

Chemistry 550 – Fall 2009 : Advanced Stereoselective Organic Synthesis

Time & Place: TBA

Instructor: Dr. Rasapalli

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Office Hours: TBA + any time! OPEN DOOR POLICY!

Texts: Stereoselective synthesis by Atkinson,
Classics in stereoselective synthesis by Carreira And Kvaerno

Reference Texts: Advanced Organic Chemistry by Carey and Sundberg, Part A & B
Stereochemistry of Organic Compounds by Ernest L. Eliel

Required Item: Molecular Models. (Buy a good set even if it is a bit expensive).

Objective: We will develop an understanding of the three-dimensional structure (stereochemistry) of organic molecules, and the relation between structure and reactivity (stereoelectronic effects). New stereoselective organic reactions will be discussed thus enabling you to design synthesis to control relative (diastereoselective) and absolute (enantioselective) configurations of the natural product targets.

Homework: Weekly problem sets will be assigned to offer a range of exposure and difficulty, and some will be even more challenging than the questions that you will encounter on class exams. They will also serve as teaching tools for more in-depth analysis of class concepts that may require literature search.

Exam Schedule: In addition to the final, there will be two “midterm” exams. There will be projects that will count as 3rd in class midterm exam, and the lowest of all three would be automatically dropped.

Grading: Your final grade will be calculated from your exam and project scores as shown below.

Percent of Final Grade

Problem Sets: 30%

Two hour midterm exams: 40%

End of semester projects 10%

Final Exam 20%

Attendance policy: Consistent with UMASSD policy, attendance is required for all lectures.

Expected topics of study

Preview of the introductory stereochemistry concepts I (ref:McMurry chapters)

Conformational Analysis

Stereoelectronic Effects

Methods and principles of stereoselective synthesis

Stereoselective 1,2 additions to C=X

Stereoselective reductions and oxidations of C=C and C=X

Stereoselective Michael (1,4) additions

Stereoselective enolate alkylations

Stereoselective Diels-Alder reactions

Other Important contemporary stereoselective Reactions

Asymmetric organo catalysis

Enzymes in asymmetric synthesis