

Chemistry 4160 (CRN 52066)Summer 2019

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 Ryan Robinson, TA rarmstrong2@student.gsu.edu
Class:	Tuesdays & Thursdays 9:00am -11:45pm, 311 Petit Science Center (3-credits) Meet individually with instructor or TA, weekly to discuss writing/presentations.
Office Hours:	Wednesdays 10:00am – 4:00pm
Text:	Class notes and handouts will be posted on iCollege: <u>CHEMISTRY LABORATORY IVA-CTW SECTION 129 SUMMER SEMESTER 2019</u>
Course Objectives:	<p>Chemistry Laboratory IVA. Concurrent enrollment in Chem 4160 & 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, integrating knowledge, demonstrating mastery and understanding of material by communicating this knowledge in both written & 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 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 and molecular visualization skills by learning to use the Accelrys Visualizer program for 3D-protein structure analysis. Identify structurally similar proteins by structure-function analysis. Explore biomolecule structures in the Protein Data Bank (PDB).</p> <p>Develop critical thinking and scientific 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 verbal and visual presentation skills by giving two oral presentations (using PowerPoint), and a poster presentation on the research project. Attend research seminars to observe presentation style of others, and to explore new areas of science.</p> <p>Molecular Modeling component: use Accelrys Visualizer to probe biomolecular interactions. Identify structurally similar proteins by structure-function analysis.</p> <p>Careers component: explore potential career paths, internships and training opportunities. Develop job searching skills by writing and revising resumes, cover letters and personal statements.</p>

Class Policies and Assignments:	<p>1) Students will select a research topic of interest to them (from list), write two short reports, do one short oral presentation (15 mins) using PowerPoint, and prepare a poster on <i>several distinct aspects</i> of their research topic/theme. Students will also present a cumulative 30min Oral Presentation (with 3+ key subtopics) and submit a Final Chem4160 Report in ACS Journal style (12-15 page text, plus figures, and ACS style references).</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 7 meetings).</p> <p>3) Students are required to complete the Responsible Conduct of Research (CITI) online courses at http://www.citiprogram.org and submit completion report & RTK report. Complete CITI Basic and Physical Science courses.</p> <p>4) Students are required to attend 1 seminar/event outside of class, during the semester: Science seminar, Science conference, Science webinar. Submit half page synopsis of the 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, play on your phone, or do other work during class.</i></p> <p>6) Assignment submission: Many assignments will require <u>hardcopy printouts</u> to be turned in during class, while others will require uploading documents to the assignment folder in iCollege, or both. Points deducted for late submissions. Assignments will only be accepted up to one week past the due date. All late submissions must be submitted as a printout to Dr. Ray.</p> <p>7) Laptops or iPads are allowed only for doing classwork. All other electronics, including cell phones, iPhones, iPods, blue tooth, tablets, and other devices must be OFF & in bag during all classes.</p> <p>8) Friday July 5th 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;"><u>Total points: 200</u> (see grading rubric)</p> <p>25 points each: Final Chem 4160 Semester Report 3*, Final Oral Presentation</p> <p>20 points: Molecular Modeling Project Report #11, Tripeptide #9, Table, Drawings and Group Computer Files #10 (collectively)</p> <p>35 points: PowerPoint slides, collectively</p> <p>10 points: Responsible Conduct in Research (CITI) #1</p> <p>10 points each: Report 1*, Report 2, 1st Oral Presentation</p> <p>5 points each: SciFinder Database Searches #2, Semester Project Outline & Abstract #3, ChemBioDraw #4, NMR Spectrum #5, Personal Statement #6, Resume #7, Cover Letter & Job Adds #8, Seminar Summary #12, Poster</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>

Date	Day	Topics	Meeting
Jun 11	T	Introduction to Course Science Literature Search: SciFinder Scholar, Web of Science Reading Technical Papers & Critically Analyzing Information → Select Chemistry Research Project Topic (related to current issues) → submit Hwk #1 – Responsible Conduct in Research Report (CITI & RTK)	1
Jun 11-14	T-F	→ meet Dr. Ray to finalize semester topic (outside class appointment)	
Jun 13	R	Reaction Synthesis Search using Structures in SciFinder Scholar Writing in the Sciences, Avoiding Plagiarism, EndNote Introduction → submit Hwk #2 – SciFinder Scholar Literature Search on student topic → submit 2 review articles on semester topic (mechanism of action)	2
Jun 12-14	W-F	→ meet with Librarian about literature search (outside class appointment)	
Jun 18	T	Drawing Structures & Reaction Mechanisms using ChemBioDraw Preparing Oral Presentations, PowerPoint Slides & Figures → submit PowerPoint Slides #1 (6 – 8 slides) on Introduction & Background → submit Hwk #3 – Abstract (half page) and Detailed Outline (1 page) on <u>entire</u> 15-page semester Research Project on: (System, Background, Molecule Synthesis, NMR, Mechanism of Action)	3
Jun 20	R	¹H-NMR Spectra Searching and Interpretation Writing Personal Statements → submit Report #1 (3 – 5 pages text plus figures) on Introduction to entire semester Project (system) with details on enzyme/process affected by drug/small molecule. Focus on explanations, not just stating facts.	4
Jun 25	T	1st Oral Presentations – Introduction to System, Molecule Synthesis and Reaction Mechanisms (20 min each, 6 students) References and Citations using ACS Style → submit PowerPoint #2 (10 – 14 slides) on Revised Introduction, and Full Synthesis (indicate reaction types) and Reaction Mechanisms → submit Hwk #4 – ChemBioDraw (Synthesis & Mechanism)	5
Jun 27	R	1st Oral Presentations – Introduction to System, Molecule Synthesis and Reaction Mechanisms (20 min each, 6 students) Mechanism of Action of Drug/Small Molecule → submit Revised Report #1 (Introduction with Figures & References) → submit Hwk #5 – ¹ H-NMR Spectra (with peaks assigned & labeled)	6
Jul 2	T	Careers in Chemistry: Job Searches, Resumes, and Cover Letters EndNote: Reference & Database Management, Poster Design → submit PowerPoint #3 (16 – 20 slides) on Introduction, Synthesis, Reaction Mechanism, and ¹H-NMR Spectra analysis → submit Hwk #6 – Personal Statement → submit Hwk #12 – Seminar Synopsis	7
Jul 4	R	Independence Day Holiday – no class	
Jul 5	F	Last day to Withdraw and possibly receive a W → submit Report #2 (7 – 10 pages text plus key figures which clarify text) on Introduction, focus on Explanation of Synthesis (reaction types) and Mechanisms, NMR Spectra Analysis, and ACS Style References	

Date	Day	Topics	Meeting
Jul 9	T	Accelrys Visualizer Molecular Modeling Activity #1 – Tripeptide → submit PowerPoint #4 (22 – 26 slides) all revised slides with focus on Mechanism of Action : explanation of how drug/process affects system → submit Hwk #7 – Technical Resume	8
Jul 11	R	Accelrys Visualizer Molecular Modeling Activity #2 – Heme Protein Active Site Structure Analysis → submit Poster (3' x 4' format) on Entire semester project, with Background, Synthesis, and focus on Mechanism of Action → submit Hwk #9 – Molecular Modeling Tripeptide Preliminary Assignment	9
Jul 16	T	Accelrys Visualizer Modeling Activity #3 – Protein Data Bank Structures on Semester Research Topic Creating Protein Structure Figure on Research Topic → submit Revised PowerPoint #4 on entire semester project → submit Hwk #8 – Cover Letter (reply to one specific job ad) and 3 Job Advertisements for related positions, with different educational qualifications (BS, MS, PhD or Professional Degree)	10
Jul 18	R	Accelrys Visualizer Activity #4 – Heme Protein 3D Structure / Function Analysis & Identification → submit Final Report #3 (12 – 15 pages text, plus Figures & References) on Introduction, Synthesis/Mechanism, ¹ H-NMR Spectra Analysis, Experimental Data Analysis, Protein Structure Analysis, with focus on Mechanism of Action : detailed explanation of how drug or molecule binds and perturbs the system, future directions → submit Hwk #13 – Protein Data Bank Structure Article and PDB file	11
Jul 19	F	→ submit Hwk #11 – Molecular Modeling Project Written Report	
Jul 23	T	Poster Presentations (all students) Review Oral Presentation Skills & References with EndNote → submit Hwk #10 - Molecular Modeling Data Table, Active Site Drawings, and Group Computer Files	12
Jul 25	R	Final (2nd) Student Oral Presentations (30 min each, 6 students) → submit Final Presentation PowerPoint (24 – 28 slides) on entire semester project, including protein structure analysis)	13
Jul 26	F	→ submit Revised Technical Resume, Cover Letter, Personal Statement	
Jul 29	M	Final (2nd) Student Oral Presentations (30 min each, 6 students) → student peer evaluations	14
Jul 30	T	→ submit Revised Final 4160 Report (hardcopy printout and electronic copy in iCollege / Turnitin), in lieu of Final Exam <i>*last day to submit all course materials by 3pm</i>	15

Color Key in Schedule:

Blue = Class Research Activities

Green = Molecular Modeling Project Activities

Red = Research Reports, Oral Presentations, PowerPoints, Poster

Black = Assignments Due in Class