

**CHEMISTRY 350W**  
**BIOORGANIC CHEMISTRY**  
**SPRING SEMESTER 2007**  
**PFAHLER 210**  
**T, TH 10:00-11:15 A.M.**

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**Text:** John McMurry and Tadhg Begley, *The Organic Chemistry of Biological Pathways*, 1<sup>st</sup> ed. Roberts and Company Publishers, 2005 ISBN 0-9747077-1-6

**Course Description:** This course has not been offered before here at Ursinus, at least not in this form. Certainly not by this instructor. So, in some ways, the course description is for US to decide, to make-up as we go along. There are some nice statements from the preface of the book, which may help us to define this course. I will weave some of them into this course description here as they are so fitting. Let's assume that everybody in the course has a background in organic chemistry. The book will focus always on the reactivity patterns of substrate molecules of enzymatic reactions and on the organic, arrow-pushing details of the individual reactions. Thus, this course will expect that you are familiar with organic chemistry. If you are not, it will be *your* responsibility to make sure you again become familiar.

With the emphasis in biochemical research now focused primarily at the molecular level, with enzyme crystal structures now obtained routinely, and with enzyme-substrate interactions now visualized easily using simple computer programs, we now have a unique opportunity to understand the chemical logic of living systems. We will use the text and the literature to provide that understanding by showing how the reactions that take place in living organisms follow the same rules of chemical reactivity and occur by the same chemical mechanisms as reactions that take place in the laboratory. Biochemical transformations are not mysterious (well many aren't); there are logical and understandable reasons why they take place as they do. Biochemical reactions usually occur with more specificity and control than analogous laboratory reactions, but the principles behind the biochemical and laboratory reactions are the same.

So, come excited, eager, and ready to explore the chemistry of living systems. We will work to apply that organic knowledge we expect you have. I hope that in so doing, you will discover some new, spectacular beauty in these living systems. Not just the smells, colors, etc., but in the organic reactions they do everyday.

**Attendance:** Attendance will not be formally recorded nor required in the absolute sense (meaning it is not formally counted into grades). Please be advised that if you perform poorly in the class, attendance of the class is part of regular studying that will help improve performance. Don't view attendance and performance as unrelated because in general, they are not. As a teacher, I am aware of general attendance patterns for all of my students and can say that students who are regularly engaged in class do better.

**Homework:** The end-of-chapter problems are wonderful and often challenging. I will not collect nor grade these, but you should do them.

**Exams:** Exams will constitute a significant portion of your grade in this class. More importantly, however, you should use them as an indicator of what areas you are still having difficulties with. You should seek prompt assistance from me after an exam. Don't let a problem get worse by not attending to it. Organic chemistry is constantly building on earlier skills, so a small problem early could become a more major problem later in the course. I am always willing to help, so just ask or stop by my office!

**An important set of policies applies to examinations. Please read these policies carefully and if you don't understand any aspect of each policy, please see me now!**

- 1) Exams are to be taken on the day and time that is specified in this syllabus. If you know in advance that you have to miss an exam, you must talk me in advance of the exam day and get approval to miss the exam. If you have a legitimate need to be off-campus on the exam day, I

will of course work with you to find an alternate, *earlier* time for you to take the exam. If you suddenly become seriously ill or have another *serious*, unanticipated emergency and need to miss the exam (and you could not arrange to see me in advance), you **MUST** contact me as soon as the situation permits (preferably prior to exam time) to explain the situation. If I am not in my office, please leave a message explaining your situation and a number where you can be reached. If you are ill, please do not be offended when I ask for written confirmation from a physician (**please note, I do not call the Wellness Center**). *Please note: multiple other exams the same day, etc. is not a serious, unanticipated emergency and I will expect you to plan ahead and take our exam on time. Failure to adhere to this policy will result in the score of 0 (ZERO) being recorded for the exam!*

- 2) Exams begin promptly at the time indicated on the syllabus and will be in **our regular classroom, during class time**. Anybody who comes after this time loses time to take the exam, as their exam will end at the same time as that of the class.
- 3) If you are late to an exam, you will be given an exam to complete in the time remaining *provided no other student has left the examination*. Once the first student leaves the exam, no other students will be seated for the exam and a score of 0 will be recorded for missing students. This policy is designed to protect the integrity of the exam and to provide a fair basis for evaluating all students.
- 4) Every person in the course will take the final exam! This includes seniors, deities, magnificent people, beautiful people, farm animals etc., etc. It will be cumulative, as well as containing questions relating to material covered after the last exam. The exact percentage of each (old material versus new material) changes and I will discuss this prior to the final exam. A common final exam time will also be sought for my two sections and this time and date will be announced as soon as possible.
- 5) I will attempt to give each student who arrives on time an exam that can reasonably be done in the time allotted. Please realize, however, that part of being successful in college (and life) involves organizing your time and working efficiently on exams and assignments. If you have a documented learning disability and you need additional time to complete an exam, please let me know **NOW** and I will be happy to work with you. If you *think* you have a learning disability, I can refer you to the proper people for diagnosis and testing.

**Quizzes:** I am hopeful that we can go without any quizzes, which are mainly designed to encourage apathetic and non-self-starting students to actually work. I rather hope that you are all inspired on your own. Rest assured, however, I know how to be punitive (I am a recovering quiz-a-holic) and we can have quizzes if you show me that you are not the students we all hope that you are.

**Papers:** There will be a total of three formal written assignments throughout the semester. The due dates for these are noted on the schedule. The topic ideas below are just that...ideas. They may evolve as we progress and I see more of your interests, which is what I hope will drive some of the course material!

- 1) A short paper (2-4 pages) describing an assigned organic reaction, its history, and its mechanism. More details to come soon. Stay tuned.
- 2) A short paper (3-6 pages) describing an assigned class of biomolecules, their use, history, and properties. More details to come not-as-soon. Stay tuned.
- 3) A long paper (10+ pages) describing the complete biosynthesis of an important biological molecule. This paper will be reviewed by a peer and then revised by you. The final paper, the quality of your response to the peer review, and the quality of your review of another peer's paper will factor into your total grade for your paper. Details to come later. Stay tuned.

Some/all of the papers may be written in pairs or small groups. Details of the paper assignments will be forthcoming. Papers are due at 10:00:00 (yes, this is precise you'll notice) a.m. on the due date shown. All papers will lose 20 percentage points for each hour (**or** portion thereof) they are late (so, after 4 hours and 1 second, they'll have no value, other than intrinsic intellectual value of course).

**Questions in Class:** Questions from students are always welcomed (and *ENCOURAGED*) and please feel free to stop me at anytime to ask. You pay a lot for this class; so don't be afraid to make it worthwhile for you. There may be rare instances where your question is more appropriately answered after class and I will

tell you this. Please keep in mind that the class has other members and try to be fair with the lecture time, realizing that other people have paid to have this time be useful for them as well.

**Grading:** The final grades for the course will be determined from the following:

In Class Exams (2x100 points)	200 points
Papers (2x50 and 1x100)	200 points
Final Exam	<u>200 points</u>
TOTAL	800 points

*Note: While not anticipated (nor hoped for), this total is subject to change if quizzes have to be given.*

Numerical scores for each exam are reported to you and recorded by me. After each exam, I will give you an idea of what letter grade your score on that exam corresponds to. This letter grade is based on how the class performs as a whole (examining things such as the high, low, average, standard deviations, and median scores) *and historical data about previous classes*, but is *not* formally recorded as a letter grade. After all exams and papers are completed, your total points are again examined relative to how the class performed as a whole (as well as historical data from previous upper-level courses) and a final letter grade is determined. The letter grade that is the “average” is dependent upon the performance of the class as a whole, meaning classes that do better as a whole may expect to have a higher average grade than classes that do not perform as well, when compared to past upper-level courses. In general, the “letter grades” you have received on individual exams will allow you to estimate your progress in the course. If you ever want to get an idea of where you stand in the course, please ask me and I’ll be happy to look at the sub-total points and give you an idea of what your overall grade would be at that point in the course.

**Academic Dishonesty:**

This is the saddest part of my job, but one that I do take seriously. I will vigorously pursue all cases of academic dishonesty (which includes uses of sources without *proper* attribution, copying, submitting other’s work as your own, using cheat sheets during exams, letting people copy off of your work, assisting or communicating with people in any way during exams, not revealing known cases of academic dishonesty, etc.). In cases of academic dishonesty, **I will fail you in the course, not just for that assignment.** If you are not clear about what constitutes academic dishonesty in specific cases you encounter, just ask and we can talk about it so that no student blindly commits academic dishonesty and then faces the serious repercussions.

**Tentative Course Schedule (see next page)**

The material covered is approximate. The dates for the exams are NOT (barring catastrophe such as a herd of bison running uncontrolled through Pfahler), meaning the coverage of material by any exam will be adjusted based on what is covered in class but you can depend on the exam dates!

