Chem 610: Organic Reactions 1

Room 2121, 2:20 - 3:35 pm, section 600, TR, 2010.
Professor Kevin Burgess, Room 301C, 845-4345, burgess@tamu.edu

1. Textbooks

All the following books will be used for this course:

- Organic Chemistry, by Clayden, Greeves, Warren, and Wothers, Oxford.
- Strategic Applications of Named Reactions in Organic Synthesis, László Kürti and Barbara Czakó.
- Organic Chemistry By Inquisition, by Kevin Burgess (www.byinquisition.org).

2. Grading Structure

The following point composition will be used (graded on a curve):

11 in class problem sets (200 pts), 2 exams, (2 x 100 pts), final (200 pts), **total pts: 600**

About 10 min in each lecture there will be for an *in class problem set.* Answers to these will be collected, and 11 chosen at random (20 pts each) will be graded. The lowest grade from the 11 that are selected will be dropped. There will be no make-up quizzes. If anyone misses one quiz that happens to be selected, that will be scored as zero, but assuming that no others are missed, this will be the lowest grade and is dropped. From the 10 quizzes that are graded, and the special homework, the lowest grade will be dropped, hence this part of the course will be worth 200 pts.

Typically the *in class problem sets* will be a quiz on two of three reactions assigned from the "Strategic Applications of Named Reactions in Organic Synthesis" book (see Table below).

Tentative dates for the *exams* will be: ??? and Thurs Oct 20. The final will be given on ??? at ???. All the exams and the final are cumulative, but emphasize the material covered since the last exam. The Final will be comprehensive.

You are welcome to come and ask me questions about chemistry anytime I am free; afternoons (1 – 3 pm) and evenings (9:30 – 11 pm) are usually best. I can also be reached by email burgess@tamu.edu. Questions about scores and related issues should be addressed to Jill Rutledge, Rutledge@chem.tamu.edu, 5-1847. Jill is in 301 C most afternoons (1- 5 pm but she takes a break sometime between 3:00 and 3:30 pm).

3. Tentative Schedule

The course will follow an order based on chapters in Clayden's book beginning at chapter 17 (but missing some subsequent chapters).

chapter in KB notes	subject (Clayden chapter)
1	Nucleophilic Substitution (17)
2	Elimination Reactions (19)
3	Electrophilic Additions (20)
4	Enols and Enolates (21)
5	Electrophilic Aromatic Substitution (22)
6	Electrophilic Alkenes (23)
7	Chemoselectivity (Reductions and Oxidations) (24)
8	Synthesis in Action (25)
9	Alkylation of Enolates (26)
10	Aldol Reactions (27)
11	Acylation at Carbon (28)
12	Conjugate Additions of Enolates (29)
13	Controlling the Geometry of Double Bonds (31)
14	Stereoselective Reactions of Cyclic Compounds (33)
15	Diastereoselectivity (34)
16	Cycloadditions (35)
17	Sigmatropic and Electrocyclic Reactions (36)
18	Rearrangements (37)
19	Fragmentation (38)
20	Radical Reactions (39)
21	Carbenes and Nitrenes (40)
22	Saturated Heterocycles (42)
23	Aromatic Heterocycles: structure and reactions (43)
24	Aromatic Heterocycles: synthesis (44)
25	Asymmetric Synthesis (45)
26	Organosulfur Chemistry
27	Organic Chemistry of B, Si, and Sn

The following table correlates the chapters I shall lecture from Clayden, some reactions described in the Kurti book, and problems from my book. Unless otherwise directed, the in-class problem sets will based on the reactions from the Kurti book *in the order they are presented here.* Thus, before

chapter in KB notes	subject (Clayden chapter)	to study *before* this chapter
1	Nucleophilic Substitution (17)	Williamson ether synthesis Mitsunobu reaction
2	Elimination Reactions (19)	Burgess dehydration Hofmann elimination
3	Electrophilic Additions (20)	Hell-Volhardt-Zelinski Brown hydroboration
4	Enols and Enolates (21)	Michael addition Baylis-Hillman
5	Electrophilic Aromatic Substitution (22)	Friedel-Crafts Gatterman-Koch Vilsmeier-Haack formylation
6	Electrophilic Alkenes (23)	Criegee oxidation Ferrier reaction/rearrangement
7	Chemoselectivity (Reductions and Oxidations) (24)	Birch reduction Wolff-Kishner reduction benzoin condensation
8	Synthesis in Action (25)	Swern Corey-Kim Pfitner-Moffatt
9	Alkylation of Enolates (26)	acetoacetic ester synthesis Enders hydrazone alkylation Myers Asymmetric alkylation
	Exam 1 on chpts 1 - 9	Finkelstein Gabriel
10	Aldol Reactions (27)	Aldol Knoevenagel Mannich
11	Acylation at Carbon (28)	Dieckmann Claisen condensation Stork enamine synthesis
12	Conjugate Additions of Enolates (29)	von Pechmann Robinson Hajos-Parrish
13	Controlling the Geometry of Double Bonds (31)	Wadsworth-Horner-Emmons Wittig Wittig-Schlosser
14	Stereoselective Reactions of Cyclic Compounds (33)	Julia Wadsworth-Horner-Emmons Still-Gennari modification Barton nitrite ester reduction
15	Diastereoselectivity (34)	Claisen rearrangement Claisen-Ireland rearrangement Cope rearrangement
16	Cycloadditions (35)	Diels-Alder reaction Danishefsky's Diene cycloaddition

		De Mayo cycloaddition
17	Sigmatropic and Electrocyclic Reactions (36)	Mislow-Evans rearrangement 1,2- and 1,3-Wittig rearrangements Danheiser benzannulation
18	Rearrangements (37)	Dienone/Phenol rearrangement Benzylic Acid rearrangement Favorski/HomoFavorski rearrangement
chapter in KB notes	subject (Clayden chapter)	to study *before* this chapter
19	Fragmentations (38)	
20	Radical Reactions (39)	acyloin coupling McMurry coupling Barton and Barton-McCombie radical decarboxylation
21	Carbenes and Nitrenes (40)	Ardnt-Eistert homologation Simmons-Smith cyclopropanation Curtius rearrangement
22	Saturated Heterocycles (42)	Baldwin's rules Amadori reaction
23	Aromatic Heterocycles: structure and reactions (43)	Combs Quinoline Synthesis Paal-Knorr furan synthesis Paal-Knorr pyrrole synthesis
24	Aromatic Heterocycles: synthesis (44)	Fischer indole Synthesis Nenitzescu indole synthesis Bartoli indole synthesis
25	Asymmetric Synthesis (45)	Shi epoxidation Sharpless epoxidation Sharpless dihydroxylation
26	Organosulfur Chemistry (46)	Pummerer rearrangement Ramberg-Bäckland Corey-Chaykovsky
27	Organic Chemistry of B, Si, and Sn (47)	Keck radical allylation Keck asymmetric allylation Brook rearrangement
	Comprehensive Final Exam **???? DATE AND TIME????**	