



Chemistry BRIDGE Program Summer 2022



Instructors

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Meeting times

Monday August 8 – Friday September 2

Daily, 2:30 pm – 4:00 pm

All meetings are on campus. Stay tuned to Canvas announcements for locations.

Course Philosophy

Description of BRIDGE

BRIDGE is a great opportunity for us to learn some chemistry this summer before grades come into play! Chemistry tends to be one of those classes that students find challenging, and it isn't usually because of the subject itself, it's because of the step away from a "high school mentality". Unlike most high school-level courses, a university level chemistry course goes beyond memorizing and tests students' understanding of chemistry concepts by their ability to solve multi-step chemistry problems. An example of this is applying two or three chemistry concepts simultaneously to solve a single problem.

Fortunately for us, **that's what BRIDGE is all about: Stepping outside of high school expectations and clarifying what a "university level" course is asking you to do.** We are going to focus not just on what it means to take courses at NU, but we are also going to build a toolbox together so that you have the skills to be successful—whether you end up being a chemistry major or never taking another chemistry class again!

Course Objectives

This course has two types of objectives: Chemistry-based ones, and skill-based ones. The amount and type of chemistry we are able to explore together will vary based on the interests of the students in the course, so it is difficult to detail the objectives here! However, I will post them as part of the class notes on Canvas.

While you will learn some chemistry in our time together, you will also learn the expert-level skills of how to approach difficult topics. These skill-based objectives are detailed explicitly in each of the “Skill Spotlights”.

Math Skills in Chemistry

Northwestern’s general chemistry courses require not just math skills, but the ability to apply these skills to solve chemistry “word” problems. In this BRIDGE program you will have the opportunity to review your algebra, word problem, and other math skills and then to apply these skills to a variety of general chemistry problems. The math skills you will need for general chemistry courses include:

- solution and manipulation of algebraic equations
- use of units in algebraic equations
- geometry relationships including volumes, areas, and perimeters of particular shapes
- trigonometry
- calculation estimation
- graph generation and interpretation
- logarithmic and power relationships
- most importantly “word problems”: yes, those “One train leaves City A at a specific time travelling at a speed X. Another leaves City B at a different time travelling at speed Y. Where and when do they collide?” problems. Most of the chemistry exams you take will be composed of problems like this, but with chemistry instead of trains 😊

Statement of Inclusivity

This course strives to be an inclusive learning community, respecting those of differing backgrounds and beliefs. As a community, we aim to be respectful to all students in this class, regardless of race, ethnicity, socio-economic status, religion, gender identity or sexual orientation.



Expressions of Personal Identity

This course affirms all gender expressions and gender identities. On or before the first day of class you will have the opportunity to reply to a survey and let us know what name we should call you and the pronouns you use. Please tell us what you want to be called, even if it doesn't match what is on the official roster. Professor Berns and your TA welcome you to correct us on your name or gender pronouns. If you have concerns, please contact Professor Berns in a meeting or by email, whatever is most comfortable for you.

Your Responsibilities

Required Texts

- **General Chemistry: Principles and Modern Applications. 11th edition, Petrucci, Herring, Madura, and Bissonette. Pearson Prentice Hall, 2011.**

If you will be taking Chem 110 or Chem 151 this will be your textbook. If you will take Chem 171, you will use a different textbook for that class.

- **Calculations in Chemistry. 2nd edition, Dahm and Nelson. Norton, 2016.**

This will be a valuable resource for you as you work through chemistry topics during the BRIDGE course and during chemistry courses during the school year. It provides detailed descriptions of the stepwise methods for solving many types of problems with worked examples.

Should we need other course materials they will be available on Canvas.

Absences

Because of the short time span of the course, absences are not expected. However if you should find yourself ill or in an emergency, please communicate with Professor Berns. Prof. Berns will determine the best course of action. **Please avoid spreading illness to others: Stay home when sick and send us an email—we will work out something!**



An absence that is unexcused or unannounced is considered unacceptable. Unexcused absences cannot be made up, and will result in potentially failing our pass/fail course.

Plagiarism and Academic Integrity

Plagiarism, the unacknowledged appropriation of another person's words or ideas, is a serious academic offense. For every course at Northwestern, it is imperative that you hand in work that is your own, and that cites sources whenever you draw from the work of others. Please see refer to [Northwestern University's Office of the Provost's Policy on Academic Integrity](#) and the [WCAS Student Handbook](#) for more information.



Our definitions of plagiarism may differ from your previous experiences. Prof. Berns and the TAs can help clarify what plagiarism is at Northwestern. Please review the links above and ask us any questions you may have.

Logistics: How does this class work?

This schedule is tentative as we want to retain the flexibility to adapt to the specific needs of the students in this program. As we discuss what applications you are most interested in, we can firm up the schedule for the chemistry to be covered in this program.

The most important part of the course is not the chemistry content; rather we will focus on how we approach learning something new. We will cover some chemical theory, discuss approaches to calculations for specific types of problems, and practice solving particular types of problems. Some work will be done as a class, some in small groups of students working with the course teaching assistant and peer counselors, and some as individuals. You'll have the opportunity to demonstrate your understanding in the form of in-class quizzes, homework, a final exam, etc.

Technology in the Classroom

Some research suggests that writing notes on paper helps you learn and study better. Though we have some of our assignments and notes available online, you may or may not want to have a laptop out in class.



I encourage you to stick with the methods that work for you, and ask for help when you need it. Sometimes we need help identifying what works for us, or how it looks in the context of a new environment.

Even if you think you can multitask successfully, please be considerate of Prof. Berns and other students in class sessions:

Put away your phone and avoid using devices to do stuff that isn't related to the class.

Class day		Do this before to prepare for this class	Lecture topic	What is going on in class
M	Aug 8	–	Dimensional analysis (DN Ch 4-5)	Welcome / lecture / skill spotlight 1
Tu	Aug 9	Read textbook (actively!)	Dimensional analysis (DN Ch 4-5)	Lecture / skill spotlight 2
W	Aug 10	Homework 1	Stoichiometry (DN Ch 9)	Quiz 1 / lecture / group practice
Th	Aug 11	Practice problems from the book	Stoichiometry (DN Ch 9)	Lecture / skill spotlight 3
M	Aug 15	Homework 2	Limiting reactants (DN Ch 9)	Quiz 2 / lecture / group practice

Tu	Aug 16	Review your notes	Gas Laws (DN Ch 16-17)	Lecture / skill spotlight 4
W	Aug 17	Homework 3	Gas Laws (DN Ch 16-17)	Quiz 3 / lecture / group practice
Th	Aug 18	Outline a problem from this chapter	Gas Laws (DN Ch 16-17)	Lecture / skill spotlight 5
M	Aug 22	Homework 4	Lab	Lab prep
Tu	Aug 23	Prelab on Canvas	Lab	Do the experiment (Tech HG10)
W	Aug 24	Organize data from lab	Lab	Post lab as a group
Th	Aug 25	Read textbook	Thermochemistry (DN Ch 18)	Lecture / skill spotlight 6
M	Aug 29	Try problems from textbook	Thermochemistry (DN Ch 18)	Lecture / skill spotlight 7
Tu	Aug 30	Homework 5	Thermochemistry (DN Ch 18)	Quiz 5 / lecture / group practice
W	Aug 31	Study for exam	Exam	Exam
Th	Sept 1	Well deserved rest!	Go over exam	Work day / skill spotlight 8