

Texas A & M University-Kingsville

CHEM 5327

Advanced Organic Chemistry, by J. March, Fourth Edition: Wiley Interscience, 1992.

Selected Journal Articles.

Course Objectives:

Develop a fundamental understanding of carbon-carbon single and double bond formation.

Development of highly stereoselective reactions and their applications in complex syntheses. These reactions include stereoselective alkylation of carbonyl compounds, stereoselective aldol condensations, stereoselective oxidations, epoxidations and reductions.

Discussion of newer methods for the stereoselective formation of carbon-carbon double bonds, and the modern application of the Diels Alder reaction, particularly its use in the control of stereochemistry in the synthesis of natural products.

Determine which strategic bond constructions can be used most effectively to obtain synthetic targets with high selectivity.

Become adept at identifying strengths and weaknesses of particular methods, and

-elimination, Pyrolytic syn elimination. Sulfoxide-sulfenate rearrangement; synthesis of allylic alcohols.

Wittig and related reactions.

Alkenes from sulfones

Decarboxylation of β -lactones

Synthesis of tri- and tetrasubstituted alkenes.

Fragmentation Reactions

Oxidative decarboxylation.

Alkenes from arylsulfonyl hydrazones

Stereospecific synthesis from 1,2 diols

Claisen rearrangement of allyl vinyl ethers

Reductive dimerization of carbonyl compounds

----4 weeks.

2nd Exam.

Diels Alder and related reactions.

Dienes and Dienophiles.

Intramolecular Diels Alder reactions.

Retro Diels Alder reactions.

Catalysis by Lewis Acids.

Regiochemistry of the Diels Alder reactions.

Stereochemistry of the Diels Alder reactions.

Asymmetric Diels Alder reaction.

The ene reaction

Cyclo additions with allyl cations and allyl anions.

1,3-dipolar cycloaddition.

----- 2 weeks

Formal presentationions.

Synthetic applications of organo boranes and organosilanes.

Hydroboration, reactions of organoboranes.

Carbonylation of organoboranes, reaction with α -bromo ketones α -bromoesters.

Application of organosilicon compounds in synthesis-protection of functional groups.

Oxidation of hydrocarbons
Oxidation of alcohols.
Oxidation of carbon-carbon double bonds.
Photosensitized oxidation of alkenes
Palladium Catalyzed alkylation of alkenes.
Oxidation of ketones
 , --unsaturated ketones.
Bayer-Villiger oxidation.
RuO₄ oxidation, Thallium nitrate oxidation

Reduction.

Catalytic Hydrogenation
Reduction by dissolving metals
Reduction by hydride transfer reagents
Reduction with boranes and dialkyl boranes
Other methods:
Wolff-Kishner reduction, desulphurisation. Di-imide, low-valent Ti, Trialkyl tin
hydrides, Trialkylsilanes

-----3 weeks

Final exam.

Student learner outcomes:

grade of zero will be recorded for unexcused absences. From time to time there will be unannounced quizzes.

Seminar Program. Students are strongly encouraged to attend the seminars offered in the Department of Chemistry. They will earn 10(bonus points)/1000 points basis if they attend the seminars.

Policies for attendance, excused absences, make-up exams, late assignments, early final exams, cell phones, etc.:

Successful performance in this class requires that you attend class. Make-ups for missed exams are granted only for excused (official university) absences. Please note that attendance policies may vary by college. No late assignments will be accepted. Graduating seniors who need to schedule an early final should inform the instructor early in the semester. Students should turn off and stow their cell phones during class.

Disability statement (See pages 2 & 11 of Student Handbook):

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides

Ongoing behaviors or single behaviors considered distracting (e.g., coming late to class, performing a repetitive act that is annoying, sleeping or reading a newspaper in class, etc.) will be addressed by the faculty member initially either generally or individually. Cases in which such annoying behavior becomes excessive and the student refuses to comply are considered disruptive behavior. In a case of serious disruptive behavior in a classroom the instructor may first request compliance from the student and if it is not received, an instructor has the authority to ask the student to leave the classroom. If the student fails to leave after being directed to do so, assistance may be obtained from other university personnel, including University Police Department. An individual engaging in such disruptive behavior is subject to

It is the responsibility of the student to keep the original graded copies of all materials (exams, problem set, in-class assignments, etc.) that have been returned for his/her records. Graded final exams are retained by the instructor for his/her permanent records.

Classroom Policies:

1. You are expected to conduct yourselves as mature professionals in class. Questions and discussions regarding the material are welcomed. Chatting and visiting are best done before or after class.
2. **PLEASE TURN OFF YOUR CELL PHONES AND PUT IT AWAY WHEN YOU COME TO CLASS!**
3. Please handle properly of anything you bring.