Senior Research (CHEMISTRY LABORATORY IVA-CTW) Dr. Ray

Chemistry 4160 (CRN 13288)

Spring 2017

Prerequisites:	Chem 4000, 4110 or 4330, and Chem 4600 with grades of C or higher, or equivalent
Instructor:	**Dr. Gigi B. Ray, 212 Courtland North, gbray@gsu.edu, Tel. (404) 413-5540** **Sharon Leslie, Librarian, sleslie@gsu.edu, Library South, Suite 542** **Patrick Chepaitis, TA, pchepaitis@student.gsu.edu**
Class:	**Mondays 9:00 am – 11:30 am, 311 Petit Science Center (3-credit hour course)** **Meet individually with instructor weekly to discuss writing/presentations, TBA**
Office Hours:	**Mondays and Fridays 1:00 – 2:00pm and Wednesdays 1:00 – 3:00 pm**
Text:	Class notes and handouts will be posted on iCollege: **CHEMISTRY LABORATORY IVA-CTW SECTION 099 SPRING SEMESTER 2017**
Course Objectives:	Chemistry Laboratory IVA. Concurrent enrollment in Chem 4160 and 4170 is not allowed. ***Signature Experience: Independent research on a special topic related to chemistry. Capstone project that integrates different aspects of chemistry: biological, organic, physical, computational, and analytical.*** Individual projects involve exploring a topic in depth, learning and doing research using a variety of sources, and demonstrating mastery and understanding of the material by communicating this knowledge in both written and oral form. Develop research skills by becoming proficient in the use of science databases: SciFinder Scholar, Web of Science, Reaxys, Medline (Pub Med), and the EndNote reference management system. Develop practical skills by becoming proficient in the use of ChemBioDraw Ultra software to represent chemical reactions and mechanisms. Analyze NMR spectra and literature synthesis routes to compound in research project. Develop computational skills by learning to use the Accelyrs Visualizer program for 3D-protein structure analysis, and explore structures in the Protein Data Bank (PDB). Develop critical thinking and writing skills (CTW), by writing and revising reports on semester-long research project. Have regular, individual meetings with research advisor to improve understanding, writing and presentation skills. Final Chem 4160 Report is submitted to Chemistry Department. Develop presentation skills by giving two oral presentations (using PowerPoint), and a poster presentation on the research project. Attend research seminars to observe the presentation style of others, and to learn about new areas of science. Molecular Modeling component: use Accelrys Visualizer to probe biomolecular interactions and do structure-function analysis of proteins. Careers component: explore potential career paths, internships and training opportunities, and develop job searching skills by writing resumes and cover letters.

Policies and Assignments:	**1) Students will select a research topic of interest to them (from list), write two short reports, do a one short oral presentation (15 mins) using PowerPoint, and present a poster on *several distinct aspects* of their topic/theme. Students will also present a cumulative 30min Oral Presentation (*three subtopics*), and submit a final 8-12 page Chem4160 Report in ACS Journal style.** **2) Students are required to schedule 20-min appointments with instructor or TA, every other week outside of class to discuss paper / presentation content & organization, and how to improve written work & oral presentations (minimum 6 times per semester).** **3) Students are required to complete the Responsible Conduct of Research online Physical Science module (CITI), and submit completion report.** **Go to: http://www.citiprogram.org** **4) Students are required to attend 4 seminars/events outside of class, during the semester (one from each category):** Science seminar, Science conference, Career fair, Career seminar. Submit half page synopsis of each seminar (describe content & style). **5) Attendance, timely arrival and participation in all class meetings required.** If absent, it is the student's responsibility to makeup missed work. Students must pay attention to speaker (instructor, guest speaker, or classmate), ***do not browse the internet or do other work during class.*** **6) *Submit hardcopy printouts of all assignments* at class meetings, rather than emailing assignments to instructor. Late submissions (points deducted) only accepted in person during office hours upto one week past due date.** **7) Cell phones, iPhones, iPods, blue tooth, tablets, and other electronic devices must be OFF during all classes. Laptops are allowed.** **8) Tuesday Feb 28th is last day to withdraw from the class and receive "W".** You are responsible for withdrawing before the deadline if you need to do so. The University requires that faculty members must, on a date after the mid-point of the course to be set by the Provost (or his designee): 1. Give a WF to all those students who are on their rolls but no longer taking the class 2. Report the last day the student attended or turned in an assignment.
Grading:	**Total points: 200** *(see grading rubric)* **25 points each:** Final Semester Report #3, Final Oral Presentation, Molecular Modeling Project Report **15 points:** Resume (8pts), Cover Letter (4pts), Job Adds (3pts) **20 points:** PowerPoint slides #1 to #4 collectively (4,4,4,8pts) **10 points each:** Report #1, Report #2, Poster, 1st Oral Presentation **10 points:** Seminar Summaries collectively (2.5 pts each x 4) **5 points each:** SciFinder Scholar assignment #1, Semester project Outline/Abstract/Articles #2, SciFinder Structures #3, Responsible Conduct in Research (CITI) assignment #4, ChemBioUltra Draw assignment #5, NMR Spectra assignment #6, EndNote reference file #7 **15 points:** Class attendance/participation
Grading Scale:	**A+ 97% A 90% A- 87% B+ 84% B 80% B- 76% C+ 71% C 65%** **C- 59% D 50% F <50%**

TENTATIVE CHEM 4160 CLASS SCHEDULE (Subject to change) Spring 2017

Date	Day	Topics	Meeting
Jan 9	**M**	**Introduction to Course** **Search Scientific Literature - SciFinder Scholar and Web of Science** Select Chemistry Research Project Topic (related to current issues)	**1**
Jan 16	***M***	***Martin Luther King Holiday, no class*** → submit detailed topic for the entire semester project *(iCollege dropbox)*	
Jan 17-20	**T-F**	• meet with Dr. Ray to finalize semester topic (outside class appointment)	
Jan 23	**M**	**Search Databases, Structures, Synthesis – SciFinder Scholar** **Discuss Writing in the Sciences** → submit **Abstract and detailed 1-page Outline of entire semester Research Project** → submit printouts of 1 review article & 1 research article on semester topic → submit SciFinder Scholar assignment #1	**2**
Jan 24-27	**T-F**	• meet with Librarian to finalize literature search (outside class appointment)	
Jan 30	**M**	**Careers in Chemistry: Resumes, Cover Letters, and Internships** **Discuss Good Writing Skills and How to Avoid Plagiarism** → submit 5 – 8 **PowerPoint slides #1** (Introduction to entire semester's topic) → submit SciFinder Structures assignment #3 → submit Responsible Conduct of Research Report (CITI) #4 by this date → submit 1st synopsis of seminar attended in January	**3**
Feb 6	**M**	**Draw Structures and Reaction Mechanisms using ChemBioDraw** → submit **Report #1 (Introduction to *entire* semester's Topic; 3 – 4 pages)** → submit 3 Job Adds for related positions, with different educational qualifications (BS, MS, PhD or Professional Degree) → submit Cover Letter for one specific internship or job application → submit Technical Resume (by 12 noon on Friday Feb 10 - *iCollege dropbox*)	**4**
Feb 13	**M**	**Search NMR Spectra; Discuss PowerPoint & Poster Presentations** **Reference and Database Management (Introduction to EndNote)** → submit 10 – 12 **PowerPoint slides #2** (including Synthesis / Mechanism, and revised Introduction slides) → submit ChemBioDraw Ultra Drawing assignment #5 *(iCollege dropbox)* (detailed Synthesis or Mechanism related to your research topic) → submit 2nd synopsis of seminars attended in January/February	**5**
Feb 20	**M**	**1st Oral Presentations using PowerPoint (20 min each, 6 students)** → submit **Report #1 revisions** *(Dropbox and Turnitin originality checker)* → submit NMR Spectra assignment #6 (with peaks assigned & labeled)	**6**
Feb 27	**M**	**1st Oral Presentations using PowerPoint (20 min each, 6 students)** → submit 12 – 15 **PowerPoint slides #3** (including Introduction, revised Synthesis/Mechanism, and NMR Spectra analysis slides) → submit final Resume and Cover Letter revisions	**7**
W Feb 28	***T***	***Last day to Withdraw and possibly receive a W***	
Mar 6	**M**	**Accelyrs Visualizer Molecular Modeling Activity #1 – Tripeptide** → submit **Report #2** (including revised Introduction and Synthesis or Mechanism, and NMR Spectra analysis), with References formatted in ACS style using EndNote linked to Word, 6 – 8 pages) → submit 3nd synopsis of seminars attended in February/March	**8**

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Date	Day	Topics	Meeting
Mar 13-19		***Spring Break, no class***	
Mar 20	**M**	**Accelyrs Visualizer Molecular Modeling Activity #2** → submit **Poster** (12 slides, including revised PPT slides #3 and how the drug or system works) → submit Molecular Modeling Preliminary Exercises	**9**
Mar 27	**M**	**Accelyrs Visualizer Molecular Modeling Activity #3** → submit **Report #2 revisions** *(iCollege Dropbox, Turnitin originality checker)* → submit final, properly formatted EndNote Reference List for entire semester (assignment #7, dropbox)	**10**
Mar 31	**F**	**Present Research Poster at Undergraduate STEM Research Conference *(required)***	
Apr 3	**M**	**Accelyrs Visualizer Molecular Modeling Activity #4** **Protein Structure Analysis (Protein Data Bank)** Review Endnote usage and reference formatting questions → submit 16 – 20 **Final PowerPoint slides #4** (including all revised slides) → submit 4th synopsis of seminars attended during semester	**11**
Apr 7	**F**	**→ Submit completed Molecular Modeling Project Report and Computer Files by 3pm**	
Apr 10	**M**	**Final (2nd) Student Oral Presentations (30 min each, 4 students)** → submit printout of 3D protein structure reference article related to your semester topic (including PDB protein structure filenames)	**12**
Apr 17	**M**	**Final (2nd) Student Oral Presentations (30 min each, 4 students)** → submit **Final Report #3** (including Introduction, revised Synthesis / Mechanism, NMR Spectra & Protein Structure analysis, and how the drug or systems works (8–12 pages text, plus Figures & References)	**13**
Apr 24	**M**	**Final (2nd) Student Oral Presentations (30 min each, 4 students)** Semester Wrap Up	**14**
May 1	**M**	**→ Submit Revised Final 4160 Report (hardcopy printout and electronic copy in iCollege dropbox), in lieu of Final Exam by 1pm**	

Spring 2017 Events:

- Thursday Jan 26 – Science & Technology Career Fair (12 – 3 pm)
- Friday Mar 31 – Undergraduate STEM Research Conference (12 – 4pm)
- Saturday Apr 8 – Southeast Enzyme Conference (all day)
- Tuesday Apr 11 – Georgia State Undergraduate Research Conference (GSURC)

Color Key in Schedule:

Blue = Research Project Reports; Red = Research Project Presentations;
Green = Molecular Modeling Project; Black = Skills Assignments