

RODGERS
CHEMISTRY 2280
WINTER 2019

Peer Mentor: Navkiran Deol

Email: ga2225@wayne.edu

Chemistry Learning Center Hours

T 5:30 pm – 6:20 pm (A Paul Schaap Atrium of Chemistry)
Th 5:30 pm – 6:20 pm (A Paul Schaap Atrium of Chemistry)
F 12:30 pm – 1:30 pm (A Paul Schaap Atrium of Chemistry)

Help/Problem Solving Session:

M 2:30 pm – 3:20 pm (0231 State Hall)



Teaching Assistant: Mateusz Silenski

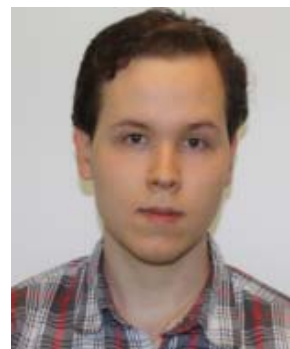
Email: f15328@wayne.edu

Chemistry Learning Center Hours

M 9:30 am – 11:20 am (A Paul Schaap Atrium of Chemistry)
T 1:30 pm – 2:20 pm (A Paul Schaap Atrium of Chemistry)
Th 2:30 pm – 3:30 pm (A. Paul Schaap Atrium of Chemistry)

Help/Problem Solving Session:

T 2:30 pm – 3:20 pm (0212 State Hall)
T 5:30 pm – 6:20 pm (0111 State Hall)



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COURSE DESCRIPTION

Chemistry 2280 is the second course in a two-course sequence in General Chemistry. The objective of this course is to introduce you to some of the basic principles of chemistry with an emphasis on quantitative chemical analysis. We will also illustrate the use of these principles in a wide variety of examples from science, engineering, medicine, technology and everyday life.

PLEASE REVIEW GENERAL CHEMISTRY I TO ENSURE THAT YOU ARE PREPARED.

Prerequisites: Required course CHM 1240 and 1250, 1410 or equivalent.

Co-requisite: CHM2290

LEARNING OBJECTIVES

By the end of this course, students should be able to:

- Describe using words, equations and/or diagrams a variety of chemical and instrumental techniques commonly used in quantitative analytical chemistry.
- Analyze quantitative data provided on homework assignments and exams related to chemical equilibria in general and in particular, acid-base, solubility, complexation and redox chemistry.
- Analyze quantitative data associated with a wide variety of analytical techniques including: acid-base, EDTA and redox titrations; UV-Vis and fluorescence spectrophotometry; atomic absorption spectroscopy; mass spectrometry; and column, gas and liquid chromatography.

METHODS OF INSTRUCTION:

This course consists of two 75-minute lectures per week. Four lecture periods will be used to administer in-class exams.

REQUIRED MATERIALS

“Quantitative Chemical Analysis”, 9th edition, Daniel C. Harris, W. H. Freeman and Company, New York, 2016 (ISBN-13: 978-1464135385 and ISBN-10: 9781464135385), which is available at the bookstore as a hardbound text, or can be purchased online as a hardbound text or as an e-book. **Copies of this book are held on reserve at the Undergraduate Library.**

HOMEWORK: Homework will be completed and graded online using Sapling. You will be required to register with Sapling Learning for one semester at a cost of \$47.

Please go to the following URL to login or create a new account if you are new to Sapling, and to register for the course.

<https://www.macmillanlearning.com/Catalog/elearningbrowsebymediatype/SaplingLearning>

RODGERS
CHEMISTRY 2280
WINTER 2019

INTERNET ACCESS: You are required to have *internet access*. It is also necessary that you are able to print documents. The Adamany Undergraduate Library provides web access at no charge; printing is available at the Adamany Undergraduate Library for a fee per page.

CALCULATORS: In addition to the textbook and access to e-mail, **you will need a *scientific calculator***. The calculator should have the basic arithmetic functions, express numbers in scientific notation and have the ability to raise numbers to exponents, take roots, to do logarithms and antilogarithms. The TI-30 series of calculators made by Texas Instruments are examples of the type of calculator you could use and they cost less than \$20. Casio also makes several scientific calculators in this price range (e.g., FX-115ES and FX-300ES series) which would be acceptable. **The calculator must not be a programmable one. Graphing calculators such as the TI-83 or TI-84 series are NOT acceptable. You will NOT be permitted to use a programmable calculator during any exam.** You must bring your calculator to all exams. Calculators will not be provided to students by the instructor. **you are NOT permitted to share calculators during exams or quizzes.**

RECOMMENDED ADDITIONAL TEXTBOOK

“**Calculations in Chemistry: An Introduction**”, 2nd edition, Donald J. Dahm and Eric A. Nelson, Norton, 2017 (ISBN-13: 978-0393614367 ISBN-10: 0393614360). This book is not required for this course. However, it is recommended for those students who would like or need additional practice with the mathematical applications of chemistry. This book is available as either a paperback or an e-book.

OTHER OPTIONAL MATERIALS

“Solutions Manual for Quantitative Chemical Analysis, 9th edition, Daniel C. Harris, W. H. Freeman and Company, New York, 2015 (ISBN-13: 978-142931237 and ISBN-10: 429231238).

RODGERS
CHEMISTRY 2280
WINTER 2019

TENTATIVE SCHEDULE*

Lecture Topics	Reading
The Analytical Process	Chapter 0
Measurements (Stoichiometry and Equilibria)	Chapter 1
Chemical Equilibrium	Chapter 6
Activity (Ionic Strength and Solubility) & Systematic Treatment of Equilibrium (Solubility and pH)	Chapter 8
Monoprotic Acid-Base Equilibria	Chapter 9
Polyprotic Acid-Base Equilibria	Chapter 10
Acid-Base Titrations	Chapters 11
EDTA Titrations	Chapter 12
Fundamentals of Electrochemistry (Nernst Equation)	Chapter 14
Redox Titrations	Chapter 16
Fundamentals of Spectrophotometry	Chapter 18
Applications of Spectrophotometry	Chapter 19
Introduction to Analytical Separations	Chapter 23
Gas Chromatography	Chapter 24
High-Performance Liquid Chromatography	Chapter 25
Chromatographic Methods and Capillary Electrophoresis	Chapter 26
Atomic Spectroscopy	Chapter 21
Mass Spectrometry	Chapter 22

*It is likely that we will not have sufficient time to cover all of the topics listed above. Thus, the lecture topics are subject to change based upon the flow of the course.

NOTE: We will not directly cover the following chapters. However, these chapters provide supporting information that will make the material we do cover easier to understand. Thus, it is recommended that all students read these chapters as time in their busy schedules allows.

Tools of the Trade	Chapter 2
Experimental Error	Chapter 3
Statistics	Chapter 4
Quality Assurance and Calibration Methods	Chapter 5
Let the Titrations Begin	Chapter 7
Electrodes and Potentiometry	Chapter 15
Electroanalytical Techniques	Chapter 17
Spectrophotometers	Chapter 20
Sample Preparation	Chapter 28

RODGERS
CHEMISTRY 2280
WINTER 2019

COURSE POLICIES

- 1. ATTENDANCE:** Attendance at all lectures and exams is expected in CHM2280. Attendance at help/problem solving sessions is optional, but strongly encouraged. Because the course is intensive and fast-paced, it is important to attend all lectures because they will be the primary mode of communication between Professor Rodgers and the students. Course announcements will be made at the beginning of the lecture. **THEREFORE, PLEASE AVOID BEING LATE. You are responsible for all material covered in class whether or not you attend the session.** If you do miss class for ANY reason, you should review the course notes as soon as possible so that you do not fall behind in the course material.
- 2. LECTURE / HELP SESSION DECORUM:** Disturbances during lectures or help sessions will not be tolerated. Other students wish to learn and you should not disturb them or the instructor by talking, by walking in and out of class, answering cell phones, texting, or by creating other distractions. You will be asked to leave the class if your cell phone rings during class or you are being disruptive. You will be penalized 20 points each time you are asked to leave the classroom. The only electronic devices you are allowed to bring to class are tablets or laptop computers for note-taking. The instructor or teaching assistants may walk through the classroom aisles and if you are caught on social-media, watching videos or anything not classified as note-taking, you will be asked to leave and will lose points for disrupting class.
- 3. HELP / PROBLEM SOLVING SESSIONS:** These are smaller classes led by a teaching assistant or peer mentor. You WILL be required to sign up for one of the help sessions, but will NOT be required to attend. Their purpose is to give you an opportunity to participate actively in class work and to ask questions about the current material. You should bring your textbook, homework and calculator to each help session. Quizzes will be given during these help sessions to enable you to test your mastery of the material. **However, these quizzes are optional and will only count as extra credit. There will be no make-up quizzes for any reason.**
- 4. LEARN YOUR TA'S NAME AND YOUR SECTION #.** You will be required to put your name, your TA's name, and your section # on all exams and extra credit quizzes as they will be returned to you during help sessions.
- 5. HOMEWORK:** Homework problems will be assigned on a regular, roughly weekly basis and will be worth ~20-25 points per assignment. Homework will be conducted using Sapling. You will need to purchase access to the homework site for the semester. All students are expected to master the problems assigned and to complete them within the specified timeframe. **There are no extensions to homework for any reason.** All technology fails at some time. If there is a technological issue with your homework, you will need to contact Sapling Technical Support in time to still complete your homework by the deadline. The number of homework points assigned will likely exceed 200 points; regardless of the total number of points assessed in homework, your score will be normalized to a 200 point scale (i.e., % earned x 2) such that a maximum of 200 homework points will apply toward your grade.

RODGERS
CHEMISTRY 2280
WINTER 2019

6. SHOW ALL OF YOUR WORK ON PROBLEMS GIVEN ON EXAMS AND QUIZZES.

Providing only the correct final answer will result in very few points. Partial credit is allocated in advance so that it can be applied fairly to all students. You must always provide your final answer with appropriate units and with the correct number of significant figures (please see handout on significant figures). Penalties for improperly reporting answers (i.e., leaving off units or providing an inappropriate number of significant figures in your answer) will be incurred for each and every instance. Effort must be made to present your answers clearly and legibly. If Dr. Rodgers or the TAs cannot read your answers/solutions, you will receive a “zero” for that problem. Regrades on exams must be requested in writing using the exam review form within one week after they are returned or will not be granted additional points even if a mistake has been made in the grading. **Therefore, be sure to carefully review your graded exams right away.**

7. EXAMS: Excused absences must be approved before the exam starts. **THERE ARE NO MAKE-UP EXAMS FOR ANY REASON.** In the event of last minute emergencies, an email should be sent to Dr. Rodgers prior to the start of the exam outlining the nature of the emergency, your name and the name of your help session TA. Documentation will be required for an absence during an exam. Documentation will be verified by phone calls to doctors, police officers and anyone else who has provided relevant information. Individuals that are excused from an exam by Professor Rodgers will be given a score equivalent to the percent earned on the final exam***Individuals who are absent without being excused by Dr. Rodgers will receive a grade of zero on the exam. Each exam will include the following Academic Integrity Pledge:

ACADEMIC INTEGRITY PLEDGE

DURING THE EXAM I WILL:

- ✓ Turn off my cell phone and put it away (out of sight and not on my person)
- ✓ Close all books, notebooks, etc. and put them under the seat in which I sit
- ✓ Use only a permitted calculator (no graphing or programmable calculators or cell phones (including smart phones) are permitted)
- ✓ Keep my eyes down and focused on my own paper
- ✓ Keep my answers covered
- ✓ Stop writing immediately when the end is announced

DURING THE EXAM I WILL NOT:

- ✓ Have any papers other than those provided
- ✓ Have any writing on my clothing or person or desk
- ✓ Talk to anyone other than a TA, peer mentor or the instructor

I understand that **the minimum consequence** of any behavior contrary to this pledge is that I will receive a zero on this exam that will not be replaced by the percent earned on my final exam.

Name (print & sign): _____

RODGERS
CHEMISTRY 2280
WINTER 2019

8. **EMAIL ETIQUETTE:** The relationship between a student and WSU faculty and staff is a professional one. Professional relationships require certain “polite” and respectful behavior whenever students and faculty/staff interact with each other or via email. Please follow these rules of etiquette when composing e-mails for this course or when writing to any other member of the WSU faculty or staff in the department (e.g, Ms. Erin Bachert). Proper email etiquette will make it possible to answer your questions as quickly as possible. Please note that email is handled during normal WSU business hours.

- **You should check your Wayne State e-mail frequently, preferably daily.** This is the major method of communication for this class. Announcements will be posted on a regular basis and you are responsible to make yourself aware of them. If you do not check your email, you will miss key information about exams, deadlines and other class issues. Either check it regularly, or set it to forward to another address that you check regularly. If you need help with this, call the **C&IT Help Desk at (313) 577-4778.**
- Use only a Wayne State Account to send email (Gmail, Hotmail, etc. emails may not be read as they are frequently filtered into the WSU spam folder).
- The subject line needs to contain your course number (CHM 2280).
- The subject line needs to contain your help session section number.
- The e-mail should be “Professional”. This means you should include a salutation, a brief message and your full name as it appears on Blackboard and your access ID. Please do not address the email using “Hey” – this is unprofessional. “Hi”, “Hello”, “Good Morning/Afternoon”, “Dr. Rodgers”, and “Professor Rodgers” are all acceptable ways to address your e-mail. It is not appropriate to address me by my first name. It is not appropriate to use vulgar language in e-mail.
- To help me understand your questions clearly, the e-mail should contain complete sentences. Please use spell check to prevent confusion caused by misspelled words.
- If referring to something mentioned in a previous e-mail, you should “reply” to that e-mail so that the complete text of our previous correspondence is included. Please do not create a new e-mail to reply or your new e-mail may not be understood because key pieces of background information will be missing.

9. **EXTRA CREDIT.** Dr. Rodgers will occasionally provide opportunities for extra credit. This will generally take the form of additional points being made available on exams or extra credit quizzes given in the help sessions. When earned, these points will increase your score, but will not be included in the total points available in the class. **All opportunities for extra credit will be provided to the entire class. If you do not regularly attend the help sessions you will miss out on some of these opportunities.** Additional extra credit assignments will not be granted to any individual.

RODGERS
CHEMISTRY 2280
WINTER 2019

10. STUDENT DISABILITIES SERVICES: If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located in the Adamany Undergraduate Library. The SDS telephone number is 313-577-1851 or 313-202-4216 (Videophone use only). Once your accommodation is in place, someone can meet with you privately to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Students who are registered with Student Disability Services and who are eligible for alternate testing accommodations such as extended test time and/or a distraction-reduced environment should present the required test permit to the professor **at least one week in advance of the exam**. Federal law requires that a student registered with SDS is entitled to the reasonable accommodations specified in the student's accommodation letter, which might include allowing the student to take the final exam on a day different than the rest of the class.

11. ACADEMIC DISHONESTY -- PLAGIARISM AND CHEATING: Academic misbehavior means any activity that tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the Student Code of Conduct (<http://www.doso.wayne.edu/student-conduct-services.html>). Students who commit or assist in committing dishonest acts are subject to downgrading (to a failing grade for the exam or other course-related activity in question, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct.

- ***Cheating:*** Intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information or assistance in any academic exercise. Examples include: (a) copying from another student's test paper; (b) allowing another student to copy from a test paper; (c) using unauthorized material such as a "cheat sheet" during an exam.
- ***Fabrication:*** Intentional and unauthorized falsification of any information or citation. Examples include: (a) citation of information not taken from the source indicated; (b) listing sources in a bibliography not used in a research paper.
- ***Plagiarism:*** To take and use another's words or ideas as one's own. Examples include: (a) failure to use appropriate referencing when using the words or ideas of other persons; (b) altering the language, paraphrasing, omitting, rearranging, or forming new combinations of words in an attempt to make the thoughts of another appear as your own.
- ***Other forms of academic misbehavior include, but are not limited to:*** (a) unauthorized use of resources, any attempt to limit another student's access to educational resources, or any attempt to alter equipment so as to lead to an incorrect answer for subsequent users; (b) enlisting the assistance of a substitute in the taking of examinations; (c) violating course rules as defined in the course syllabus or other written information provided to the student; (d) selling, buying or stealing all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

RODGERS
CHEMISTRY 2280
WINTER 2019

12. **RELIGIOUS HOLIDAYS:** Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.

13. **STUDENT SERVICES:**

- **The Academic Success Center** (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit www.success.wayne.edu for schedules and information on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level courses).
- **The Writing Center** is located on the 2nd floor of the Undergraduate Library and provides individual tutoring consultations free of charge. Visit <http://clasweb.clas.wayne.edu/writing> to obtain information on tutors, appointments, and the type of help they can provide.
- **The Chemistry Learning Center** is located on the first floor of the Chemistry Building in the A. Paul Schaap atrium outside of the 101 office suite. Graduate students will be available to assist students with content in selected courses during designated hours (usually 9:00 am to 4:00 PM, Monday through Friday). The schedule for this semester will be posted to Blackboard as soon as it becomes available.

14. **CANVAS:** Canvas is a web-based resource for courses. In this course we use Canvas for several reasons primarily for announcements and to post lecture or course resources information. Canvas is located at <http://canvas.wayne.edu> Once you login, the courses for which you are registered will be listed. This site will be used for announcements, lecture slides, and course materials.

Canvas is meant for essential communication between the professor and the students. Canvas is meant for topics pertaining to CHM2280. If inappropriate requests are sent by a student, a penalty of 50 points will be deducted from their overall point total in the class.

15. **COURSE DROPS AND WITHDRAWALS:** In the first two weeks of the semester, students can drop this class and receive 100% tuition and course fee cancellation. **(For Winter 2019, this deadline is Friday January 18, 2019)** After this date, there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Academics. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after **Sunday, March 24, 2019**. Students enrolled beyond this date will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: <https://wayne.edu/registrar/registration/>

RODGERS
CHEMISTRY 2280
WINTER 2019

GRADING CRITERIA and IMPORTANT DATES

Homework	Approximately Weekly	200pts
Pop Quizzes	Random	100pts
4 In Class Exams	4 x 125 points each	500pts
Final Exam	Tuesday 4/30 2:45AM – 4:45PM	200pts
Total points possible		1000pts

IMPORTANT DATES

DATE(S)

First day of classes	Monday 1/7
Census date (instructor permission required to withdraw)	Friday 1/18
1 st in Class Exam	originally scheduled for Tuesday 1/29 (4:00PM–5:15PM)
	postponed due to University closure to Tuesday 2/5 (4:00PM–5:15PM)
2 nd in Class Exam	Thursday 2/21 (4:00PM–5:15PM)
Spring Break (No Class)	Tuesday 3/12 and Thursday 3/14
Last day to withdraw	Sunday 3/24
3 rd in Class Exam	Tuesday 3/26 (4:00PM–5:15PM)
Last day of classes and 4 th in Class Exam	Thursday 4/18
Final Exam	Tuesday 4/30 (2:45PM-4:45PM)

***NOTE: EXAM DATES ARE TENTATIVE AND SUBJECT TO CHANGE !!! DR. RODGERS RESERVES THE RIGHT TO CHANGE THE DATE OF ANY OF THE IN CLASS EXAMS SHOULD SITUATIONS OR CONDITIONS ARISE THAT MAKE IT APPROPRIATE OR NECESSARY FOR HER TO DO SO (e.g., due to UNIVERSITY CLOSURE).**

GRADES WILL BE BASED ON THE FOLLOWING SCALE.

<u>Final Grade</u>	<u>Total Points</u>	<u>Percentage</u>
A	920 – 1000	(≥ 92.0%)
A-	890 – 919	(≥ 89.0% and < 92.0%)
B+	860 – 889	(≥ 86.0% and < 89.0%)
B	820 – 869	(≥ 82.0% and < 86.0%)
B-	790 – 819	(≥ 79.0% and < 82.0%)
C+	760 – 789	(≥ 76.0% and < 79.0%)
C	720 – 759	(≥ 72.0% and < 76.0%)
C-	690 – 719	(≥ 69.0% and < 72.0%)
D+	660 – 689	(≥ 66.0% and < 69.0%)
D	620 – 659	(≥ 62.0% and < 66.0%)
D-	590 – 619	(≥ 59.0% and < 62.0%)
F	< 590	(< 59.0%)

RODGERS
CHEMISTRY 2280
WINTER 2019

SUGGESTIONS FOR ACHIEVING SUCCESS IN CHM2280: The staff of this course – instructor, teaching assistants, and peer mentors – want you to enjoy this course and do well in it! By the nature of its content, however, it is a course that requires your *active* participation. You cannot succeed by passively listening to lectures and reading the book. Based on our collective experience with hundreds of students we offer the following suggestions.

- **Attend all lectures.** Pay close attention and take good notes. After the lecture go over the notes and work through in detail any examples or problems that were presented. In our lectures we will not only be presenting the facts but also trying to show you by example how to think about the material and how to approach problem solving. Many of the general principles we show by example will be applicable not just to chemistry but to almost any kind of quantitative science or engineering discipline.
- **Do the homework.** Study the sample problems in the text and then try the assigned problems. Make a note of any questions that you have or problems steps that you do not understand and raise them in help session. If you need more help see one of the TAs or peer mentors in the Chemistry Learning Center promptly.
- **Study habits.** Schedule your study time to allow a few large blocks of time for studying this course. Do your studying in a quiet place free from distractions. These habits will enable you to study more efficiently. They will also enable you to develop the ability to work intensively on chemistry for an extended period; this will help you maintain your concentration on the mid-semester exams and the final.
- **Form a study group.** Get together with two or three other CHM 2280 students and form a study group. Educational research and the experience of former students have shown that this is one of the best ways to learn in almost any course. If you don't know anyone, introduce yourself to people sitting near you in a lecture or help session.
- **Set aside time for CHM2280.** Don't underestimate the study time that your courses will require. We are expecting you to do more of the learning on your own. A traditional rule of thumb says that you should be spending two hours of study time outside of class for every hour spent in class. This will vary widely from student to student, from course to course, and from time to time in a given course. Nevertheless a typical successful student with normal fulltime course load is probably spending at least forty hours a week total on courses, in and out of class. You can do this and have time for other things if you plan and budget your time carefully.
- **Don't fall behind.** Because of the pace and the cumulative nature of the material in this course, procrastination can quickly lead to a situation from which it may be very difficult to recover. Also, don't wait till the last minute to study for exams. You may find it difficult to get help if you need it.
- If you are repeating the course ask yourself "**What will be different this time?**" If you cannot give yourself a good answer, chances are that nothing will be different including the outcome.
- If you have problems, academic or administrative, that you cannot get resolved at a lower level, contact one of the TAs, peer mentors or Professor Rodgers for assistance.