CHEM 371  Subject to Change  Posted August 20th, 2013

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Office Hours: By appointment or by email. If I am not in the CHEM 371 laboratory room (SSMB 333) I will most likely be in my office or research lab (343 SSMB).

Learning Objectives:

- Design and carry out experiments based on evaluation of primary literature
- Collect library resources (e.g. SciFinder, Web of Science, books, journals) to select information that aids experimental work
- Demonstrate proficiency with purification (e.g. recrystallize, distill, chromatograph) and characterization (e.g. NMR, IR, MS) of products
- Preparation of formal reports based on editorial guidelines from primary literature journals
- Appraise safety/reactivity hazards, identify appropriate techniques / procedures, and operate safely in a synthetic laboratory
- Write accurate records of experimental work

Lab Safety:

The departmental and SSM School wide safety policy will be followed. The risks in the chemical synthesis and characterization laboratory are much higher than in introductory organic chemistry labs. The chemicals are more hazardous, the techniques are more likely to cause harm if not performed properly and with caution. Even an experienced chemist can make mistakes, and mistakes in this lab can easily lead to serious situations. Lab coats, goggle and gloves are required at all times in the synthesis laboratory room. Students should carry current health insurance coverage identification cards with them at all times in the lab.

Scientific Integrity:

We will follow the department policies. Known or suspected violations must be reported immediately. Each student is work independently and is responsible for her or his own results. At the same time, students are strongly encouraged to talk with each other about what they are doing, and to work collegially in the laboratory.

Attendance:

You should expect to spend a minimum of 7 hours a week in the classroom or laboratory. The laboratory room will normally be open for conducting experiments Monday through Thursday afternoon (2-5 pm MW, 1:40 - 4:40 pm TR). The laboratory may be open on some Friday afternoons (1-4 pm), as announced by the instructor. Section L.01 students are expected to be in the lab and have priority access on MT; section L.02 students are expected to be in the lab and have priority access on WR. No laboratory work is allowed after 6:00 pm or on the weekends. Even after being certified to use instrumentation, no use of instrumentation is allowed for this course.
unless a faculty or staff member who is willing and able to troubleshoot is in SSMB while the instrument is being used.

Course Assignments:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Description</th>
<th>Due Date</th>
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<tr>
<td>Check In:</td>
<td>Safety, Policy, Orientation</td>
<td>Aug 20-21</td>
</tr>
<tr>
<td>Assignment I:</td>
<td>Instrumentation Use Certification from Dr. Boussett for GC-MS, LC-MS, and NMR</td>
<td>Sept 6th</td>
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<tr>
<td>Assignment IIa:</td>
<td>Library Resources Certification</td>
<td>Sept 6th</td>
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<tr>
<td>Assignment IIb:</td>
<td>Seminar Participation</td>
<td>variable</td>
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<td>Assignment III:</td>
<td>Binary Unknown Report</td>
<td>Sept. 27th</td>
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<td>Assignment IV:</td>
<td>One Step Procedure Report</td>
<td>Oct. 18th</td>
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<td>Assignment V:</td>
<td>Synthetic Project, Mid-Term Report</td>
<td>Nov. 8th</td>
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<td>Assignment VI:</td>
<td>Synthetic Project, Final Report</td>
<td>Dec. 2nd</td>
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<td>Check Out:</td>
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<td>Dec 3rd</td>
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<tr>
<td>Assignment VII:</td>
<td>Final Exam</td>
<td>Dec. 9th, noon</td>
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Assignments are on the dates indicated above. A 3% penalty will be applied to work completed later than the due dates. The drop dead dates for the assignments in order to avoid an additional 7% late penalty are as follows: I and IIa by Sept 13th, III by Oct 4th; IV by Oct 25th; V by Nov 15th; VI before 5 pm on Dec 9th. Nothing submitted after 5 pm Dec 9th will be graded. The Final Exam is optional. If taken, it will be used to replace the lowest grade received for any one of the graded assignments (IIa, III, IV, V or VI). Any assignment not submitted will count as “0” but will not count as a graded assignment that can be replaced by the final exam grade.

Reports:

Reports must be in the format of an appropriate primary journal in the field of organic chemistry. The report author is free to select a journal style of their choosing and attach the corresponding guidelines for the author to the report. The recommended journal format is for a “Note” in the Journal of Organic Chemistry, 2013.

Grade Policy:

Assignment I is pass fail only. If failed, then the course grade will be F or W. If passed, the course grade will be determined by your performance on 5 assignments (IIa, III, IV, V and VI) each of which will constitute 18% of the course grade; and Student Department, Seminar Participation, and the Notebook Grade will each contribute 5% to the final course grade.

Virtual Lab Breakage Fee:

At the start of the semester each student has a Virtual Breakage Credit (VBC) of 25 points. Up to an additional 100 VBC points can be earned by active participation in Laboratory Clean Up & Readiness (25 points per each Laboratory Clean Up & Readiness). However, failure to conduct at
least two Laboratory Clean Up and Readiness Reports will result in a loss of VBC 25 points. Each item broken or lost during the semester will count as a deduction from a student's VBC equal to 1/2 of the list price of the broken or missing item, up to a maximum deduction per item of no more than 25 points. Any balance of VBC points accumulated by a student during the semester that is less than 25 points will result in deduction to the student's department grade for the course.

Notebook:

Each student is required to keep a written laboratory notebook. The written notebook must be a permanently bound composition style book, where all pages are numbered (first to last) and the first five pages are reserved for a Table of Contents. The Table of Contents must be updated regularly. The written notebook must be written in ball point pen. The student must record date and time stamps associated with each entry in the style as described during the Check In. The written notebook must be turned in to the instructor as part of the final report and is subject to random inspection and evaluation throughout the entire semester.

Department:

Acceptable student department requires regular attendance, safe conduct, awareness of safety concerns, and adequate preparation before conducting laboratory work. Students will begin with a Department grade of 100, and deductions from that will be based on the end of semester VBC points and any daily deductions posted on OAKS for each student by the instructor. The Department grade can be a negative value, but it cannot exceed -5%.

Laboratory Clean Up & Readiness:

At the end of each lab period, up to two students can conduct a Laboratory Clean & Readiness report by inspecting the lab, correct problems that can be correcting and making note of concerns that need to be corrected by others. The students conducting the report must be the last students to leave the laboratory on the day the report is made. Each student must conduct at least two reports during the semester, even if they do not need to earn VBC points.

Seminar Participation:

There will be at least two special departmental seminars during the semester as part of a recruitment effort to identify and hire a new faculty member to specialize in analytical chemistry. Students in CHEM 371 are required to actively participate in that effort by attending candidate seminars and submitting a brief 1-2 page synopsis of each the candidate's past research accomplishments or for planned research to be performed at the College of Charleston. The concluding paragraph of the synopsis should be the student's identification of the strength or weakness of the candidate in terms of success as a potential faculty member in our department. You may write a paper to summarize a published research paper authored or co-authored by a candidate if you are not able to attend a candidate seminar due to class scheduling conflicts. Times and places of candidate seminars and candidate information will be posted on OAKS as that information becomes available.

OAKS:

Course materials and grades will be posted on OAKS.
Availability of Chemicals, Glassware, and Supplies:

Students are not allowed to bring in chemicals, glassware or supplies from other laboratory rooms (teaching labs or research labs) into the Chemical Synthesis and Characterization laboratory room without explicit permission of the instructor. Chemicals, glassware and supplies from the CHEM 371 laboratory may not be taken out of the CHEM 371 laboratory rooms without explicit permission of the instructor. When something is missing or supply is running low, inform the instructor.

Text Information:

There is no required text for this course. However, there are several excellent reference texts for this course that are on 2 hour overnight reserve in the College's library. There are other excellent texts in the library on the shelves and as e-texts that you can access as well.

On Spectroscopic Interpretation:

On Reporting:

There are many other books that you might find useful and which are in circulation at the library. As just one example:

On Laboratory Skills:
- Li, Modern Organic Synthesis in the Lab, QD 262.I47
- Keese, Practical Organic Synthesis, QD 257.7.K4313
- Cooper, Organic Chemist's Desk Reference, QD 257.7.R46

Hopefully, you also still have copies of your introductory organic chemistry texts from both lecture and laboratory. They contain preliminary information needed for success in this course.

Internet Resources:

You should make liberal use of the internet to locate useful public access sites that might be helpful for this course. As you discover other useful sites, please share them.

  - Webspectra, UCLA for interpretation of spectral data: chem.ucla.edu/~webspectra/
  - Not Voodoo, chem.chem.rochester.edu/~nv/g/organicworldwide.net/
  - Dr. Reich's site: www.chem.wisc.edu/areas/organic/index-chem.htm
  - MIT course materials: ocw.mit.edu/courses/chemistry/
  - Acorn NMR: acornnmr.com