Instructor: Prof. Bor-cherng Hong (洪伯誠)

Office: Chemistry 514

Phone: x-66404

Office Hours: Monday, 2:00pm-3:00pm or by appt.

Lecture Text:

(1) Lecture Handout	
(2) 有機合成	方俊民等著
(3) Organic Synthesis, the Disconnection Approach	Stauart Warren

References:

Asymmetric Synthesis	G.-Q. Lin, et. al.
Organic Synthesis Work Book	J. A. Gewert, et. al.
Concepts of Organic Synthesis	B. P. Mundy
Organic Synthesis	M. B. Smith
Catalytic Asymmetric Synthesis	I. Ojima
And much more	

Course Grading: Your grad will be determined from your performance in the three areas shown below:

Mid-term Examination	35%
On-line Examination	30%
Final Examination	35%
Total points	100%

Examination Schedule: Please note that all examinations will be held on Wednesday. Be advised that there will be no make-up exams.

Mid-term Examination	Apr 30	Thursday
On-line Examination	May 21	Thursday
Final Examination Jun	Jun 18	Thursday

<u>IMPORTANT</u>: NOTE THAT NO MAKE-UP EXAMS WILL BE GIVEN!

The topics and their ordering as provided below are only approximate. This agenda reflects an optimism which could well be tempered. Accordingly, I reserve the right to shuffle and delete topics in response to time constraints.

Oxidation Reactions
Reduction reactions
Protecting groups
Functional groups transformation
Organo metallic Reactions.
Transsiton metal assisted in the C-C bond formation.
Cycloadditions
Rearrangement and Fragmentation.
Photoreaction and Radical reactions.
Design and Selectivity of Organic Synthesis
The Basis for Retrosynthetic Analysis
Transform-Based Strategies
Structure-Base and Topological Strategies
Stereochemical Strategies
Functional Group-Based and Other Strategies
Selected C-C Bond-Forming Reactions:
<u>I. Transition metal assisted in the C-C bond formation:</u>
Metathesis: Grubb catalyst
Heck reaction:
Dötz reaction, Fischer carbene
Pauson-Khand reaction

<u>II. Acid and Base Chemistry:</u>
Aldol reaction: Felkin-Anh model, Zimmerman-Traxler transition states
Nucleophilc and Electrophilc reactions
Friedel-Crafts reactions
Prins reaction
Mannich reaction
Enolate reaction: addition of enolates to electophiles, activated alkenes and alkyness,
Anionic Alkylation
Lewis-Acids Cyclization
Michael reaction: Robinson annulation

<u>III. Cycloadditions:</u>
Diels-Alder reaction
Dipolar cycloaddition: [3+2] cycloaddition, formal (hetero) [6+3],
Higher order cycloaddition: [6+4], [6+3], [6+2], [5+2], [5+3], [2+2+2]

<u>IV. Active Intermediate Methods:</u>
Photoreaction: [2+2] photoreaction, di-π methane rearrangement, Norrish type I, II reaction, arene-alkene photocycloaddition
Radical cyclization
Cationic rearrangement (cyclization): Wagner-Meerwein rearrangement,
Carbenoid Reaction:

<u>V. Rearrangement.</u>
Rearrangement: Pinacol rearrangement, Wolff rearrangement, Beckmann rearrangement,, Favorskii rearrangement,, Stevenes rearrangement, Wittig rearrangement, Cope rearrangement: Claisen rearrangement. Ene reaction.
Fragmentation: Wharton fragmentation, Eschenmoser fragmentation, Maddox-kendall fragmentation, Beckman fragmentation.

Selected state-of-the-art reagents:
Martin's sulfurane reagent, Lawesson's reagent, Matteson reagent , McMurry-Hendrickson reagent , Nigishi reagent , Schwartz's reagent , Tebbe reagent , Trost's reagent, Eschenmoser reagent , Harpp reagent , etc.