

CHEM343: Introductory Organic Chemistry

University of Wisconsin – Madison

Instructor - Contact Information and Office Hours

Aubrey Ellison

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Office Hours: By appointment

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TA Office Hours: Separate individual TA Office hours are not regularly held during the summer term. There are 150 minutes of discussion, 150 minutes of open work time with TA and instructor assistance, and 150 minutes of large group Q&A each week of the summer session. Please make use of these times to get all the assistance you need. Additionally, the TAs and course instructor will be monitoring and responding to Piazza throughout the week, which provides another avenue for assistance.

Amy Van Aartsen (avanaartsen@wisc.edu): Office hours by appointment.

Cara Schwarz (ceschwarz@wisc.edu): Office hours by appointment.

Chemistry 343 Official Course Information

Official Course Description: Chemistry 343 covers fundamental aspects of organic molecular structure, including stereochemistry, and introduces basic themes in organic reactivity. It is the first semester of a two-semester organic chemistry sequence. Chemistry 345 is the second course in the sequence. Class is for students expecting to take two semesters of organic chemistry.

Canvas Course URL: <https://canvas.wisc.edu/courses/145375>

Course Designations: Intermediate level; physical science breadth; counts as L&S credit

Requisite: CHEM 104, 109, 116

Chemistry 343 Learning Outcomes

Students will be able to use the electronic and molecular structure of organic molecules to predict and rationalize their reactivity using concepts of bond strength, electronegativity, steric repulsion, strain, intermolecular interactions, hyperconjugation, conjugation, and aromaticity.

Students will be able to use molecular orbitals, potential energy surfaces, and electron-pushing reaction mechanisms to describe chemical reactivity with an emphasis on the reactions of alkenes, alkynes, alcohols, alkyl halides, and ethers.

Students will be able to propose multi-step synthetic schemes to generate complex organic molecules from simple starting materials using studied reactions.

Chemistry 345 (3 credits) Credit Hour Accounting

Learning in this course is structured in a blended and flipped model spread across many platforms. The numbers provided below are a good-faith estimate of the time needed to be spent on this course in each component. The exact hours will vary from student to student.

Activity	Time (hr)
M/W Large Group Q & A	14
T/R Work Sessions/Individual Help Office Hours	15
Discussion	19
Video Lectures	40
Homework	50
Exams & Quizzes	7
Total	145

Teaching and Learning Philosophy

Knowledge can be broken down into 4 categories. What you know you know, What you know you don't know, What you don't know that you know, and What you don't know that you don't know. I believe that the most powerful of those categories is knowing what you don't know. It is only through recognizing what you don't know that you take the first steps toward learning. One of the best ways to accomplish this is to try to explain why you know what you know. I highly encourage students to not be passive learners but to be teachers and thereby active learners.

Being an active learner:

Teach- Find a classmate/friend/pet/mirror and explain your thought process. As stated above, teaching/explaining a concept allows you to reflect on your own understanding of the material. Be thorough in your discussion of the material and take note of any confusion so that you can address it later.

Ask questions- While your in lecture or reading the textbook write down any questions you have about the material. This is a great way to engage with the material as it is presented to you.

Attempt to answer all questions- Beyond the problem sets and the discussion questions, look to answer the questions that you pose yourself from lecture and the text. Before seeking the solution, attempt to answer the question yourself. It is okay not to know the answer as the self reflection and identifying the gaps in knowledge are the true goals of this exercise. This will help pinpoint where learning needs to occur.

Review what you got wrong- Take time to review your quizzes and exams. Organic chemistry builds on itself. Taking the time to address and clarify what you don't know will facilitate your future understanding of new course material.

Being an active learner takes work and practice. Part of our role as instructors is to help you with this process. We as your instructors are always happy to listen to your explanations as it in turn helps guide our teaching. I hope that students that take my class are able to take away not only an understanding of the course material, but more importantly, develop their own approach to addressing problems that they can carry on in their next adventure.

Learning is not free and is not easy. To move from familiarity to understanding and mastery, in organic chemistry, is going to require a great deal of focus and effort. We promise that by the end of chemistry 343/344/345, you will be a more mature learner, a stronger thinker, and have a much better understanding of chemistry. To begin that journey you will likely need to improve in several areas:

1) Time management and dedication - It is critical that you work very hard and very efficiently to master the course concepts. First and second semester organic chemistry covers more material and at a greater depth than you have likely encountered before this stage in your education. Each concept and chapter builds upon the previous one. You must find a way to work at a consistently intense level for the entirety of the course. This is difficult. It will likely require you to develop greater intellectual and emotional stamina. You will need to work on organic chemistry each and every day. You cannot afford to fall behind; it is very difficult to recover.

2) Learning for Mastery - Most of the students entering organic chemistry are very, very intelligent. Most of the students entering organic chemistry have been very successful in high school and their past college courses. Unfortunately, that means that most of you have never been sufficiently challenged to develop the learning skills necessary to have success in organic chemistry and beyond. As is the case in many areas of learning, those with poor learning and study skills don't even know that they lack good learning skills. One of the best things you could

do for yourself is to continually push your mind to understand the underlying concepts. You should continually check to make sure that you can answer all assigned course questions, explain the underlying concepts in writing and verbally, and to identify any areas where you have not mastered the course content.

3) Self-motivation - As an adult learner, you are responsible for your own learning and your own motivation. If you are taking organic chemistry, it's almost certainly because it is important to your future. Learning this material and gaining the skills necessary to master it will be critically helpful to your future. As such, you should not expect someone else to provide you with the desire to learn, the desire to master, or the desire to succeed. In order to put in the time and dedication necessary to achieve mastery of the course content, you will have to be very motivated. We can't motivate you. Your TAs cannot motivate you. Motivation must come from within!

Where the Learnin' Happens (Instructional modes)

[Chem 343 Summer 2018 Schedule](#)

Large Class Q & A (Monday and Wednesday), 1315 Chem

We will meet approximately twice per week to discuss the course material in an Review / Q & A style session in the large lecture hall. These sessions will allow you ample time to ask questions of clarification about a particular concept or how to solve a particular question. You also have the ability to hear and see the answers to the questions that other people have raised. We will be using Top Hat to ask 2 to 3 questions per lecture. These are graded, quiz/exam-level questions and will contribute (~50 pts) to your final grade in the course.

Large Class Work Time / Individual Help Office Hours (Tuesday and Thursday), 1371 Chem

On these days, you are encouraged to come to class and spend 75 minutes working on your coursework with classmates and ready to ask questions in small groups or one-on-one with your course instructors. No course points will be obtained during these sessions.

Lecture Videos

The purpose of lecture, or in this case lecture video, is to provide a conceptual framework for you to understand the course material. Key concepts and examples will be highlighted. While many details will be discussed, the focus will be on the big concepts and how the current material connects to past learning and future expectations. Lecture videos will help define the depth and breadth of the course and will help you understand the course expectations. You cannot learn everything necessary for success in the course from these lecture videos alone. The videos will only build the foundation of learning. *The course schedule indicates exactly which lectures are assigned for each day.*

Discussion Meetings

The discussion sections with your TA are probably the second most critical as part of your learning process. The discussions play many roles all of which serve to deepen your understanding of the course material. You will have a chance to talk to your TA and classmates about problem solving strategies, difficult course concepts, and common misconceptions. Discussion provides a great opportunity to talk about the material. Discussion sections will always involve group work of some form or another; you will not be passively listening to your TA talk about chemistry. Furthermore, your TA's are highly successful organic chemists. This means that they can point out common issues that students struggle with and help you avoid them. They can provide you with learning insights that worked for them and they can help you interpret the textbook and lecture materials in a fairly sophisticated manner. Get the most out of each discussion by showing up ready to work and ready to discuss the week's material.

Textbook Reading

It is quite difficult for most students to understand the course material at the depth needed for a high-level of success without reading the textbook. Loudon's organic textbook (6th edition) is a great book chosen for its clear explanation and great practice problems. We recommend reading each chapter before or after each lecture, depending on your preference. A thorough reading of the textbook on any topic you are struggling with is critical. The explanations and examples provided will be helpful to your mastery of the material. It will provide more depth and breadth to the course material than we can provide in lecture and should not be over-looked as a valuable tool. We highly recommend working the in-text problems as you go.

Quizzes/Exams

The quizzes and exams are not just evaluation tools. These assessments (including the practice ones from previous terms) are teaching tools. They will give you the opportunity to clarify what you know and don't know. Use them to identify weak areas in your knowledge that you can address.

Email / Piazza

We get a lot of emails, and we lose them in the inbox more often than we'd like. In order to help bring your email to our attention, please include Chem 343 in the subject line of all emails you send me. Email should be limited to logisticals, concerns about grades, requests for alternate office hours, or any non-content related course questions. Content questions should be directed to Piazza and not sent *via* email directly to the course instructors. **Content questions received via email will be directed to Piazza.** Piazza is a great online resource where you can post questions, post answers to other students' questions, and receive answers to your questions from the course instructors. Please remember to be very clear when wording your questions on Piazza. Pictures of structures from ChemDraw are very helpful. Chemdraw is an expensive piece of chemistry software that you have free access. It is a high-quality chemistry drawing program that you can download (see below) and it will allow you to draw structures to

accompany your questions. Pictures or scanned images are also okay on Piazza, but you will likely find [Chemdraw](#) easy to use to make high-quality organic chemistry drawings. Piazza can be accessed from within Canvas by the link on the sidebar.

Problem Sets, Textbook Practice Problems, Previous Quizzes/Exams

The only way to make sure you are learning at the right depth and pace is to complete the practice problems available. If you cannot transfer what you know to new molecules or new structures, it identifies a gap in your knowledge and understanding. Answer keys are provided to the problem sets and textbook, use these to check your learning. Answer keys are intentionally not provided to some of the previous quizzes/exams. This is done to encourage you to talk to your classmates and instructors about any answers that you are unsure of and to work through problems that you can't simply look up the answer to and shortcut the thinking/learning process.

Classmates

Nothing reveals your misconceptions and misunderstandings regarding organic chemistry than trying to explain something in words. If you are working with one or more classmates on a regular basis, both of you will benefit from the opportunity to talk about organic chemistry. Helping others through material is a great way to take your own learning of a concept from superficial to mastery.

Tutors

The Department of Chemistry maintains a list of private tutors available for hire. Although the private tutors included on the list have been affiliated with the department in some way, we provide this list as a resource and cannot guarantee the quality of any individual private tutor. ([Tutors and Tutoring Services for Summer 2019](#))

Grading and Grading Philosophy

Chemistry 343 Grading - Summer 2018

There are approximately 650 points available in this course. There are three 25 pt quizzes, three 100 pt exams, and one 200 point final. Additionally, there are in-class Top Hat questions worth 50 pts. No points will be awarded for the problem sets or attending class. No exams or quizzes will be dropped; you must take them all at the regularly scheduled time. The final letter grades based upon 625 course points will reflect the historic averages of Chem 343 with a course GPA near 2.74. (see the example histogram below)

25 pts. Quiz 1 Discussion

100 pts. Exam 1

25 pts. Quiz 2 Discussion

100 pts. Exam 2

25 pts. Quiz 3 Discussion

100 pts. Exam 3

25 pts. Quiz 4

50 pts. Top Hat

200 pts. Final Exam

There are NO planned makeup quizzes or exams. You must attend class on the dates of the assessments. Top Hat questions are graded live during class, there are no ways to make up missed questions. You can log into Top Hat from anywhere and attempt to answer the questions.

Grading Philosophy

Grades are important to you, to us, and to the university. Thus, **grade assignments must reflect achievement and learning**. How that is measured and what achievement looks like are issues that are up for debate and are subject-dependent. We consider the exams and quizzes in this course to be reasonable markers of achievement and learning. Certainly, there are better/alternate methods for assessing student learning, though none of which seem overly practical in a course that serves 200 - 350 students per fall/spring course and 100+ in the summer term. The final exam counts for 200 of 625 course points weighing it double the other exams or the quiz total. This favors students who have improved in their understanding and preparation as the course progresses. We endeavor to write exams that challenge students at all levels of learning and provide a wide grade distribution. Our goal is to have no one be perfect on the entire exam, at least one student provide a perfect answer to each question, and everyone demonstrate the learning that they have achieved. We will always try to separate those that are trying to memorize patterns or use mnemonic devices from those who understand the content in terms of reactivity, structures, molecular orbitals, pKa's, etc.

Every semester, we get a lot of emails about grades, many of them suggesting that a better grade is desired than was assigned. Often these emails include a significant misconception, in our opinion, about how grading is supposed to work. Grading in our lecture of Chem 343 is not about any of the following and are not considered as rationale for wanting/deserving a better grade than what you have earned:

1. Effort/Hard work
2. Attitude toward organic chemistry

3. Attendance of office hours, lecture, or discussion
4. How much your TA or us like/dislike you
5. Needing a better grade for {insert school type here} school admissions
6. Wanting to take a course for which Chem 345 are prerequisites

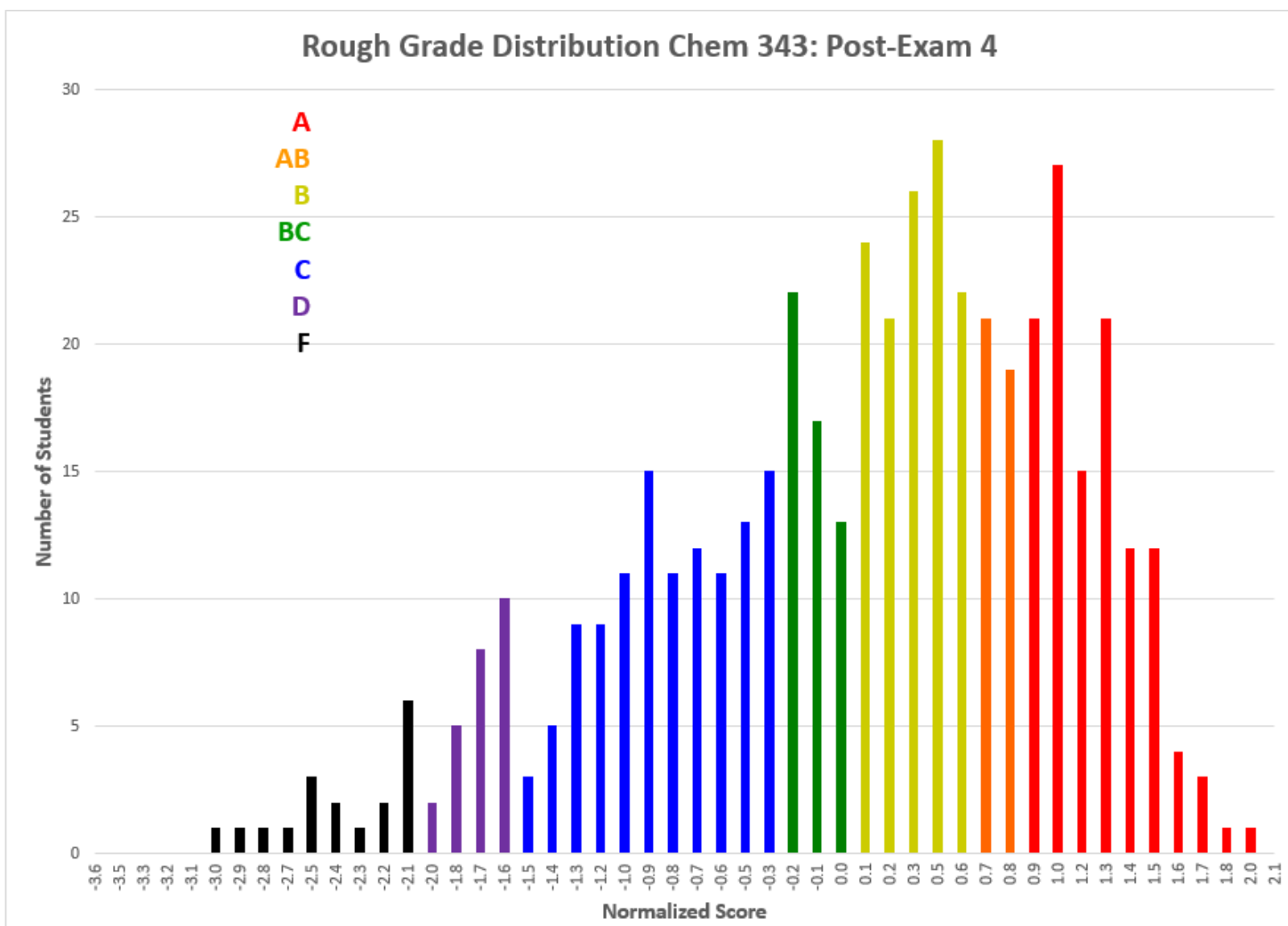
Unfortunately, instructors and students have helped create a general state of confusion about how grades are assigned, generally. Setting a certain % grade for an **A/B/C** is entirely artificial and is based upon a few assumptions. Firstly, it assumes that all assignments are of equal difficulty and can be compared directly. This is certainly not the case in this course as the mean and standard deviation vary significantly from assignment to assignment. Secondly, it assumes that there is some universal standard (such as 80 % = **B**) that should be attained for a particular grade. Furthermore, without intervention it often creates grade distributions in difficult classes with GPA's that are much lower than desired or reasonable. This forces odd adjustments to be made to scores to make them *fit* with the instructor's desired grade distribution. This seems artificial and doesn't help students gauge their performance in light of mysterious adjustments. (Often times, people misuse the word *curve* here to mean a positive adjustment in everyone's score.)

A much simpler approach is to allow the scores to fall where they do from assessment to assessment and to determine each grade relative to the mean in units of standard deviation. This allows us to attempt to write the best exam that we possibly can that advances learning, probes misconceptions, and highlights areas of deficiency. This is an imperfect approach, but far more instructive than simply looking at raw scores or % scores without considering the mean and standard deviation. In order to do this, simply use the formula below and apply an actual (simple) curve.

normalized score = (your score - average score)/(standard deviation)

If your score is +1, you rocked that assessment! If your score is near zero, you have achieved an average grade on that assignment (~ **B** in Chem 343). If you have a score of -1, your achievement is not where it needs to be. This information will be added to the title of each quiz or exam once the information is available. To put this in terms that might fit better your expectation of **A/AB/B/BC/C/D/F**, see the rough breakdown below. This shows the grade breakdown in pretty colors from a previous chemistry 343 term. The numbers in parenthesis are the normalized grade breaks. ***Do not attempt to use percentage scores or point values to estimate your current or projected course grade.***

We did choose a wavelength scale (**A** = red) rather than a frequency scale (**A** = violet) for the color coding which could be another subject for debate. The historic GPA and the GPA of this example section below is 2.74.



There are two times that we will consider deviating from this grading formula and the historic GPA.

1) **A truly exceptional lecture section** This is likely to be a fairly rare occurrence. But if the TAs and us do a remarkable job of teaching and all of you do an amazing job of learning and somehow students exceed our expectations based upon past experience, we'll shift the grades up a bit.

2) **An exceptional student performance** This is a more frequent occurrence (1 to 2% of students per term). If a student demonstrates that their raw score does not reflect their achievement, we will consider raising the student's grade by 1/2 a letter grade to acknowledge that achievement. This typically occurs when a student is not academically well-prepared for organic and struggles on exams 1 and 2, but shows a high amount of growth and achieves mastery in the second half of the course. Here's what we look for:

- a bad outlier of an exam (a normalized score about one standard deviation less than the student's normalized average)
- a positive trend in exam performance (a positive slope of ~ 0.4 std dev/exam throughout the course)
- a consistent trend of performance (a bad 1st or 2nd exam, not a bad 3rd or 4th exam)
- a good final exam performance (at least better than the exam performance)

or

- a A for anyone scoring over 90 % on the final (happened twice for a student not already getting an A, but we're waiting and cheering for it to happen many more times)

Academic Misconduct

Folks, please don't cheat. Cheating is bad; cheating is sad.

Dealing with academic misconduct is the most painful/sad/annoying part of our job. Historically in Chem 343/345, penalties have ranged from a zero on the related-work and a letter on file with the Dean of Students office to failure/removal from the course with larger UW Dean's office penalties. The TAs and us had to deal with several cases of academic misconduct last year and it was pretty unpleasant and heartbreaking all around. Out of respect, for yourselves, each other, and your instructors please behave in an appropriate manner with regards to all of the assessments.

[UW Dean of Students Office - Academic Integrity](#)

From our experience, the two most common forms of academic misconduct in this course are related to re-grades and sharing information about quizzes/exams. Here are some general thoughts and suggestions on the topic... (no particular organization or forethought)

- 1) *Do not talk to people about the quiz or exam until after the key is posted.*
- 2) *Do not turn in work or thoughts that aren't your own.*
- 3) *Looking at someone else's exam or notes you brought in or whatever during quiz/exam is bad, very bad.*
- 4) *If it feels like you might be doing something icky and dishonest; you may well be, try doing something else instead.*
- 5) *Do not change your answers on your exam and ask for a re-grade. You might think we are stupid and we might be... but we're not that stupid.*
- 6) *When you come to the exam or quiz, sit far enough away from anyone else and in a posture that no proctor can think you are cheating. Make sure all of your stuff is in airplane mode, like*

your phones, computers, purses, backpacks, etc... If all your stuff is put away, shut down, zipped up, and not connected to the internet, so no one can think you're trying to cheat.

7) In the words of one of your classmates from a previous semester about sharing exam related information, "It wouldn't be moral and since this class is curved, revealing knowledge of the exam wouldn't be beneficial to my grade either."

8) Cheating to gain a few points is not worth the possible repercussions. We're sure of it. We've checked.

Recommended and Required Course Materials

Required:

Organic Chemistry 6th (or 5th) edition by Marc Loudon

Recommended:

Solution Manual Organic Chemistry 6th (or 5th) edition

Molecular Model Kit

Several model kits are available online, at the UW Bookstore, and from AXΣ in the Mills Street Atrium of the Chemistry Building. It is not important which model kit you acquire, none of them are perfect and all are helpful.

ChemDraw ([ChemDraw 15 Download Instructions](#))

As a UW student, you get ChemDraw 15 free! This is pretty awesome! We highly recommend downloading the software and using it whenever you are posting on Piazza. It is the same software that we use to draw all of the molecules for your problem sets, quizzes, and exams.

Letters of Recommendation

As you can imagine, between all the lectures (Chem 343/345) and 3 laboratory sessions (Chem 344) annually, we get a lot of requests for letters of recommendation. We are happy to help you in your future plans when we are able to, but there are a few things we'd like you to consider before making a letter of recommendation request.

- 1) Good letters of recommendation tell a good story. What story can we tell about you? How well do we know you? Were you an office hour regular? Did you do particularly well in the course? Did you show dramatic improvement from beginning to end? Did we get to see your success in more than one course? Sometimes students want to get letters from instructors that they appreciated or from instructors of courses that they enjoyed. These are not bad things, but they should not be the primary concern when choosing someone to ask for a letter of recommendation. Try to get letters from instructors who can paint you in the best possible light.
- 2) Please prepare a detailed explanation of what you need the letter for, and when you will need it by. We will likely need significant prompting and prodding to get the letter written/submitted. Plenty of lead time is always appreciated.
- 3) This is a large course with many students. More detailed, and thus more effective, letters generally come from research advisors and instructors of much smaller courses. In order for us to tell a good story, we will need to know you and how you think via office hours and a high-quality performance in the lecture course.

Accommodations for Students with Disabilities

McBurney Disability Resource Center syllabus statement: “The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.” <http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

Diversity and Inclusion

Institutional statement on diversity: “Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.” <https://diversity.wisc.edu/>

