

Chemistry 320 (Introduction to Research) 2010–2011

Host: Prof. Robert D. Pike (1-2555, rdpik@wm.edu)

Course Objectives: Become familiar with laboratory safety, scientific research ethics, and the various resources available within the library and on-line for searching chemically related information, also develop scientific writing skills and establish a working research relationship with a faculty mentor.

Course Requirements (as related to the course schedule given on the back of this page):

- 1. Faculty research presentations (Fall 2010).** Brief talks were presented by the chemistry faculty on their research interests last semester. By now you should have been assigned a faculty advisor for the Chem 320 writing requirement, as well as a potential research mentor for the summer and/or senior year. If you are unsure to whom you've been assigned, check the advisor assignment list posted on Blackboard. If you have not been assigned an advisor, please see Prof. Pike as soon as possible.
- 2. Chemistry Safety.** Safety in the chemistry research laboratory will be presented in two lectures with a brief short answer exercise and fire extinguisher demo.
- 3. Scientific Research Ethics.** New to Chem 320 this year is a requirement from the National Science Foundation that new research students be instructed in responsible conduct of research (RCR). You will be expected to read the short brochure *On Being a Scientist: Responsible Conduct in Research*, 2nd Edition: http://www.nap.edu/openbook.php?record_id=4917. Once again, there will be a short answer exercise, as well as an in-class discussion. Since the RCR training is new material for 2011, I welcome your feedback and/or suggestions.
- 4. Introduction to computer based searching and library resources.** A demonstration of on-line searching techniques for chemical literature databases will be presented. A literature based problem set will be given in which you must find the answers to a variety of questions using available library and on-line resources. A useful on-line subject guide for Chem 320 may be found at <http://guides.swem.wm.edu/Chemistry>
- 5. Department seminars.** The department has regularly scheduled seminars on the Friday afternoon time slots. The seminar schedule is posted on Blackboard and throughout the department. It is updated on a regular basis. **You are expected to attend all spring seminars. It is your responsibility to be cognizant of seminar announcements and changes.**
- 6. Chem 320 paper.** This paper, critiqued and graded by your Chem 320 advisor, is the bulk of the course grade. The paper topic is chosen by mutual agreement with your faculty advisor. The paper, written in a scientific format comparable to articles that you may collect for writing the paper, should be 8-10 pages in length. You should be given appropriate directions for collecting references for the paper by your faculty advisor and should plan a reasonable time frame to collect references, prepare an outline, and write a rough draft, all of which should be approved by the advisor prior to submission of a final draft by the end of the semester. A recommended time line for completing the Chem 320 paper is provided on the back of this page.

GRADING: ATTENDANCE IS MANDATORY for all of the Chem 320 dates given on the back of this page. Sign in sheets will be available in Rogers 100 for all meetings. Please make sure that you sign in for all meetings! Only one unexcused absence will be allowed for the department seminars only. Additional absences are only allowed for academic or other school related activities and must be approved in advance. There are certainly other factors that may warrant excused absences as well. Unexcused failure to complete any of items 1-4 will result in an automatic one third letter grade reduction per item from the grade given by your faculty advisor for the 320 paper. For

example, if you receive an A on your 320 paper but fail to complete the library exercise and have two unexcused absences for Chem 320 meetings (including seminars), your course grade will be a B {A \approx A- \approx B+ \approx B}. An incomplete in Chem 320 will result from failure to complete the 320 paper by the end of the term. A full letter grade reduction to the assigned grade will occur upon completion. Full attendance and completion of the paper is your best assurance for a successful grade.

Tentative Schedule for Chem 320 Meetings – Spring, 2011

Jan 21	Introduction to the course, Safety Film
Jan 28	Library Presentation (literature exercise due Feb 11)*
Feb 4	Environmental Health & Safety Presentation (safety exercise due Feb 18)*
Feb 11	<i>Department Seminar</i> (Kevin Schug, Univ. TX)
Feb 18	Undergraduate Research Symposium (Sadler Center; time and location TBA)
Feb 25	<i>Department Seminar</i> (Jason Chruma, UVA)
Mar 4	No class (beginning of Spring break)
Mar 18	<i>Department Seminar</i> (Keith Woerpel, NYU)
Mar 25	<i>Department Seminar</i> (Jean-Peirre Pascault, Université Claude Bernard, France)
Apr 1	<i>Department Seminar</i> (Carolyn Prairie Outten, Univ. SC)
Apr 8	<i>Department Seminar</i> (Cavid Mantus, Cubist Pharma.)
Apr 15	<i>Department Seminar</i> (Robert Hinde, Univ. TN)
Apr 22	RCR Discussion (RCR exercise due in class today)

*** These assignments are to be turned into the Chemistry Office no later than 5 p.m. for the due dates given above.** There may be additional departmental seminars or changes during the semester. You will be informed by e-mail with any changes in the schedule as they occur.

Recommended time line for faculty advisor selection and completing the Chem 320 paper**

Mar 18	Complete material collection for paper with advisor input and approval
Apr 1	Complete outline of paper with advisor input and approval.
Apr 15	Submit first rough draft of paper to faculty advisor for editing and comments.
Apr 29	Submit final draft of paper to advisor for grade assignment.

**** Keep in mind that this schedule represents a recommended time line for completion of the 320 paper. This also helps spread the work load of the faculty advisor so that papers can be returned in a timely manner. Your advisor has the right to change these deadlines in any way he/she desires.**

Research Opportunities

The Department of Chemistry is very proud of the research opportunities made available to our majors. The vast majority of the support for the research program is the result of a wide variety of external grants and contracts awarded to the faculty. The breadth of research interests of the faculty is excellent and provides you with the opportunity to experience one-on-one contact with faculty at the highest level of professionalism.

Independent research is not required to obtain a chemistry degree; however the advantages of obtaining research credit and participating in the summer research and academic year programs are numerous with respect to gaining invaluable experience in independent research and oral communication skills, greater exposure to advanced instrumentation, and noteworthy credentials for post graduate opportunities.

Chem 320 is the focal point for initiating a research relationship with a selected faculty mentor. In an ideal world such a process would allow you to work with anyone of your choosing; however this is unrealistic considering that we will have 45-50 students working over the summer alone. What you must keep in mind is that which particular mentor that you are assigned to is irrelevant compared to the value of the research experience. We try to the best of our ability and resources to assign you within the list of faculty that you provide on the yellow information sheet. Nevertheless, we are still obligated to distribute the class over 15 faculty members, thus compromises must occasionally be made to provide all faculty with the research talent we would like to foster from our students.

The summer research program is a unique opportunity to experience research without the pressures of classes at the same time. The program runs throughout the ten week summer school session, although there is some flexibility which if necessary can be discussed with your faculty mentor. You are paid a minimum stipend of \$3250 and provided with free campus housing. You cannot receive academic credit for summer research unless you forfeit the summer stipend. Variations in the stipend level can be made for special cases such as the desire to take a summer school course or extended vacations during the ten week session.

There are some internal summer research fellowships available through the Charles Center. Good academic credentials are part of the decision criteria. A list of available fellowships is summarized on the next page. Application forms can be downloaded directly from the Charles Center and HHMI web sites. You can apply for more than one fellowship to better the odds. A summary of internal fellowships available and the associated web sites are provided on the following page.

Students normally continue research during the academic year with the same faculty mentor from the summer given that a considerable amount of time was invested during that period to provide you with a substantial level of research independence with minimal guidance. Summer research is not required to participate in our research program during the academic year.

For students ultimately planning to participate in the summer research program, the following tentative schedule should be followed to insure housing and summer stipends:

- Feb 25** Deadline to submit HHMI summer fellowship applications (this is only applicable if recommended and pursued with your faculty mentor).
- Mar 18 (noon)** Deadline to submit Charles Center fellowship applications if applicable as above.
- By Mar 25** **Last date** to inform our Department administrative assistant (Mrs. Hilger in the Chemistry office, ISC 1039) that you need campus housing for the summer research program
- By Apr 15** **Last date** to complete tax and FICA forms with Ms. Mulholland in ISC 1053 (you must have your social security card). **Last date** to complete housing and health forms with Mrs. Hilger in the Chemistry Office. This only applies to summer stipends supported through faculty grants. All others (HHMI, Charles Center, etc.) should be completed through those programs deadlines.
- May 30** Summer research program begins.

Summary of Internal Summer Undergraduate Research Fellowships Applicable to Chemistry Majors for Summer, 2011. ^A

Name of Fellowship	Restrictions	Student Stipend ^B	Additional Support ^C	Number Available	Due Date
Chappell Undergraduate Research Fellowships (Charles Center)	Student must be associated with a faculty member engaged in summer research	\$3000	none	4-6	Mar 17 noon
Cummings Memorial Summer Scholarships in the Sciences (Charles Center)	Preference given to students in under-represented groups doing summer research in a natural science or math	\$3000	"materials budget"	2-3	Mar 17 noon
Dintersmith Fellowships (Charles Center)	Strictly for students doing preliminary summer research for their senior honors thesis over the academic year	\$4000	\$1000	5	Mar 17 noon
HHMI Summer Fellowships	Research related to biology or biological chemistry	\$3800	none	20	Feb 26
Mercury Project (Charles Center)	Supports students in any academic discipline that relates to mercury	\$4000	none	??	Mar 17

^A Application guidelines and forms can be downloaded from the following web sites:

Charles Center (<http://www.wm.edu/sites/scholarships/scholarshipsfellowshipsawards/summer/index.php>)

HHMI (http://web.wm.edu/hhmi/summer_fellowships.html)

^B Additional monies will be added by the Chemistry Department to applicable \$3000 fellowships to provide a total stipend of \$3250.

^C Free campus housing is provided over both summer sessions for all students provided with summer research fellowships.