A. Getting Started: What do you need before classes start?

1) **Please have regular access to a computer with a webcam**. Three weekly lectures will be given over Zoom each week. You will find links to these Zoom meetings on the course Canvas page. It is my strong preference that we all have our webcams on during these meetings; however, if this is not possible or makes you extremely uncomfortable, webcam use is not required. This will function as a synchronous course. Please plan to attend all meetings live unless you have a course conflict previously approved by me. I will record each class lecture and post it to Canvas, but please do not use this as an excuse to skip the live lecture.
2) **Please have a notebook** so you can take notes as you see fit. Most of the content will be delivered via white board as it would be if we were in-person. Taking notes is recommended.

B. Week-to-week: What should you be looking for on Canvas?

1) **There will be new assignments every week or two on Canvas.** Unless otherwise specified, my expectation is that you will write out answers to these problems and upload them into Canvas.
2) **There will be a midterm exam and final exam on Canvas.** Like the homework assignments, you will hand-write and upload your answers to Canvas. Unlike the homework assignments, working together or seeking help is not allowed.

C. Resources

One challenge in this course is that there is no textbook, and there is certainly no one in the Tutoring-Learning Center who is going to be able to help.

1) **Use each other as a resource**. While the work you submit on homework assignments must reflect your understanding of the topic and must never be copied from someone else, I have no issues with you working together to figure out homework problems. This, of course, is not allowed on exams.
2) **Lecture videos on Canvas** will be maintained for the entire semester. If you need to review a topic, feel free to re-watch lectures.
3) **Schedule an appointment with me.** I should be available during any of the times on my schedule that are blank. Email me at nbowling@uwsp.edu to schedule a Zoom appointment.

	Monday	Tuesday	Wednesday	Thursday	Friday
08:00	***Chem 105 CBB 226***	***Not Available***	***Chem 326 CBB 420***	***Not Available***	**Chem 399 CBB 436**
09:00	***Chem 105 CBB 226***		***Chem 326 CBB 420***		**Chem 399 CBB 436**
10:00	***Chem 105 CBB 226***		***Chem 326 CBB 420***		**Chem 399 CBB 436**
11:00	**Chem 399 CBB 436**	***Chem 326 CBB 420***			**Chem 399 CBB 436**
12:00	**Chem 399 CBB 436**	***Chem 326 CBB 420***			**Chem 399 CBB 436**
13:00	**Chem 399 CBB 436**	***Chem 326 CBB 420***			**Chem 399 CBB 436**
14:00	***Chem 425 Virtual***	***Chem 425 Virtual***		***Chem 425 Virtual***	***Meetings/ Seminar***
15:00	***Meeting***	***Not Available***			***Meetings/ Seminar***
16:00		***Not Available***		***Not Available***	

D. Course Approach and Grading

The courses I took in graduate school had a much different feel than my undergraduate courses. In my undergraduate chemistry courses, I was constantly being assessed via homework assignments, quizzes, and exams. When I went to graduate school, I found my courses were much less assessment focused and much more about learning cool, new things about chemistry. For Chem 425, I lean toward this approach rather than the assessment heavy approach you are likely used to from your 100- to 300-level courses in chemistry.

Frequently asked questions regarding this approach:

Does this mean this course will be less work than my other chemistry courses? Maybe, but don't count on it. It is certainly not my intention to eat up a significant portion of your study schedule with this course. However, you will be introduced to many new topics and several new tools. If these things come naturally to you, the workload will seem fairly light; some students, on the other hand, find these topics and new tools challenging, which warrants significant effort on their part.

Does this mean I am going to get a good grade in this course? Maybe, but there are no guarantees. Students who put in effort to understand topics often do well in this course. However, this course is by no means an "easy A." As mentioned above, some of the topics can be challenging for students, and some students find the lack of a textbook can be frustrating when they are trying to figure out a new topic.

How am I supposed to learn chemistry if I don't have a textbook? This can be a tough transition for students. If you are anything like me as an undergraduate, you spend *lots* of time studying your chemistry textbooks and working through problems. Once you graduate from your undergraduate institution, you will find that you rarely use textbooks. Chemistry professionals rely on primary literature to learn topics. A big part of this course is learning how to use these resources.

Since this course is not assessment focused, does this mean I have lots of flexibility with due dates? Nope. I will perform two grade calculations at the end of the semester: one that is exam heavy (Track 1) and one that is homework heavy (Track 2). I will use whatever calculation gives you the better grade in the class. However, in order to participate in Track 2, you must turn in every homework assignment (on-time), and each must be complete. If you have more than one incomplete/late assignment, your grade will be determined by Track 1, regardless of which Track would potentially result in a higher final grade for you.

	Track 1	*multiplier*	*% of grade*	***Track 2***	*multiplier*	*% of grade*
Assignments	150 pts	0.0667	10%	150 pts	0.3667	55%
Mid-Term	150 pts	0.30	45%	150 pts	0.15	22.5%
Final	150 pts	0.30	45%	150 pts	0.15	22.5%

Will this be the coolest course I take as an undergraduate? Yes.

E. Course Content

Chem 425: *(3.0 Credits, Prereq. 326)*
Course Description/Learning Outcomes: Students will be able to solve complex problems by mastering advanced organic chemistry concepts, accessing chemical literature, and utilizing chemical database resources. Students will predict outcomes for chemical reactions based upon their knowledge of MO theory, coordination chemistry, intermediate stabilities, and general electronic concerns. Students will propose reaction mechanisms for organic and inorganic reactions, indicating stereochemical outcomes when appropriate.

Topics:

Applications of MO Theory to Reaction Mechanism
Review of molecular orbital predictions for simple systems
Electrocyclic reactions (Woodward Hoffman rules)
Cycloaddition and cycloreversion reactions (e.g. Diels-Alder reaction)
Sigmatropic rearrangements
Sharpless "Click" chemistry

Electronic and Steric Constraints in Organic Reactions
Review of kinetic and thermodynamic considerations
Hammett equation
Enolate chemistry
Neighboring group contributions

Reactive Intermediates
Review of reactive intermediates
Migrations in carbocations
Carbanion rearrangements
Free radical rearrangements
Carbene chemistry

Organometallic and Transition Metal Chemistry
Introduction to transition metal chemistry
Inorganic reaction mechanism
Organometallic reaction mechanism
Coordination driven stereo-control

Incorporation of Concepts into Natural Product Synthesis
Review of retrosynthetic analysis
Discussion of enantiomeric/diastereomeric excess