# INTRODUCTORY CHEMISTRY FOR NON-MAJORS

**Instructor Information**
**Instructor**: Dr. Hannah Sturtevant
**Office**: Chem 206B
**Office Hours**: TBA or schedule a meeting
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**Course Information:**
Class Sessions: MWF 11-11:50 AM, [location]
Class Website: https://collab.itc.virginia.edu/

## Course Description

Have you marveled at a brightly colored sunset? Felt the water droplets that form on a cold glass on a warm afternoon? Felt a slimy sensation when you spilled detergent or bleach on your hand? Mixed colors of makeup, art pigments, or even food coloring to create a new color? Wondered how soap actually cleans your hands? Tasted the tartness of a lemon or the sweetness of chocolate? Or perhaps more socially grounded, have you seen articles in the news or on Facebook sensationalizing the latest scientific discovery (maybe you noticed conflicting reports saying fats are good one year then bad the next) and wondered if it's legit?

All the different phenomena mentioned above can be explained with chemistry. Chemistry is truly everywhere! It is at the heart of the study of the natural world. Interactions between tiny 'micro' particles much smaller than the eye can see determine the properties of materials and phenomena that we experience in the everyday 'macro' world! In this class, we will learn foundational concepts in chemistry, including the very nature of science and how understanding science can help you be an informed citizen, no matter what career path you take. You will get the chance to explore phenomena of interest to you personally and experience how the world of chemistry relates to you! I am excited to share this journey with you!

By the end of this course you will be able to:

- Connect the scientific knowledge you learn in this course to real world phenomena and explain these observed phenomena based on what you know about atomic structure and properties.
- Evaluate the legitimacy of scientific discoveries announced in the popular press or social media.
- Recognize the value of science in your personal context and to the world.
- Articulate the tenets of the nature of science including the rigor, theories vs laws, creativity, collaborativeness, and tentativeness.
- Communicate findings orally and in writing to form evidence-based arguments and explanations.
- Collaborate with others and recognize the value in collaboration while becoming aware of how you learn most effectively.

## Who am I?

My name is Hannah Sturtevant, and I received my PhD in chemistry from Purdue University with emphasis in chemical education. I'm originally from the beautiful state of Washington in the Pacific Northwest of the US. I love learning about the natural world and helping students understand chemistry. Feel free to drop by my office hours or email me to set up a meeting that works for your schedule with any questions or concerns you have. I am more than happy to help!

**Course Materials**
Textbook TBD

**Tips for Success in this Course:**

- Stay on top of all assignments as nothing assigned is "busy work" but is all designed to help you learn and meet the objectives for this course. **If there is anything you do not understand in a given week, please reach out for assistance right away**. The course topics in chemistry are naturally cumulative, building on the knowledge from each previous week. If you fall behind by more than a couple weeks, it is difficult to catch up and really takes the fun out of what we do. I want each of you to succeed in this course, and I am here to help as is your TA and the Tutoring Center. To avoid the stress of falling behind, just get any questions or problems you don't understand dealt with the day or week it comes up so you will be ready to learn the next topic the following week(s). Collab forums will always be available for asking questions as well.
- The work you do on your homework is expected to be your own, but if you want to work with a partner or form a study group (which I encourage and am happy to facilitate if you let me know), make sure to work through the homework to the best of your ability first before turning to help from others. The homework is designed to give you practice so you can see if you fully understand the chemistry and where you may need further help. So try it on your own at first to see what you don't understand before discussing with a partner and getting help. It's always easier to help someone else if they have jotted down their attempt and their current understanding than if they left a problem completely blank.
- Avoid waiting until the last day before the exam to study for it. The weekly in class activities and online homework is designed to facilitate your learning. If you do your work each week and get help if a concept or problem does not make sense to you, then all you have to do is review what you already know for each exam.

**Assessments in the Course**

Assessments in this class will help you and me understand your progress through the semester so we can both make changes as needed to ensure your successful learning. The semester will culminate in a final project on a topic of your interest where you put into action all the things you're learned over the course of the semester. The percent that each assessment will factor into your final grade are included.

**In-class Activities and Participation (15%)**

Each week we will have interactive worksheet-based activities that you'll get to work through during class time in order to understand the content for the week better in a real life context. The grading of these worksheets are based on completion and effort, not that you got everything correct. They also show me where you are having difficulties so that I can address questions and problems you have in the next class period. Attendance is crucial to our learning environment; thus, any unexcused absences will result in a loss of 2% of your participation grade. If you have any mandatory excused absence, you must let me know via email at least one week prior (unless an emergency occurs right away) so that a makeup activity can be assigned to ensure you still gain the relevant knowledge. Please ask a classmate to take notes in class for you as well.

**Weekly Homework (15%)**

Each week you will have some online practice problems to work on individually based on the topics we worked on in class to firm up your understanding. I will give you feedback on these so that you can know if you need to work to understand something better before the exams. You are welcome to check your answers with peers once you have attempted them yourself, just keep in mind that I will give feedback to each of you individually so that you can succeed on exams where you will answer questions individually. Homework is due the same time every week by Sunday at 6 pm.

**Article Critiques (15%)**

For every primary chemistry topic we cover, we will examine both a popular news article and a scientific paper that relates to it together in class. You will learn how to critique articles you see in the news/social media as well as understand how to access and interpret the scientific papers behind them. We will discuss and critique these together orally at the beginning of the semester, learning the process, and switch to writing critiques of the articles with peers and individually as the semester continues to help you on your final project and, hopefully, in your post-graduation life as well.

**Checkpoint Exams (25%)**

These 3 short exams will assess your learning of topics every 3-4 weeks through the semester. They will be a combination of multiple choice, short answer, and essay questions that check your conceptual understanding of the content we have covered along with some key calculations to help you retain the information and use it effectively on your final project. The first two exams will contain a reflective component so that you'll have the chance to think about and make any changes needed to succeed in the class.

**Final Project (35%)**

For your final project, you will choose a chemical phenomenon of interest (e.g., why do onions make you cry, what causes us to feel 'in love', how does bread rise) or current issue in the news/social media related to chemistry (e.g., what does science say about vaccines, climate change, or plastics in the ocean) that is of interest to you personally. You will use the knowledge and skills you gained over the course of the semester to investigate the topic, both what the scientific literature says about it as well as what popular media/news says about it. In place of a final exam, you will design and produce a video presentation where you explain the chemistry and implications behind your chosen topic/issue in an easy to understand, professional manner. You'll be able to share this video with family and friends and even use it as a sample of your work in job searches that ask for such samples.

**Grading Scale**

| | |
|---|---|
| 90-100 % | A |
| 80-89 % | B |
| 70-79 % | C |
| 60-69 % | D |
| <60 % | F |

## Course Roadmap

In general, our weeks will look like this:

- On *Mondays* we will begin with a real world case that the content knowledge we learn that day will help us solve. We will begin learning the foundational content knowledge needed to understand the case via an interactive worksheet-based activity in groups.
- On *Wednesdays*, we will cover areas of confusion and follow up with the content for Wednesday to firm up everyone's understanding and reconnect to the real world example.
- On *Fridays*, we will explore a popular media article related to the chemistry content of the week and the scientific paper related to it, learning how to locate scientific information and critique articles in the news.
- On *Sunday*s, your weekly homework is due. Our 3 exams are on Mondays and you will not have homework due the Sunday before each of them.

## Course Policies

### Accessibility

This course is designed to be welcoming to, accessible to, and usable by everyone, including students who are English-language learners, have different learning preferences, have disabilities, or are new to the college environment. Be sure to let me know immediately if you encounter a required element or resource in the course that is not accessible to you. Also, please let me know of any changes I can make to the course so that it is more welcoming to, accessible to, or usable by students who take this course in the future. If you need accommodations of any kind, make sure to talk to SDAC and, if needed, to me.

### Low Scores

I will drop your lowest homework grade. For exams, you will have the chance to revise your answers within 5 days following getting your exam back. You can earn up to half credit back if you can show the work to get the correct answer and explain what went wrong the first time.

### Late Work

All assignments should be submitted on time. I give two grace days after the due date where you may still submit the assignment, with 10% deduction each day. Later work will not be accepted, though you are still encouraged to complete it as it will help you with mastering the content. I understand in life stuff happens, so if there are extenuating circumstances that come up, please contact me right away so that I can consider the best approach to your situation. Likewise, if you are having problems managing your time and work-life balance, please come talk to me – I am happy to help and connect you with any resources you may need.

### Technology

As much of our in-class sessions are interactive, you will want to pay attention to what's going on in the class. There will be times we will use our laptops in class for activities, and you are welcome to use them to keep notes as long as it's not a distraction to you. We will agree on a laptop policy together on the first day of class. To avoid distractions, we will turn our cell phones onto Airplane or Do Not Disturb mode and tuck them away - unless you need the phone active for emergency situations. Most of us will reflexively look at

notifications on our phones if they are out and connected (I know I do), and it will distract us and those around us from being present and active learners, so I much appreciate your help to keep our classroom environment an effective learning environment for all.

**Honor Statement**[1]

I trust every student in this course to fully comply with all of the provisions of the University's Honor Code. By enrolling in this course, you have agreed to abide by and uphold the Honor System of the University of Virginia, as well as the following policies specific to this course.

- All graded assignments/exams must be pledged unless it is otherwise stated you can work together.
- In this class specifically, you may collaborate with other students on in-class activities and the weekly homework once you have completed the assignment to the best of your ability on your own
- You are expected to properly cite any resources you use in your work. Plagiarism is considered a violation of the honor code.
    - What is plagiarism? Generally speaking, it is any attempt to take credit for work done by another person. All scientists, including undergraduates in this science class, rely on the work of others to shape their own knowledge and interpretations. In their writing they must acknowledge the importance of other works through footnotes and/or direct textual references to influential books, articles, and ideas. If you have any questions about what may constitute plagiarism, please consult with me. There is no penalty for honest inquiry or confusion!
- All suspected violations will be forwarded to the Honor Committee, and you may, at my discretion, receive an immediate zero on that assignment regardless of any action taken by the Honor Committee.

[1] Honor statement provided by the Center for Teaching Excellence's Course Design Institute

**Course Schedule (tentative)**

| Week | Content | What's Due |
|---|---|---|
| Week 1 | M Intro to Chemistry! | Pre-survey due on Collab |
| | W What really is science? | |
| | F NOS…Science or not? | Online HW 1 due Sunday by 10 pm |
| Week 2 | M We can't 'see' atoms, so how do we know their structure, and why does it even matter? | |
| | W How the crazy world we can't 'see' works... | |
| | F Implications to us of atomic structure! | Online HW 2 due Sunday by 10 pm |
| Week 3 | M | |
| | W | |
| | F Exam Review | |
| Week 4 | M | Checkpoint Exam 1 |
| | W | Final Project topic and group due |
| | F | Online HW 4 due Sunday by 10 pm |
| Week 5 | M | |
| | W | |
| | F | Online HW 5 due Sunday by 10 pm |
| Week 6 | M | Final project lit review due |
| | W | |
| | F | Online HW 6 due Sunday by 10 pm |
| Week 7 | M | |
| | W | |
| | F Exam Review | |
| Week 8 | M | Checkpoint Exam 2 |
| | W | |
| | F | Online HW 8 due Sunday by 10 pm |
| Week 9 | M | Final project video outline, demo, and prof meeting due |
| | W | |
| | F | Online HW 9 due Sunday by 10 pm |

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| Week 10 | M | Prof meeting should be completed by Friday |
| | W | |
| | F | Online HW 10 due Sunday by 10 pm |
| Week 11 | M | |
| | W | |
| | F Exam Review | |
| Week 12 | M | Checkpoint Exam 3 |
| | W | |
| | F | Online HW 12 due Sunday by 10 pm |
| Week 13 | M | |
| | W | |
| | F | Online HW 13 due Sunday by 10 pm |
| Week 14 | No class this week – extra work time and Thanksgiving Break | None |
| Week 15 | M | |
| | W | |
| | F | Online HW 15 due Sunday by 10 pm |
| Week 16 | M Last day of class | Finish final projects |
| | W | |
| | F | |
| Finals Week | Video Viewing and Feedback | Final Project Video Due |