Syllabus of Chem 5530 (part II), Spring 2012

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Meeting Time/Place: MW, 1:30-5:20 pm. Widtsoe 336 (March to April)

Course Projects:  
1) Synthesis of heterocyclic compounds (Antibacterial and anticancer studies)  
2) Synthesis of (+) and (-) N-methyl coniine (Animal toxicity study)

Work Schedule:  
1) Students will work in pair and conduct experiments at the course meeting time.  
2) Each group will design their own work schedule based on the time of the synthetic progress.  
3) Scheduled date for antibacterial assay: April 27  
4) Scheduled dates for N-methyl coniine evaluation:  
   April 6 (optical rotation measurement)  
   April 20 (purity determination)  
5) Final report due: April 30

On-line Resources for Lab Techniques:  
(http://ion.chem.usu.edu/~tchang/Chem5530/Chem5530.htm)  
Re crystallization (http://www.youtube.com/watch?v=aAa065hWyYg)  
Flash Column Chromatography (http://www.youtube.com/watch?v=fFlgXUvyGb4)  
TLC Technique (http://www.youtube.com/watch?v=EUn2skAAjHk)

General Learning Objectives for Chem 5530 (Part II)  
Know how to record the experimental data.  
Know how to monitor the progress of organic reaction  
Know how to carry out column chromatography purification.  
Know how to design a proper workup procedure.  
Know how to report the experimental result.
Know how to find the related references.

Grade Breakdown:

1. Required Criteria for Lab Notebook (30%):

1. **Informative.** All of the essential information needs to be incorporated, for example the reaction scheme, physical properties of compounds and reagents, amounts of compound and reagents used, reference, actual procedure, TLC information, column chromatography information, and NMR characterization data.

2. **Easy to follow by others.** Clarity is important. All the information needs to be written clearly so others can repeat and reproduce the same results.

3. **Associated with NMR data.** A tracking or coding system is needed for locating the NMR spectra with the corresponding experiments.

Please refer to the sample format below:

![Standard Proton Experiment](image)

**Notebook Code**

**Spec. no.**

$^1$H NMR (400 MHz, CDCl$_3$) 8 $\delta$ 5.13 (dd, $J = 9.6, 9.1$ Hz, 1H, H-5), 5.0 - 5.1 (m, 2H), 5.04 (dd, $J = 9.8, 9.6$ Hz, 1H, H-4'), 4.94 (dd, $J = 9.9, 9.9$ Hz, 1H, H-6), 4.55 (d, $J = 10.3$ Hz, 1H, NH), 4.40 (ddd, $J = 9.9, 4.3, 4.1$ Hz, 1H, H-5'), 4.00 (ddd, $J = 10.5, 10.4, 3.7$ Hz,
1H, H-2'), 3.69 (dd, J = 9.7, 9.7 Hz, 1H, H-4), 3.6 (m, 1H, H-1), 3.5 (m, 1H, H-3), 3.3 - 3.4 (m, 2H), 2.44 (ddd, J = 13.4, 4.6, 4.5 Hz, 1H, H-2α), 2.07 (s, 3H), 2.04 (s, 3H), 2.01 (s, 3H), 2.00 (s, 3H), 1.65 (ddd, J = 13.1, 12.7, 12.6 Hz, 1H, H-2β), 1.43 (s, 9H, C(O)(CH₃)₃); ¹³C NMR (100 MHz, CDCl₃) δ 170.9, 169.8 (2C), 169.6, 155.3, 98.9, 80.3, 77.7, 74.2, 73.7, 71.3, 70.2, 69.4, 58.8, 57.9, 53.0, 51.2, 32.0, 28.3, 20.8 (2C), 20.7 (2C)

2. Report of Experimental Data (30%):

The data needs to be organized according to the publication format (J. Org. Chem.). Please refer to the sample format.

3. Final Report (40%):

1) Choose one of the course project for the final report.

2) **Important:** Use J. Org. Chem. Note as the template. (http://ion.chem.usu.edu/~tchang/Cchem5530/Chem5530.htm)

3) Submit your report electronically as WORD document.

4) Quality of the manuscript will be judged based on clarity, explanation (rationale of design, approaches, etc), description of the results, conclusion and reference citing.