EVERYDAY CHEMISTRY

**Autumn 2019**

Instructor: Tom Di Gaetano **digaetanot@wcsu.edu** Office Hours Mondays @ 5:00 pm – 6:00 pm

Website: [www.scientiaestubique.com](http://www.scientiaestubique.com)

# ATTENDANCE

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egular attendance for both the lectures and laboratory exercises is an expectation. Everyone knows as well that life happens, and unavoidable absences may occur. It’s all about good faith efforts. The student is

responsible for the work missed work due to his/her absence(s). Any and all work that is done / assigned, or due, must be completed by the due date for any score greater than zero. Poor attendance in lecture may result in failure, but poor attendance in lab will ABSOLUTELY be a cause for failure.

**Lecture:** You are urged to take excellent notes. It is your responsibility to obtain any notes, by interacting with other students, and by going to my website: [**www.scientiaestubique.com**](http://www.scientiaestubique.com) to download and complete the formal lecture notes. My website works best off a computer, as all notes are in Word format. Once you have a copy of the notes from class, I can then go over those notes with you, during office hours. The tests and in-class work are based upon the lecture notes and the assignments. I urge you, as well to turn in any assigned work from a missed class, on time. Most assignments bear points towards your grade. Do not expect any extension of time/due date.

When you to miss any class in which an evaluation is given, there will be an opportunity for an **essay-based make-up** evaluation. You must initiate contact with me to schedule the evaluation, within 48 hours of the missed evaluation, or 0 points will be assigned automatically. This alternate evaluation will be given during my office hours.

**Laboratory:** Students need to be aware that there are no make-up laboratories. To avoid penalties, you should consider slipping into another section’s laboratory period, assuming you have the permission of that session’s instructor, *in advance* of your attendance. You need to arrange such attendance with that session’s instructor. Other sessions are listed outside the laboratory, **(SB 336)**.

In order to earn any credit in lab, you must participate in the experiment and turn in a completed laboratory report, on time. Missed labs earn a score of 0 points. **Were you to miss three labs, for any reason, you will fail the course, automatically. Make sure you understand this point ... failure is automatic.**

The student presentations at the end of the semester are **scheduled as laboratory exercises. They carry a grade and attendance requirement as any other laboratory exercise. Non-attendance of the presentations earns a grade of zero and counts towards the attendance policy. Participation points are assigned during these presentations as well, for a separate grade.**

**The bottom line:** Your attendance is expected, but more than that, it is valued. The course is designed to help arm you with the artifacts and habits of mind, necessary to engage in the intelligent and informed dialogue of an educated citizen, regarding biochemical / environmental / chemical issues.

# GRADES

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rading is an expected, and appropriate activity. Do not hesitate to ask questions about how your

grade is determined. This course section works on a total-points basis.

**Grade = earned points x 100**

**total possible points**

Your grade is a combination of evaluations, lab reports, various credit-bearing exercises used during or between the lecture periods, papers and participation. You should expect evaluations and you are expected to write about chemical issues, using a short answer, and/or formal literature review format. Quizzes will be announced in advance. There are no "pop quizzes". **See the attendance policy of this packet for the remediation policies / procedures regarding missed evaluations.**

Laboratory work is graded and testable material. Please note that cleaning up of your lab space (lab hygiene) is part of your lab report grade. Five points will be deducted from each lab, for a lab station left in unacceptable condition. You are responsible for following the rules of chemical disposal, lab hygiene and lab comportment.

There are weekly laboratory reports and they are worth 25 points apiece. **Any** assignments turned in past the due date, (regardless of reason), will earn a maximum of only 50% of available points, unless you have made appropriate arrangements, in advance.

**The course requires a written literature review paper** and this paper is worth 100 points. Your presentation of the literature review and participation at the ancillary presentations is worth a total of 100 points as well.

**General Summary Of Points**

3 to 4 "Quests” at 40 to 80 points each

10 lab reports at 25 points each

1 six-page literature review at 100 points maximum

1 presentation at 50 points maximum

Participation in 3 presentations at 50 points maximum

TBA: Homework, readings, lab quizzes, and participation will account for any

remaining points. No grades will be dropped, curved, or scaled.

**Midterm and**

**Final Grades**

Letter grades will be assigned on the following percentage basis:

A > 93 B+ 86-89 C+ 73-77 D+ 60-64 F < 50

A- 90-92 B 82-85 C **69-72** D 55-59

B- 78-81 C- 65-68 D- 50-58

For students requiring learning accommodations, AccessAbility Services, has asked us to urge you to visit the office to request those accommodations. They will give you an accommodation letter, to be shared with me. You should do this as soon as possible. For this course, please note that extended time for all writing assignments has been built into the course, with all students benefiting from extended time on writing assignments. Thus, there will be no further time extensions. Exams requiring extended time will begin during my office hours and of course, alternate setting is fairly easy to accommodate, during my office hours. Be sure to see me well in advance to schedule any such accommodation.

## WRITTEN SUBMISSIONS

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ritten submissions are expected to be accurate, concise, cited, logical, *and* handed in on time.

Timeliness is professional and expected. Troubles arise though. When you fear work will be late,

you need to make prior arrangements with me. There will be a grade penalty, in all likelihood, with a few exceptions.

Except for exam essays, written submissions (like papers and lab reports) **must include** appropriate citations and *reasonable* grammar. You may use any citation format of your choosing.  **A lack of citations implies plagiarism.** Lab reports and papers without appropriate citations will earn a score of zero points. Plagiarism will be reported. **Paraphrased internet sources must be cited.** When you use whole pieces of a site or text, you should indent the passage and cite the work. **It is not unusual for a lab report or paper to have a dozen *or more* citations.** **Do not worry about this**. Your original work is how you construct a response and in the selection of sources. No one expects you to know the GRAS system, or the work of the alchemist Roger Bacon, off the top of your head. You need to look these things up … and thus, you need to cite your sources. **It is that easy. If you look it up … cite the source.** Copying someone else’s work will earn a score of zero. You are a university student. It is expected you know and follow the rules.

When using internet sources, it is acceptable to cite a passage, using enough of the url address so that the reader can look up the complete reference in the works cited section. The following is an illustration of this technique.

This passage comes from: <http://antoine.frostburg.edu/chem/senese/101/acidbase/faq/antacid-titration.shtml>

**The complete citation (above) should appear in the works cited section**. However, notice the shortened format as the citation, embedded in the paper. All citations are to be embedded into the body of the paper.

When measuring the capacity of an acidic sample to neutralize a base, you really want to measure the amount of acid

neutralized, not the change in pH. For a study of stomach acid, prepare a solution of a base that is similar in concentration

to the acid (0.1 M NaOH would be ideal). Determine what volume of base solution is necessary to neutralize 1) a measured

volume of fresh acid, and 2) the same volume of acid which has a weighed, crushed antacid tablet dissolved in it. The difference

between volumes of base in 1) and 2) is a good, reproducible measure of how much acid was actually neutralized by the antacid.

(<http://antoine.frostburg.edu/chem/>)

**Note the embedded, acceptable, shortened url**

N.B. *Internet sites are a bit tricky and I urge you to use only authoritative sites. Acceptable sites include but are not limited to the .gov or .edu sites.* ***Avoid*** *.com sites , and avoid using* About.com., *especially. The use of* Wikipedia.com. *requires at least 1 other confirming citation. There is a host of exceptions - but be judicious. For instance, if you research the drug Crestor®, I believe it is appropriate to use AstraZeneca’s website. However, it should never be used as a source of definitive statistics. Such statistics should be verified by an unbiased source from outside of AstraZeneca. I do consider* howstuffworks.com & britannica.com *as appropriate sites. The* ***big idea here*** *is to use internet sites judiciously, and in the manner of scholarship****. When you have a question regarding the appropriateness of an internet site, please contact me****. We can talk about it. Your site selection is an integral part of your work.*

### Lab & Laboratory Report: While you write the lab report by yourself, you (generally) get to perform the experiments in pairs. Phew! Each member of the team is responsible for preparing for the lab experiments and turning in their own lab report, 1 week after the lab. When a laboratory or a laboratory report is not completed in the assigned time, a score of zero will recorded, unless prior arrangements have been made.

**⮊** Each student will take a brief lab-quiz, prior to the lab. Successful completion is required for lab

participation. Failing the pre-quiz will require the student to re-read the lab, be quizzed and then begin

the lab, outside of a team (that is, on their own) Completion must be within the allotted lab period.

* A complete report will be word processed and have: your name, the lab title, the objective (found in the lab book) all necessary data, appropriate responses to all assigned questions, citations, and a reflection which is 4 to 6 sentences, at least. **The next page explains a bit more.**
* When required, the lab report will state any tabulated or collected results in word-processed tables.
* The questions at the end of each lab report are to be included in the write-up and followed by the answer. **Please type out the question and then include the answer to the question**.

⮊ The laboratory report will be word-processed. It will be; **double-spaced, cited appropriately** in the

body of **the text and have a works cited page if necessary**. Failure to cite sources is plagiarism.

* The report will be turned in the next week, at the start of the lab period. A report not handed in at that time, can be emailed to me within **1 hour** of a lab period ending, for **full credit**. I do not return printed copies of emailed assignments. Any report electronically **received** after the 1-hour period, but by midnight of the due date, begins at 10/20 points, unless other arrangements have been made. After midnight, or the agreed to arrangements, the lab report is rated at zero pts.
* The first time it appears that a lab report has been copied or is not of your authorship, at any point, the

score will begin at 10/20 points for all involved parties. Any reports which continue to demonstrate a lack of personal authorship, after the initial warning will bear a 0/20 points for each party. Plagiarized

work may earn an automatic score of 0/20 points.

I believe firmly that classmates should ***discuss*** the work. The report is not written in tandem, however. At any point, I too will discuss the laboratory with you and help you as best as I may.

**Your laboratory report should be patterned along the lines of the following:**

**Lab Report Format Summary**

Your Name

Title of Lab

Objective of the Lab

Table(s) of Results (if necessary)

Question 1: type it out / double space

Answer, Proof, Settings (**embed citations when necessary**)

Question 2 type it out / double space

Answer, Proof, Settings (**embed citations when necessary**)

and so on ....

Reflection\* (see the next page for help)

Include a works cited page IF you used abbreviated urls in your answer(s) section. If you included full urls or footnotes in the Answer section, then you may ignore having a works cited page.

**Reflection Stems:** You may uase the following stem sentences to help you evolve an organized, focused, thoughtful reflection. Consider using three to four for each of your reflections. By no means do you need to, nor should you use them all at any one time. Each reflection should be at least 4 to 6 sentences, discussing your learning/questions/insights

|  |  |
| --- | --- |
| * I was surprised that… * I think I am strong at ... because .. * I learned… | * What was really valuable to me… * It was really interesting when ... * What amazes me... |
| * I now understand… * I never knew that… | * I am beginning to connect ideas like… * I don’t agree with… |
| * The question I still have is… * If I could repeat this, I would like to… | * I wish I knew more about… * There is a weakness… |
| * I still don’t get… * The skill I value most... * (An) Idea(s) / Concept(s) that helped me from the lab / lecture were... | * This issue dovetails with my major because... * I can see why someone would study this because... * I would re-fine and/or re-design the experiment by / My work could be improved by … |

**LITERATURE REVIEW & PRESENTATION**

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his course requires a literature review paper and a presentation on that work. The literature review is due

**7 November 2019.** Presentations will occur during the last 3 scheduled lab periods (14 Nov. – 5 Dec).

All the rules regarding writing papers, citation, plagiarism, accuracy ...etc, apply.

**The Literature Review:** Note that depending upon time, your paper may not be returned to you. However, to

have full consideration, your paper will

⮊ be on a topic pre-approved by the instructor. Speak to me ASAP.

**For ideas/topics/possibilities,** check out <http://www.chemistryexplained.com/index.html>

### ⮊ be written with the instructor in mind as the reader.

⮊ have a minimum of 6 pages (exclusive of a title page, citation page and/or formal works cited)

⮊ be word-processed, double-spaced, with a font equivalent to Times New Roman 12-point font, with

1” maximum margins on all sides for every page.

⮊ include appropriate equations, formulae of chemicals, tables/graphs/charts of data (be aware that a page

of such diagrams or data does not count towards your 6-page minimum.

⮊ be original and written, for this course, use correct jargon, from the class and your research, and be

accurate according to current mainstream scientific tenets.

⮊ have all embedded, & appropriate citations with a fully researchable bibliography or works cited page

⮊ be written as a treatise on***chemistry***  (This not a health or psychology paper ...etc, nor is it to be a persuasive piece).

**The Presentation:** The presentation of your work will be explained in depth, later in the semester. But, in short, the presentation of your literature review is worth 50 points and your participation in the presentation process of other students is worth another 50 points. For full credit, your own presentation must include and be graded at 10 points apiece, upon the answers to the following 5 questions:

* How does your literature review dovetail specifically with work done in our class over the last semester?

(e.g. What are the jargon, ideas, formula, chemical processes, lab work, readings, experiences, discussions associated with your work?)

⮊ What surprises, attitudes, revelations, did you take away with you / learn, from your literature review?

⮊ Were you able to attack this issue again, how would the work change?

(e.g. What would you wish to learn still / What different direction would you take?)

⮊ What connection(s) / impacts did the topic make with; ➊your major/➋day-to-day life /➌education?

(You need to identify/discuss the connections to only *one area ...not all three*)

⮊ What would be one idea you wish the class members to learn from your work, and why is it an

important idea?

# Syllabus

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he syllabus may include but is not limited to the following topics. Syllabic topics are selected; to enhance the laboratory work, provide a functional, but basic, chemical vocabulary; engender the habits which lead to successful researching, reading, interpretation, writing about chemical topics, and of course, student interest. The studied curricular material can be changed to meet the needs and/or interests of class participants.

Thus, I will happily attempt to address topics students ask of me - or I will shift focus so as to pursue student interest, as long as the basic tenets of; biochemistry, biophysical chemistry, environmental chemistry, industrial, and/or consumer chemistry are followed. I hope to integrate an understanding of basic chemistry into your "everyday life experience" and/or your major area of study. The syllabus will be affected greatly by your interests.

A good understanding of basic chemistry can; help a marketer design a better campaign, enable an art student in the selection of materials, help a history major grasp the role of industrialization/discovery/the scientific process as a cause for changes in society, develop a deeper meaning for proper policy development for a health major, illustrate the role of the scientist in the culture, make you a savvier consumer / investor, help to prepare a parent to ask a medical professional appropriate questions for the benefit of their loved ones.

For me, a basic understanding of chemistry should include, but is not limited to;

1) the Law of the Conservation of Mass, Energy and Charge

2) Energy (in general) and potential energy (specifically)

3) the concept of charge

4) the activity of (valance) electrons

5) the nature of a chemical bond and the resulting behavior of matter

6) the activity of acids and bases

**A Few Internet Research Sites Appropriate for Everyday Chemistry**

|  |  |  |
| --- | --- | --- |
| **Institute** | **Links** | **Comments** |
| American Chemical Society  (ACS) | <http://portal.acs.org/portal/acs/corg/content> | You can get a good deal of info from the public pages ...(I like many of the other links found below more) ... but the ACS's "molecule of the week" is good. You could try DISCOVER CHEMISTRY link at the top of the ACS page. |
| Centers for Disease Control &  Prevention | <http://www.cdc.gov/> | A very good site overall for medical issues. |
| Howstuffworks | <http://www.howstuffworks.com/> | Terrific for any technology / industrial process |
| Hyperphysics | <http://hyperphysics.phy-astr.gsu.edu/hbase/hph.html> | Good for tutorial and background information, only. It is **not great** for individual processes or chemicals |
| Linus Pauling Institute | <http://lpi.oregonstate.edu/infocenter/> | A good place to start on biomedical &/or nutritional issues. A host of articles. Check the validity of the work drawn from this site, with other sites/sources. |
| National Cancer Institute | <http://www.cancer.gov/> |  |
| National Institute  of Drug Abuse | <http://www.nida.nih.gov/nidahome.html> | Very informative re: vitamins, illicit drugs, pharmaceuticals, etc… |
| National Institutes of Health | <http://www.nih.gov/> | Name it... They cover so many areas. |
| National Institute of  Mental Health | <http://www.nimh.nih.gov/index.shtml> | This provides a nice blend of medicine, chemistry, neurology, sociology ... |
| US National Library of Medicine | <http://www.nlm.nih.gov/> | This can get overwhelming ... but a nice source |
| United States Geological Service | <http://www.usgs.gov/> | I love these folks ... everything from biophysical & physical chemistry to the names of animal animals. COOL |
| Chemistry Explained | <http://www.chemistryexplained.com/index.html> | Another solid source. The bibliographies at the end of each article are excellent. |
| The Brain at McGill | <http://thebrain.mcgill.ca> | Just... WOW ... multiple levels of expertise depending upon your interest, all about the brain. |

**Autumn 2019 – EVERYDAY CHEMISTRY LAB SCHEDULE**

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| --- | --- |
| **MONDAY** | **THURSDAY** |
|  | AUG 29  ORIENTATION/SAFETY |
| SEP 02  HOLIDAY | SEP 05  ALCHEMY |
| SEP 09  ALCHEMY | \*\*SEP 12  MEASUREMENT |
| \*\*SEP 16  MEASUREMENT | SEP 19  CHROMATOGRAPHY |
| SEPT 23  CHROMATOGRAPHY | SEP 26  WATER ANALYSIS |
| SEP 30  WATER ANALYSIS | OCT 3  ACID-BASE |
| OCT 07  ACID-BASE | OCT 10  SOAP PREPARATION |
| OCT 14  SOAP PREPARATION | OCT 17  POLYMERS/SYNTHESIS |
| OCT 21  POLYMERS/SYNTHESIS | OCT 24  FOOD ANALYSIS |
| OCT 28  FOOD ANALYSIS | OCT 31  ELECTROCHEMISTRY |
| NOV 4  ELECTROCHEMISTRY | NOV 7  COLLIGATIVE PROP |
| NOV 11  COLLIGATIVE PROP. | NOV 14  PRESENTATIONS |
| NOV 18  PRESENTATIONS | NOV 21  PRESENTATIONS |
| NOV 25  PRESENTATIONS | NOV 28  HOLIDAY |
| DEC 2  PRESENTATIONS | DEC 05  PRESENTATIONS |

**\*\*Prior to the measurement lab you must review how to read a Vernier caliper. I like:**

[**http://www.upscale.utoronto.ca/PVB/Harrison/Vernier/Vernier.html**](http://www.upscale.utoronto.ca/PVB/Harrison/Vernier/Vernier.html) This site works best when you scroll down to the very bottom and use the interactive caliper diagram to explore out how to use one.

(Were you to dislike the above site, you may use any reference that helps you learn how to use a Vernier caliper)