MHCC librarians are happy to help you complete these requests. Here is an **example** of a **peer-reviewed scientific paper with an abstract** can be found here: http://mhchem.org/abstr

Tell me about the Class Presentation Rough Draft Paper During the seventh week, you will be submitting a rough draft of your class presentation paper to the instructor. Ideally this will be the paper in a mostly complete format, but at the very least, two typed pages of text should be submitted.

The rough draft does not require a cover sheet or a separate list of references; however, you should have at least one peer reviewed scientific paper submitted with your rough draft. **Use the Rough Draft Class Presentation form** when submitting (http://mhchem.org/rd2) The Class Presentation Rough Draft Paper is worth 20 points (out of the 100 points total.)

What should I know when preparing for the presentation?

You will present a five-minute **presentation** on your chosen subject to the class and anyone who wishes to attend. The presentation must be well prepared and interesting; sloppy preparation shows in the presentation portion. Students can use videos, presentation software (PowerPoint, etc.), posters and chalk to enhance their presentation. Presentation software users will be limited to a maximum of six slides; more invokes a penalty.

Please note that using your paper (or a *copy* of your paper) during the presentation will result in a ten point penalty. This will prevent you from "reading" your presentation to the audience.

How will I be graded?

There are 100 points total for this project. 40 points will reflect the work presented in the paper, 40 points will reflect the work done in the presentation and 20 points will be given for completing the peer review process on time.

In addition, failure to turn in the "Class Presentation Reviewer Guide" to the instructor at the end of the day of presentations will result in a ten-point penalty. You will be completing the Reviewer Guide while others are giving their presentations. If curious, you can view this guide on our website (http://mhchem.org/cp222info).

Late class presentation papers will result in a five-point penalty per day.

Plagiarism discovered from any source will result in an overall Class Presentation grade of zero.

A sample Class Presentation Grading Rubric is available for viewing on the CH 222 website (http://mhchem.org/cgr2) The rubric will allow you to look at the items deemed most important when grading your Class Presentation.

Note that your **attendance** is required on the day of presentations, and if you are not present for at least 95% of your normally scheduled lab period, you will lose half of your assigned grade.

How do I get started?

<u>Step 1</u>: Reserve your Class Presentation Compound

Decide on some compounds that interest you, then email the instructor or complete the online web form to reserve your compound: http://mhchem.org/cp222

You should receive a response from Dr. Russell within 48 hours after the beginning of the second week of class; if you do not, email him directly at mike.russell@mhcc.edu. Be sure to include alternate compounds in case your first choice has already been claimed; he can also pick one for you if you are uncertain which compound to pick. Reserve your class presentation compound by the end of the fourth week, **February 2** at **9 AM**. You can see which compounds are still available here: http://mhchem.org/222av

Step 2: Turn in the Class Presentation Rough Draft Paper

The Class Presentation Rough Draft paper should include at least two typed pages and one peer reviewed scientific article using the handout (http://mhchem.org/rd2) at the beginning of your recitation period: February 20 (Tuesday), February 21 (Wednesday) or February 22 (Thursday).

Step 3: Give the Class Presentation and turn in your final Class Presentation paper

At the time of your Class Presentation, turn in your final Class Presentation paper (with copies of the abstracts of your two peer reviewed scientific papers on separate pieces of paper in proper citation format and give your class presentation during the following lab period: March 6 (Tuesday), March 7 (Wednesday) or March 8 (Thursday)

Before you present and submit your paper, check out the reminders contained within the "Class Presentation 'Last Minute' Checklist", found here: http://mhchem.org/cpcs Note that you must both present your work and submit your paper to receive *any* points on this assignment. Finally, the MHCC Librarians keep a webpage devoted to chemistry... it might be worth viewing as a research tool, and it is found here: http://mhchem.org/libchem

If you have any questions, see this site (http://mhchem.org/cp222info) or contact the instructor.

Class Presentations Citation Guide

With thanks to Lisa Bartee and Wally Shriner

Why do you have to cite your sources?

No research paper is complete without a list of the sources that you used in your writing. Scholars are very careful to keep accurate records of the resources they've used, and of the ideas and concepts they've quoted or used from others. This record keeping is generally presented in the form of citations.

A citation is a description of a book, article, URL, etc. that provides enough information so that others can locate the source you used themselves. It allows you to credit the authors of the sources you use and clarify which ideas belong to you and which belong to other sources. And providing a citation or reference will allow others to find and use these sources as well. Most research papers have a list of citations or cited references and there are special formatting guidelines for different types of research.

It is also important to cite your sources to avoid plagiarizing information.

What is Plagiarism?

Plagiarism is presenting the words or ideas of someone else as your own without proper acknowledgment of the source. When you work on a research paper you will probably find supporting material for your paper from works by others. It's okay to quote people and use their ideas, but you do need to correctly credit them. Even when you summarize or paraphrase information found in books, articles, or Web pages, you must acknowledge the original author.

These are all examples of plagiarism:

- Buying or using a term paper written by someone else.
- Cutting and pasting passages from the Web, a book, or an article and insert them into your paper without citing them. *Warning!* It is now easy for your instructors to search and identify passages that you have copied from the Web.
- Using the words or ideas of another person without citing them.
- Paraphrasing that person's words without citing them.

Tips for Avoiding Plagiarism:

- First, use your own ideas—it should be your paper and your ideas should be the focus.
- Use the ideas of others sparingly—only to support or reinforce your own argument.
- When taking notes, include complete citation information for each item you use.
- Use quotation marks when directly stating another person's words. Quotes are not frequently used in scientific writing unless you are directly quoting someone's spoken words.

Citing Sources in CSE Format

The Council of Science Editors (CSE) citation format is commonly used in scientific writing. CSE format emphasizes the information that is important when writing scientifically: who wrote the information and when they wrote it. In different fields, there is an emphasis on different types of information. In the humanities, MLA format is commonly used. This style emphasizes the author's name and the page number. This information allows a reader to track down the exact quotes that are being discussed. Another commonly used format, APA, emphasizes the author's name and the year the information was published.

If you are not familiar with the CSE citation style, you can get additional information and examples at http://writing.wisc.edu/Handbook/DocCSE_NameYear.html

The basic format of a citation in CSE format you should use for your Class Presentation paper can be seen below:

<u>Scientific Journal Article</u>: Please note that you need to cite the JOURNAL, not the DATABASE that you got it from. Citing the database in which you found a scientific journal article is like citing Google for an internet resource that you are using.

BASIC FORMAT: Author's last name, first initial. Date published. Title of Article. Journal Name. Volume (issue): pages.

EXAMPLE of a Journal article that you accessed via a paper journal:

Flores-Cruz Z, Allen C. 2011. Necessity of OxyR for the hydrogen peroxide stress response and full virulence in *Ralstonia solanacearum*. Appl Environ Microbiol. 77(18):6426-6432.

EXAMPLE of a Journal article that you accessed online:

Werling BP, Lowenstein DM, Straub CS, Gratton C. 2012. Multi-predator effects produced by functionally distinct species vary with prey density. J Insect Sci [Internet]. [cited 12 Sep 2013];12(30): 346-378. Available from: insectscience.org/12.30

Internet Resource:

BASIC FORMAT: Author's last name, first initial. Date published. Title of Website [Internet]. Publisher information. [cited on date that you accessed the information]. Available from: URL where you accessed the source.

EXAMPLE of an Internet Resource:

Williamson RC. 2004. Deciduous tree galls [Internet]. Madison (WI): University of Wisconsin-Madison; [cited 2013 Sep 12]. Available from http://labs.russell.wisc.edu/pddc/files/Fact_Sheets/FC_PDF/Deciduous_Tree_Galls.pdf

Citing Sources Within Text:

We will be using the CSE Name-year format for citations. When you want to provide a citation reference for a statement that you are making, you should end the sentence with (First author's last name, year).

EXAMPLE of Citing a Source Within Your Paper:

Sickle cell anemia is caused by abnormally-shaped haemoglobin proteins (Bartee, 2012).

You should then list all your references in the Literature Cited section alphabetically by author's last name.

| Name: | |
|-------|--|
| | |

CH 222 CLASS PRESENTATIONS ROUGH DRAFT PAPER

Staple this form to the top of your Rough Draft Class Presentation Paper for full credit

| Lab Section: | | |
|--------------------|--|--|
| Reserved Compound: | | |

Directions:

- This assignment is worth 20 points out of the 100 points assigned to the Class Presentation assignment.
- Include at least two typed pages of your Class Presentation report with this form (more is fine!)
- *Include* at least one abstract from a peer reviewed scientific article with a proper citation included (more is fine!)
- This page should be stapled to the top of the other pages in this assignment.

Helpful Resources:

The CH 222 Class Presentation Frequently Asked Questions handout: http://mhchem.org/faq2
 The CH 222 Citation Guide: http://mhchem.org/cg

Class Presentation Rough Draft Paper Due Dates for Winter 2018:

Section 01 (Tuesday): February 20 at 8:00 AM
Section 02 (Tuesday): February 20 at 1:10 PM
Section H1 (Wednesday): February 21 at 1:10 PM
Section 03 (Thursday): February 22 at 8:00 AM

The final Class Presentation paper will be due during Week 9 in Winter 2018.