

Senior Research (CHEMISTRY LABORATORY IVA-CTW)

Dr. Ray

Chemistry 4160 (CRN 13104)

Spring 2018

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 Kelsey Jordan, Science Librarian, kjordan44@gsu.edu, Library South, Suite 542 Andrew Baumert, TA, dbaumert1@student.gsu.edu
Class:	Mondays 9:00am – 11:30am, 311 Petit Science Center (3-credit hour course) Meet individually with instructor or TA, weekly to discuss writing/presentations.
Office Hours:	Mondays and Wednesdays 1:00 – 2:00pm, and Fridays 2:30 – 3:30pm Individual appointments: Wed 10am-12pm, Thurs 12:30- 4:30pm, Fri 2:30- 4:30pm
Text:	Class notes and handouts will be posted on iCollege: <u>CHEMISTRY LABORATORY IVA-CTW SECTION 099 SPRING SEMESTER 2018</u>
Course Objectives:	<p>Chemistry Laboratory IVA. Concurrent enrollment in Chem 4160 and 4170 is not allowed.</p> <p><i>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.</i></p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Develop computational skills by learning to use the Accelrys Visualizer program for 3D-protein structure analysis, and explore structures in the Protein Data Bank (PDB).</p> <p>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.</p> <p>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.</p> <p>Molecular Modeling component: use Accelrys Visualizer to probe biomolecular interactions and do structure-function analysis of proteins.</p> <p>Careers component: explore potential career paths, internships and training opportunities, and develop job searching skills by writing resumes and cover letters.</p>

Class Policies and Assignments:	<p>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 <i>several distinct aspects</i> of their topic/theme. Students will also present a cumulative 30min Oral Presentation (<i>three subtopics</i>), and submit a final 8-12 page Chem4160 Report in ACS Journal style.</p> <p>2) Students are required to schedule 20-min appointments with instructor or TA, every week outside of class to discuss paper / presentation content & organization, and how to improve written work & oral presentations (minimum 8 meetings).</p> <p>3) Students are required to complete the Responsible Conduct of Research online Physical Science module (CITI), and submit completion report. At http://www.citiprogram.org complete the Basic and Physical Science courses.</p> <p>4) Students are required to attend 3 seminars/events outside of class, during the semester (one from each category): Science seminar (1), Science conference (1), Career fair or Career seminar (1). Submit half page synopsis of each seminar (describe content and style).</p> <p>5) Attendance, timely arrival and participation in <u>all</u> 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), <i>do not browse the internet or do other work during class.</i></p> <p>6) Assignment submission: Some assignments will require <i>hardcopy printouts</i> to be turned in during class, while others will require uploading documents to an assignment folder in iCollege. Points will be deducted for late submissions. Assignments will only be accepted up to one week past the due date.</p> <p>7) Cell phones, iPhones, iPods, blue tooth, tablets, and other electronic devices must be OFF during all classes. Laptops are allowed to do classwork.</p> <p>8) Tuesday Feb 27th 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.</p>
Grading:	<p style="text-align: center;">Total points: 200 (see <i>grading rubric</i>)</p> <p>25 points each: Final Semester Report #3*, Final Oral Presentation,</p> <p>20 points: Molecular Modeling Project Report</p> <p>15 points: Resume (8pts), Cover Letter (4pts), Job Adds (3pts)</p> <p>20 points: PowerPoint slides #1 to #4 collectively (4,4,4,8pts)</p> <p>10 points each: Report #1*, Report #2, Poster, 1st Oral Presentation</p> <p>6 points: Seminar Summaries collectively (2pts each x 3)</p> <p>5 points each: SciFinder Scholar Database assignment #1, Semester project Outline/Abstract #2, SciFinder Structures #3, Responsible Conduct in Research (CITI) #4, ChemBioDraw #5, NMR Spectra #6, Personal Statement #7, EndNote reference file #8</p> <p>15 points: Class attendance and participation</p> <p><i>*Final grade for Report 1 and 3 will be an average of original and revised grade.</i></p>
Grading Scale:	<p>A+ 97% A 90% A- 87% B+ 84% B 80% B- 76% C+ 71% C 65% C- 59% D 50% F <50%</p>

TENTATIVE CHEM 4160 CLASS SCHEDULE (Subject to change) Spring 2018

Date	Day	Topics	Meeting
Jan 8	M	Introduction to Course Search Scientific Literature - SciFinder Scholar and Web of Science → Select Chemistry Research Project Topic (related to current issues)	1
Jan 15	M	Martin Luther King Holiday, no class → submit detailed topic for the entire semester project (<i>iCollege Dropbox</i>)	
Jan 16-19	T-F	• meet with Dr. Ray to finalize semester topic (outside class appointment)	
Jan 22	M	Search Databases, Structures, Synthesis – SciFinder Scholar Discuss Writing in the Sciences → submit Detailed 1-page Outline of entire semester's Research Project → submit printouts of 1 review article & 1 research article on semester topic → submit SciFinder Scholar Database assignment #1	2
Jan 23-26	T-F	• meet with Librarian to finalize literature search (outside class appointment)	
Jan 29	M	Careers in Chemistry: Resumes, Cover Letters, and Internships → submit half page Abstract about entire semester's project (assignment #2) → submit 5 – 8 PowerPoint slides #1 (Introduction to semester's topic) → submit SciFinder Structures assignment #3 → submit Responsible Conduct of Research Report (CITI) #4 by this date → submit 1 st synopsis of seminar attended in January	3
Feb 5	M	Draw Structures and Reaction Mechanisms using ChemBioDraw Discuss Writing Personal Statements → 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 9 via <i>iCollege Dropbox</i>)	4
Feb 12	M	Search NMR Spectra; Discuss PowerPoint & Poster Presentations Reference and Database Management (Introduction to EndNote) → submit 10 – 12 PowerPoint slides #2 (including Synthesis and Mechanism, and revised Introduction slides) → submit ChemBioDraw Ultra Drawing assignment #5 (<i>iCollege dropbox</i>) (detailed Synthesis and Mechanism related to your research topic)	5
Feb 19	M	1st Oral Presentations using PowerPoint (20 min each, 6 students) → submit Report #1 revision (<i>Dropbox and Turnitin originality checker</i>) → submit NMR Spectra assignment #6 (with peaks assigned & labeled)	6
Feb 26	M	1st Oral Presentations using PowerPoint (20 min each, 6 students) → submit 12 – 15 PowerPoint slides #3 (including Introduction, revised Synthesis and Mechanism, and NMR Spectra analysis slides) → submit Personal Statement assignment #7 (<i>iCollege dropbox</i>) → submit 2 nd synopsis of seminar attended in February	7
Feb 27	T	Last day to Withdraw and possibly receive a W	
Mar 5	M	Accelrys Visualizer Molecular Modeling Activity #1 – Tripeptide → submit Report #2: Synthesis, Mechanism, and NMR Spectra analysis, and revised Introduction, with References formatted in ACS style using EndNote linked to Word (6 – 8 pages of text, plus figures to clarify explanations)	8

Date	Day	Topics	Meeting
Mar 12-16	M-F	Spring Break, no class	
Mar 19	M	Accelyrs Visualizer Molecular Modeling Activity #2 Discuss Creating 3' x 4' Poster by Combining PowerPoint Slides → submit Poster (12 slides, including revised PPT slides #3 and explanation of how the drug or system works) → submit Molecular Modeling Preliminary Exercises → submit final Resume and Cover Letter revisions	9
Mar 26	M	Accelyrs Visualizer Molecular Modeling Activity #3 → submit Report #2 revisions including References properly formatted (ACS style) using EndNote linked to Word (<i>iCollege dropbox and Turnitin originality checker</i>) → submit Single Large Poster Slide (in PPT, which can be printed 3' x 4')	10
Mar 30	F	Present Research Poster at Undergraduate STEM Research Conference 1 – 4 pm (required)	
Apr 2	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 3 rd synopsis of seminar attended in March	11
Apr 4	W	→ Submit completed Molecular Modeling Project Report and Computer Files by 3pm	
Apr 9	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 filename) → submit final EndNote Reference file for entire semester (assignment #8)	12
Apr 16	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 System Works (8–12 pages text, plus figures to clarify explanations and references))	13
Apr 23	M	Final (2nd) Student Oral Presentations (30 min each, 4 students) Semester Wrap Up	14
Apr 30	M	→ Submit Revised Final 4160 Report (Hardcopy printout and Electronic copy in iCollege dropbox), in lieu of Final Exam by 2pm	

Spring 2018 Events:

- **Tuesday Jan 23** – Science & Technology Career Fair (11am - 3pm) Student Center, career.gsu.edu
- **Friday Mar 30** – Undergraduate STEM Research Conference (12 - 4pm) NSC 5th Floor, cas.gsu.edu/stem
- **Saturday Apr 7** – Southeast Enzyme Conference (all day) at GSU, sec.gsu.edu
- **Thursday Apr 12** – Georgia State Undergraduate Research Conference, (9am-3:30pm) Student Center gsurc.honors.gsu.edu

Color Key in Schedule:

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