# Course: CHEMISTRY 4524: Organic Chemistry II Spring 2017

**Professor:** Dr Jerry Fong 587-3692, Physical and Health Sciences Bldg. Room 305

E-mail addresses: campus: FONGJD@alfredstate.edu

**Lecture Schedule:** MWF 1-2

**Required Texts:**  **“Organic Chemistry,”** John McMurry 8th edition `hybrid’ paperback (**w/o OWL v2**) 2012

**Course Website:** [**http://web.alfredstate.edu/fongjd/OrgChem2.htm**](http://web.alfredstate.edu/fongjd/OrgChem2.htm)

**Suggested Model Kit:** “**Darling Molecular Model Kit”** ($15/kit cash or check to Doc)

**Suggested Software:** [**http://www.acdlabs.com/downloads**](http://www.acdlabs.com/downloads)*download Chemsketch 11.0 freeware*

Very useful for creating organic molecular structures in synthesis lab reports

**Syllabus:** Chapters 8 (review), 5 , 9, 14-17,19, 22-24

**Grading : Item pts each total pts % of total**

Homework s (~10) ~26 260 ~26

chapter abstracts (3-4) 10 ~40 4

3 Exams 100 300 30

Lab\* 250 25

Final\*\* 150 15

**TOTAL 1000 100**

*\*If you miss two labs or flunk the laboratory portion of the course, you flunk the entire course !!*

*A: 90=100% B: 80-89% C: 70-79% D:60-69% F: <60%*

**\*\*composed of two parts: written, in-class portion; take-home syntheses;**

**Course Mechanics:**

Problem sets are assigned each Wednesday and due the following Wednesday. I will not accept late homework. For selected functional groups students will be required to turn in a one page overview/abstract summarizing pertinent material covered in class. Based on class feedback, I will try to hold a regular (once-weekly) recitation where problems are worked on at a meeting time agreeable with the most number of students, but the students must arrange the meeting and attend consistently or the offer is withdrawn. Extra credit, `fun’ assignments with deadlines will be made available at various points during the course. As before in Chem 3514, there will be numerous homemade handouts summarizing and capturing key pieces of the lecture (yellow colored). These will complement the text and provide the instructor’s own `spin’ to the material. You are advised to keep a binder of these, and to date each item. You are advised to re-work your written notes daily, with an eye towards compression, reorganization and clarity. Exercises, both Powerpoint and hard copy will form the foundation of practice for reactions, syntheses and mechanisms.

**Course Goals:**

As it was for Chem 3514, the overarching goals in Chem 4524 will be for students to competently answer the following questions with respect to selected classes of organic compounds:

1) what do they `look like’ ?

2) how can you make them ?

4) what do they most likely become when they transform ?

4) why do they go where they go ?

5) what good are they , e.g. what are their practical uses ?

The specific Student Learning Outcomes (SLOs) connected to this are as follows:

1)correctly describe the stereochemistry of both chiral and rotational isomers

2) properly identify, name and draw the geometric and electronic structure of the major alcohol, allyl, diene, aryl, carbonyl and amine systems and relate structural and electronic features to physical properties and stability

3) recall the major reactions typical of the several classes of the foregoing functional groups.

4) use their knowledge of reaction directions, mechanism and molecular structure to create rational and reasonable

synthetic pathways to moderately complex compounds starting from a simple starting compound or two.

5) rationalize both the direction and mechanism of these reactions in terms of geometric and electronic structure.

**Course Philosophy**:

The basic approach taken by the instructor in Chem 3514 will be retained. However, he’s going to pitch the stuff faster.

We did ~6 chapters last semester; as many as 10 are planned this semester. We can go faster because you’ve played a few innings of Organic Chemistry and know in some measure how the game goes (and how the `coach’ runs the team.). Additionally, there will be an increased emphasis on getting you to digest and convert raw organic chemistry information into `organic muscle mass.’ As we start each new chapter, you’ll be required to turn in a one page `abstract’ of what you see as the main points of that chapter. This forces you to practice the three R’s critical to learning any large amount of material: e.g. you must **R**ead, **R**educe and **R**ecreate.

On a more general note, it is the instructor’s view that what Organic Chemistry ultimately teaches you is the unique ***thinking style*** organic chemists apply as they approach the problem of finding underlying pattern and sense from often disjointed and conflicting piles of information. Let’s face it. Two weeks after the semester is over you’ll forget a lot of the specific material. It’s only natural. Unless you’re a professional chemist, you’ll never use NMR or need to understand Claisen condensations in your day-to-day existence. However, if you master the organic chemist’s ***approach*** to dealing with puzzles and problems you’ll have permanently gained a foundation skill applicable to science, medicine and large part of living in general. Getting you to practice and permanently acquire this skill is the course’s real focus.

**SYLLABUS**

**CHEMISTRY 4524 SPRING 2017 (FONG)**

**(coverage subject to change based on class response)**

**Week Dates General Topic Specific Topics Text reading**

**1** 1/23-1/**27 Reactions of alkenes (review)**  additions substitutions, reductions, oxidations**213-253**

mechanisms of Brown 2-step syntheses to ROH

**2** 1/30 -2/3 **Stereochemistry** Polarimetry, R/S assignment **114-145**

Stereo-specific,-selective reactions  **246-248**

**3** 2/6-2/10 **Multi-π Aliphatic Compounds** Alkynes **254-274**

4 2/13- 2/17 **Multi-π Aliphatic Compounds a)** allyls **a)285-287, 317-19; 405-7 b)** alkadienes **b)400-5; 408-15;424-5**

5 Monday 2/20 exam #1 alkenes, stereochem., multi-π compounds

5-7 2/22-3/10 **Aromatic Compounds** Aromaticity **427-443**

Aromatic substituent reactions **450-93**

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**8 3/11-3/20 Saturday 12 March-Sunday 19 March SPRING BREAK**

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**9-10** 3/220-3/31 **O-bearing Compounds** Alcohols & Phenols (syntheses to & from) **494-535**

11 Monday 4/3 exam #2 aromaticity; aromatic chemistry ; alcohols

**11-12** 4/5-4/14 **O-bearing Compounds (cont.)** Aldehydes & Ketones **562-70**;**572-605**

**611-614**

**13** 4/17-4/21 **Multi-functional Compounds a)selected** α substitutions **686-698**

**b)** condensations **710-719**

**14** 4/24-4/28 **N-bearing Compounds Amines 742-746;753-758**

**15**  Monday 5/1 exam #3 aldehydes, ketones, multi-functional compounds, amines

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**16 Finals week: 5/8-5/12**

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**end of Spring term**