Instructor: Professor Joseph J. Topczewski  
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Course Description: This course discusses fundamental concepts, reactions, reagents, structural and stereochemical issues, and mechanistic skills necessary for understanding organic chemistry in a synthetic context.

Course Objectives: This course’s objective is for students to develop skills in synthetic organic chemistry. Achieving this goal will involve several sub-goals including understanding selectivity principles including stereoselectivity, gaining breadth in recognizing synthetic techniques, and honing skills in scientific communication.

Prerequisites: This class requires two prior semesters of organic chemistry lecture and an organic lab. A prior semester of intermediate or advanced organic chemistry is highly suggested. Any student who does not fulfill these prerequisites is strongly encouraged to consult with the instructor to determine if enrollment is appropriate. This is a challenging class.

Pedagogical approach: Most synthesis classes teach reactions and methods separate from the synthetic context in which the methods should or should not be applied. This class intends to provide the learner with a framework in which to use the power of retrosynthesis in combination with knowledge regarding specific reactions to design approaches to the synthesis of complex targets. Most common methods used to construct molecules will be discussed along with selectivity principles and case studies which use these methods as well as the underlying framework of organic chemistry.

Required Materials:  
1. Strategic Applications of Named Reactions in Organic Chemistry by L. Kurti & B. Czakoand  
3. Model Kit (if you don’t have one they are available at http://www.darlingmodels.com/ or https://duluthlabs.com/). You will probably want a model kit with up to 15-20 carbon atoms.

Suggested Materials: These are not required and will not be used. They may be handy for grad students who are interested in the topics:  
1. An introductory undergraduate textbook in organic chemistry – if you don’t have one get an old one from Amazon for like $10 – author does not matter and version does not matter. It will be handy to review from.  
2. Stereoelectronic Effects A bridge Between Structure and Reactivity by Igor V. Alabugin  

Expectations: Students are expected to (1) be prepared for class and arrive promptly to class. (2) attend class on a regular basis and stay for the full duration of the class. (3) recognize gaps in their own fundamental knowledge of prerequisite material and fill those gaps with appropriate material from earlier organic chemistry classes. (4) participate during in-class exercises that will require doing readings and assignments prior to class. (5) operate within an inclusive atmosphere of mutual respect between all class participants. (6) participate appropriately in group projects. (7) conduct themselves with the highest levels of academic integrity.

Ungraded Problems: A number of brief but ungraded homework problems will be provided during the semester. These are intended to be self-check exercises and many will be discussed in class. Frequently, the last slide of a class’s notes will contain a sample homework problem. Typically, the next class will begin with a discussion of the previous class’s problem. Students are strongly encouraged to work through these problems in-between class. Other example problems can be obtained at https://www.organicchemproblems.com/.

Graded Problem Sets: Two problem sets (5-8 in depth questions) will be assigned throughout the semester. These will require a significant amount of time to complete. These are not group problem sets and students are expected to submit their own work (see policy below). These will be due at the start of class in hard copy two weeks following the date the
Student Mental Health: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student’s ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via [http://www.mentalhealth.umn.edu/](http://www.mentalhealth.umn.edu/).

Student Conduct Code
The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community. As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To
review the Student Conduct Code, please see: http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student_Conduct_Code.pdf.

**Appropriate Student Use of Class Notes and Course Materials**

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: http://policy.umn.edu/education/studentresp.

**Sexual Harassment**

“Sexual harassment” means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual’s work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: https://regents.umn.edu/sites/regents.umn.edu/files/policies/Sexual_Harassment_Sexual_Assault_Stalking_Relationship_Violence.pdf

**Title IX**

I want to let you know that, in my role as a University employee, I am required to share information that I learn about possible sexual misconduct with the campus Title IX office that addresses these concerns. This allows a Title IX staff member to reach out to those who have experienced sexual misconduct to provide information about the personal support resources and options for investigation that they can choose to access. You are welcome to talk with me about concerns related to sexual misconduct. You can also or alternately choose to talk with a confidential resource; the University offers victim-advocacy support professionals, health services professionals and counselors that will not share information that they learn about sexual misconduct. http://aurora.umn.edu/

**Equity, Diversity, Equal Opportunity, and Affirmative Action**

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf.

**Academic Freedom and Responsibility: for courses that do not involve students in research**

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.