CHEM 0970
General Chemistry for Engineers 2 – section 5
Spring 2025

****Special thanks to Dr. Kevin Quan and Dr. Jiabei Zhou for their supports in this document.****

Lecturer: Dr. Jue Gong

Lecture time and location: Monday 01:50 pm-04:25 pm, 江安现代工学互动教学中心（南楼）(SCUPI new building south) S204

Office hour: 10:00 am-12:00 am Tuesday

02:30 pm-04:30 pm Wednesday

10:00 am-12:00 am Thursday

02:00 pm-05:00 pm Friday

Office: N526, SCUPI new building

Catalog Description

Expanding upon the basic concepts introduced from CHEM 0960, CHEM 0970 delves into physical properties of solutions, entropy and free energy, chemical equilibrium, acid-base equilibria and solubility equilibria, electrochemistry, chemical kinetics, nuclear chemistry, coordination chemistry and organic chemistry. This second-term chemistry course aims to provide students with a comprehensive understanding of introductory-level chemistry topics, thereby equipping them for future senior-level courses.

CHEM 0960 is required for CHEM 0970.

Credit hours: 3.0

Course Objectives

Fundamental concepts and principles of chemistry are important to engineers. Knowledge on chemistry will help engineers to communicate with chemists, and more importantly, to understand the properties of working objects. To gain such knowledge, this two-semester course (including CHEM 0960) covers a relatively broad yet important range of topics. Learning objectives related to specific topics will be listed in the lecture slides as each chapter goes. Upon successful completion of this course, you should gain "global" skills as follows:

- Be able to communicate chemistry using basic chemistry vocabulary.

- Predict material properties using basic concepts and principles of chemistry. Explain scientific methods e.g., how theory is constructed and tested via experimental efforts, particularly in chemistry.
- Demonstrate both qualitative and quantitative problem-solving skills using knowledge on structural chemistry, stoichiometry, thermochemistry, chemical equilibrium, and reaction kinetics.

Applicable ABET Learning Outcome

- Students are able to have a fundamental understanding of the principles and concepts of general chemistry.
- Students are able to have the critical thinking to apply chemistry knowledge to real world problems.
- Students are able to have scientific communication skills in English and prepare them for advanced studies.

Required Textbook

- *Chemistry: Atoms First, 4th edition* by Julia Burdge and Jason Overby.

Course Format

In this semester, I will introduce the concepts first and then solve the relevant practical problems together during lectures. I highly recommend reviewing the handouts before each class session. Understanding fundamental English terms is essential for maximizing your effectiveness in class.

While you are working on in-lecture problems, you are more than welcome to reach to me as well. Related questions are still welcome **anytime** during the class. Feel free to interrupt me. I won't feel annoyed but pleased.

Usually 2-3 days ahead of the class, the class handouts will be posted on BB.

For the after-class homework, you can still discuss with others but should complete it **INDEPENDENTLY.** It means that you can't copy others' work or let others copy yours.

After class, you are welcome to discuss with me during the office hours by appointment.

Homework

- Homework is due at the **BEGINNING** of the class in the week after. **5 pts** will be deducted from your homework scores for late homework submission. Short answer to the homework will be posted usually on Friday noon. **Late homework will not be graded after the homework solution is posted.**

- Please submit your homework in **PDF format** through **blackboard** via **computer**. Refer to the 'how-to' folder for instructions on PDF conversion as well as online submission. **AVOID** use cell phone app to submit homework. **Do not use cellphone** since glitches frequently happened on cell phone APP and we cannot receive your homework!

- Name the PDF file as section #-your name since it is extremely important for us to archive your performance.

- Homework grades are released within one week after submission. If you have any questions for any of your grades, contact your TA first. If problems cannot be resolved, please contact Prof. Xu to make the final decision. Any homework grading requests will be denied five-day after the grade is released.

Grades

Midterm Exam	100
Final Exam	150
Homework	30
Attendance	10
Total	290

Please expect a midterm exam after lecture 6. Midterm exam will last two hours covering all content for the whole 6 lectures. The final exam is 2 hours long and will cover content throughout the course, with emphasis on the content after the midterm.

Homework will be given weekly to help you practice and check your mastery of class content.

If you have any questions for any of your homework grades, you should contact your TA first **within 5 days** after the homework score has been posted. If there is still disagreement, you can contact me.

For exam grades, contact Prof. Xu within four days after the grade is released. Any requests will be denied after this four-day period.

Grades might be curved at the end of the semester if the class average is low. However, curving is not guaranteed. ***You should only rely on your performance in all the assignments and exams.***

Absence and Makeup

In principle, any absence in exams is not allowed except for irresistible reasons (diseases, accidents, deaths, etc.). For other reasons, you should contact me in advance. Make-up exams will not be guaranteed.

Failure of the Course

If you unfortunately failed the course (assigned an F), you can either retake the course or pass a make-up exam at the beginning of the next semester. Based on your performance in the make-up exam, a "D" or an "F" should be expected as the final grade.

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Academic Integrity

Upon accepting admission to SCUPI, you immediately assume to follow the SCUPI academic integrity guidelines. See a staff in the administrative office if you are not aware of it. The guidelines should be followed in homework, examinations, and other academic work. Violations of these guidelines may result in zero points for an exam or failure for the course.

Study Tips

- Do your homework ON YOUR OWN! You can discuss with a friend, but do it independently. Make sure you can solve similar problems after completion.
- Come to classes and take notes. You may find it's hard to understand your instructor. Keep on trying and it will get easier. Even if you have learned some of the topics in high school, you may find minor to huge differences.
- Attend tutorial sessions with questions.
- Consult a text book in Chinese if you have trouble understanding the required text book. However, make sure you learn all the terminology in English. The exam is in English! Study your notes every day. Memorizing basic facts, terms, and principles is a must. Chemistry is a subject based on workings of this objective world

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Course Schedule

*This schedule may be slightly adjusted depending on how the class performs.

Week	Topics
1	Physical properties of solutions
2	Chemical kinetics
3	Entropy and Gibbs free energy
4	Problem practice
5	Chemical equilibrium
6	Acids bases and salts
7	Acid base equilibria and solubility equilibria
8	Midterm Exam
9	Electrochemistry
10	Nuclear Chemistry
11	Labor day
12	Coordination Chemistry
13	Organic chemistry I
14	Organic chemistry II
15	Nonmetallic Elements / Metallurgy and the Chemistry of Metals
16	Final exam