

Chemistry 4160 (CRN 55792)Summer 2020

Prerequisites:	Chem 4000, 4110 or 4330, and Chem 4600 with grades of C or higher, or equivalent
Instructor:	Dr. Gigi B. Ray, <a href="mailto:gbray@gsu.edu">gbray@gsu.edu</a> , 212 Courtland North, Kelsey Jordan, Science Librarian, <a href="mailto:kjordan44@gsu.edu">kjordan44@gsu.edu</a> , Library South, Suite 542 Stefanie Casa, TA <a href="mailto:scasa1@student.gsu.edu">scasa1@student.gsu.edu</a>
Class:	Tuesdays 9:00am –11:00am via WebEx in iCollege (3-credits) Weekly Individual Virtual Meetings with instructor or TA, to discuss research progress and improvements.
Office Hours/ Appointments:	Mondays 1:00 – 3:00pm, Wednesdays 11:00am – 2:00pm Thursdays 10:00 – 11:30am, Fridays 2:30 – 4:30pm Schedule via Doodle Polls
Text:	Class notes, handouts and videos will be posted on iCollege: <b><u>CHEMISTRY LABORATORY IVA-CTW SECTION 147 SUMMER SEMESTER 2020</u></b>
Course Objectives:	Chemistry Laboratory IVA. Concurrent enrollment in Chem 4160 & 4170 is not allowed. <b><i>Signature Experience: Independent research on a special topic related to chemistry. Capstone project that integrates different aspects of chemistry: biological, organic, physical and analytical.</i></b>  Individual projects involve exploring a topic in depth, doing research using a variety of sources, integrating knowledge, demonstrating mastery and understanding of material by communicating this knowledge in written, oral and visual form.  Develop research skills by becoming proficient in the use of science databases: SciFinder-n, Web of Science, Reaxys, Medline (PubMed), PubChem, and EndNote reference management system.  Develop practical skills by becoming proficient in the use of ChemBioDraw Ultra software to represent chemical reactions and mechanisms. Examine literature synthesis routes to research compound, explain reaction types & mechanisms, analyze NMR spectra and experimental data sets.  Develop critical thinking and scientific writing skills (CTW), by writing and revising reports on semester-long research project. Have regular individual virtual meetings with research advisor to improve understanding, writing and presentation skills. Final Chem 4160 Report is submitted to Chemistry Department.  Develop verbal and visual presentation skills by preparing and recording two oral presentations (using PowerPoint), and a poster presentation on the research project. Attend webinars to observe presentation style of others & explore new areas of science.  Develop molecular visualization skills by learning to use Protein Data Bank (PDB) visualization modules for 3D-protein structure analysis. Probe intermolecular interactions between research compound and macromolecules to which it binds. Apply structure-function analysis skills to explain how compound effects its environment.  Develop career building skills by exploring potential career paths, internships & training opportunities, and individual development plan. Develop job searching skills by writing and revising resume, cover letter, personal statement, and LinkedIn profile for networking.

Class Policies and Assignments:	<p><b>1) Students will select a research topic of interest to them (from list), and by mid-semester write a report, do one 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 4+ key subtopics) and submit a Final Chem4160 Report in ACS Journal style on entire project (12-15 pages of text, plus figures, and ACS style references).</b></p> <p><b>2) Students are required to schedule 20-min appointments with instructor or TA, every week outside of class to discuss paper / presentation content &amp; organization, and how to improve written work &amp; oral presentations (minimum 7 meetings).</b></p> <p><b>3) Students are required to complete the Responsible Conduct of Research (CITI) online courses at <a href="http://www.citiprogram.org">http://www.citiprogram.org</a> (CITI Basic and Physical Science) and submit completion report &amp; RTK Hazardous waste training report.</b></p> <p><b>4) Students are required to attend 2 webinar or virtual career seminars during the semester. Submit half page synopsis of the seminar (describe content and style).</b></p> <p><b>5) Attendance, timely arrival and participation in <u>all</u> virtual class meetings required.</b> If absent, it is the student's responsibility to makeup missed work. Students must pay attention to speaker (instructor, guest speaker, or classmate). <b><i>Do not browse the internet, play on your phone, or do other work during class.</i></b></p> <p><b>6) Assignment submission:</b> Completed assignments will be uploaded to the assignment folder in iCollege by the due date. <b><i>Assignments will only be accepted up to one day past the due date, 10% points deducted for lateness.</i></b> Some online quizzes will occur.</p> <p><b>7) Students will need access to a Laptop or Desktop computer with a WebCam and Microphone</b> to download course software (freeware), record videos of their presentations, and have internet access for attending Tuesday morning interactive virtual class meetings. All other electronics need to be turned off during class.</p> <p><b>8) Monday July 6<sup>th</sup> is last day to withdraw from the class and receive "W".</b> 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):</p> <ol style="list-style-type: none"> <li>1. Give a WF to all those students who are on their rolls but no longer taking the class</li> <li>2. Report the last day the student attended or turned in an assignment.</li> </ol>
Grading:	<p style="text-align: center;"><b><u>Total points: 200</u></b> (see grading rubric)</p> <p><b>30 points:</b> Final Chem 4160 Semester Report 2*</p> <p><b>25 points:</b> Final Oral Presentation</p> <p><b>20 points each:</b> Report 1*, Final PowerPoint 2</p> <p><b>10 points each:</b> 1<sup>st</sup> Oral Presentation, PowerPoint 1</p> <p><b>5 points each:</b> CITI &amp; RTK #1, SciFinder Database Searches #2, Semester Project Outline &amp; Abstract #3, ChemBioDraw #4, Seminar Summaries #5, NMR Spectrum #6, Resume #7, Cover Letter &amp; Job Adds #8, Personal Statement #9, Peer Evaluation of Final Presentations #10, Protein Structure #11, Poster #12, LinkedIn Profile #13, EndNote Database #14, Online Quizzes</p> <p><b>15 points:</b> Class attendance, Online participation &amp; Appointments</p> <p><i>*Final grade for Reports 1 &amp; 2 will be an average of original and revised grade.</i></p>
Grading Scale:	<p><b>A+ 97%   A 90%   A- 87%   B+ 84%   B 80%   B- 76%   C+ 71%   C 65%</b>  <b>C- 59%   D 50%   F &lt;50%</b></p>

Date	Day	Topics	Meeting
Jun 9	T	<b>Introduction to Course, Syllabus, Class Schedule</b> <b>Selection of Research Topics</b> <b>Reading Technical Papers &amp; Critically Analyzing Information</b> <b>Introduction to Literature Searching &amp; Library Services</b> <b>4160 Report Guidelines &amp; Content</b> → submit Hwk #1 – Responsible Conduct in Research Report (CITI & RTK)	1
At Home Between Class 1 – 2		<b>Video – Literature Searches using SciFinder-n</b> <b>Video – Literature Searches using Web of Science</b> <b>Video – PubChem</b> <b>Finalize Selection of Research Project Topic</b> (related to current issues) Find & submit two review papers on topic *students take Quiz 1 & 2 – SciFinder, Web of Science & PubChem Searches	
Jun 9-15	T - M	→ meet with Dr. Ray to discuss semester topic (virtual appointment)	
Jun 11	R	<b>Discuss Mechanism of Action of Molecule on System</b> <b>Discuss Report Outlines, Abstracts &amp; Integrating Components</b> <b>Appointments</b> → submit Hwk #2 – SciFinder-n Literature Search on student topic → submit <b>2 review articles</b> on semester topic, including mechanism of action → submit Quiz 1 & 2 – Database Searches	2
Between 2 – 3		<b>Video – Reaction Synthesis Searches using SciFinder-n</b> <b>Video – Outlines &amp; Abstracts</b> <b>ACS Style References</b> <b>PowerPoint Examples</b>	
Jun 12-15	R-M	→ meet with Librarian if need assistance with literature search	
Jun 16	T	<b>Drawing Synthesis &amp; Reaction Mechanisms using ChemBioDraw</b> <b>Preparing Oral Presentations, PowerPoint Slides &amp; Figures</b> → submit Hwk #3 – <b>Abstract</b> (half page) and <b>Detailed Outline</b> (1 page) on <u>entire</u> 15-page semester Research Report on: Introduction, Background on System, Molecule Synthesis, NMR & Data Analysis, Mechanism of Action) → submit Quiz 3 – SciFinder Reactions	3
Between 3 – 4		<b>Video – Designing Oral Presentations &amp; PowerPoints</b> <b>Video – Using ChemBioDraw for Synthesis &amp; Reaction Mechanisms</b> *students complete Synthesis Assignment	
Jun 18	R	<b>Discuss Synthesis, Reaction Mechanisms and ChemBioDraw</b> <b>Appointments</b> → submit Hwk #4 – ChemBioDraw (Overall Synthesis & Reaction Mechanisms)	4
Between 4 – 5		<b>Video – Writing in the Sciences and Avoiding Plagiarism</b> <b>Video – Drawing Reaction Mechanisms</b> *students complete Synthesis Assignment	
Jun 23	T	<b>Report Structure and Format: Overall project objective is to explain Mechanism of Action (how molecule interacts with and alters the system)</b> <b><sup>1</sup>H-NMR Spectra Searches, Characterization and Peak Assignments</b> → submit <b>PowerPoint 1 (8 – 10 slides)</b> on Introduction, and <b>Full Synthesis (indicate reaction types)</b> and Reaction Mechanisms <b>*due Mon 6/22</b> → submit Quiz 4 – Writing & Plagiarism → submit Hwk #5 – Seminar Synopsis 1	5

Date	Day	Topics	Meeting
Between 5 – 6		<b>Video – NMR Spectra Searches using SciFinder, Reaxys</b> <b>Video – NMR Data Interpretation</b> *students complete Report #1	
Jun 25	R	<b>Discuss NMR Assignments</b> <b>Appointments</b> → submit <b>Report 1</b> (6 – 8 pages text plus Figures & References) on <b>Introduction to <u>entire</u></b> semester project (system) with details on enzyme/process affected by drug/small molecule, molecule Synthesis (reaction types) and Reaction Mechanisms (curly arrows). <i>Focus on explanations, not just stating facts.</i>	6
Between 6 – 7		<b>Video – Writing Personal Statements</b> *students complete and record Oral Presentation #1 (using Kaltura Capture)	
Jun 30	T	<b>Careers in STEM: Job Searching Strategies, Resumes, and Cover Letters, Careers in Chemistry, Example Technical Resumes</b> → submit <b>Student Oral Presentation 1 Video &amp; PowerPoint (12–15 slides)</b> on Introduction, detailed Background to System and Molecule that affects it, Molecule Synthesis with Reaction Mechanisms (curly arrows)	7
Between 7 – 8		<b>Video – Experimental Data Analysis</b> <b>Video – ACS Careers Website</b> <b>Video – Internships and Scholarships</b> *students complete Revised Report 1	
Jul 2	R	<b>Discuss Experimental Data Analysis</b> <b>Appointments</b> → submit <b>Revised Report 1</b> (7 – 10 pages text plus <b>key figures</b> which clarify text): Introduction, <b>focus on Explanation of Synthesis (reaction types) and Reaction Mechanisms</b> , and ACS Style References → submit Hwk #6- <sup>1</sup> H-NMR Spectra of molecule (with peaks assigned & labeled)	8
Between 8 – 9		<b>Video – Making Science Posters (3’x4’ on Research Topic)</b> <b>Video – LinkedIn Training</b> Example Posters *students work on PPT 2	
Jul 6	M	<b>Last day to Withdraw and possibly receive a W</b>	
Jul 7	T	<b>Mechanism of Action (how molecule interacts &amp; affects system)</b> <b>Introduce PDB to visualize Protein Structure on Research Topic, and create Protein Structure Figure that helps explain Topic</b> <b>Poster Content and Style</b> → submit Hwk #7 – Technical Resume → submit Hwk #8 – Cover Letter (reply to a specific job ad) and 3 Job Advertisements for related positions, with different educational qualifications (BS, MS, PhD or Professional Degree) → submit Hwk #9 – Personal Statement → submit Hwk #10 – Peer Evaluations of Student Presentations → submit LinkedIn Video Completion Report	9
Between 9 – 10		<b>Video – EndNote Reference Data Management</b> <b>Video – Protein Data Bank (PDB) and 3D Protein Structures</b> <b>Video – PDB Searches</b> *students complete PPT 2	

Date	Day	Topics	Meeting
Jul 9	R	<b>Appointments</b> → submit <b>PPT 2 (20 – 24 slides)</b> on entire semester project: All revised slides from PPT 1 plus <sup>1</sup> H-NMR Analysis, Experimental Data Analysis, <b>focus on Mechanism of Action (how molecule binds to and alters system)</b> → submit Hwk #11 – PDB Structure article	10
Between 10 – 11		*students complete Poster and work on Report 2	
Jul 14	T	<b>Propose New Research Direction</b> <b>PDB 3-D Structure Searches for semester project</b> <b>Creating Protein Structure Figure on Research Topic</b> → submit <b>Poster (3' x 4' format)</b> on Entire semester project, with Background, Synthesis, and focus on Mechanism of Action (how molecule affects system) – Hwk #12 → submit Hwk #5 – Seminar Synopsis 2	11
Between 11 - 12		*students complete Report 2	
Jul 16	R	<b>Appointments</b> → submit <b>Final Report 2</b> (11 – 15 pages text, plus Figures & References) on Introduction, Synthesis/Mechanism, <sup>1</sup> H-NMR Spectra Analysis, Experimental Data Analysis, Protein Structure Analysis, with focus on <b>Mechanism of Action: detailed explanation of how drug or molecule binds to and perturbs the system</b> , and propose new research direction	12
Between 12 - 13		*students complete final oral presentation video and LinkedIn Profile	
Jul 21	T	<b>Course Wrap Up</b> <b>Appointments</b> → submit <b>Final Oral Presentation 2 Video and Final Semester PowerPoint (24-28 slides)</b> on entire semester project, including protein structure analysis	13
Between 13 - 14		*students complete revised career assignments, LinkedIn Profile and Revised Report #2	
Jul 23	R	<b>Appointments</b> → submit Hwk#13 - LinkedIn Profile → submit Hwk#14 – EndNote Database library → submit Hwk#7 - Revised Technical Resume → submit Hwk#9 - Revised Personal Statement	14
Jul 27	M	→ submit <b>Revised Final 4160 Report (electronic copy in iCollege/Turnitin), in lieu of Final Exam</b>	
Jul 28	T	→ submit Peer Evaluations of Final Student Presentations <b>*last day to submit all course materials by 5pm</b>	

Color Key in Schedule:

Blue = Class Meetings (WebEx)

Black = Research Activities Online

Red = Research Reports, Oral Presentations, PowerPoints, Poster

Green = Virtual Appointments

NAME: _____		Date: _____
<b>GRADING RUBRIC</b>		<b>CHEMISTRY 4160 (Chem Lab IVA-CTW)</b>
<b>Summer 2020 (CRN 55792) Dr. Ray</b>		<b>Tuesdays 9:00 - 11:00am and Online</b>
<b>Assignment</b>	<b>Points</b>	
Report 1 *	<b>20</b>	
Final 4160 Report 2 *	<b>30</b>	
<i>* Reports 1 &amp; 2 = average of original &amp; revised</i>		
PowerPoint 1 slides	<b>10</b>	
Final PPT 2 slides	<b>20</b>	
Oral Presentation 1	<b>10</b>	
Final Oral Presentation 2	<b>25</b>	
Poster HWK #12	<b>5</b>	
RCR Report CITI - HWK #1	<b>5</b>	
SciFinder Search HWK #2	<b>5</b>	
Abstract & Outline HWK #3	<b>5</b>	
Synthesis - ChemBioDraw HWK #4	<b>5</b>	
NMR Spectra HWK #6	<b>5</b>	
EndNote Reference Databse HWK #14	<b>5</b>	
Peer Evaluations of Presentations HWK #10	<b>5</b>	
PDB Structure Article & Figure HWK #11	<b>2</b>	
Seminar Synopsis HWK #5	<b>5</b>	
Online Quizzes	<b>5</b>	
Careers:		
Technical Resume HWK #7	<b>5</b>	
Cover Letter & Job Ads - HWK #8	<b>5</b>	
Personal Statement HWK #9	<b>5</b>	
LinkedIn Profile HWK #13	<b>5</b>	
Class Participation / Attendance	<b>7</b>	
9-Jun		
16-Jun		
23-Jun		
30-Jun		
7-Jul		
14-Jul		
21-Jul		
Online Participation	<b>6</b>	
Appointments	<b>2</b>	
<b>TOTAL SEMESTER POINTS</b>	<b>202</b>	

Name \_\_\_\_\_ Topic \_\_\_\_\_

PRESENTER	Well Done	Needs Improvement
Speaks clearly, paced, and can be heard from the back of the class.		
Connect with audience via eye-contact, good posture, confident, enthusiastic, and focused.		
<b>POWERPOINT SLIDES</b>		
<b>Text</b> , Fonts, Headings visible, colors		
<b>Text Animation</b> -used appropriately. Slide transitions used.		
<b>Graphics/Photos</b> -clear, cited, used to illustrate a point(s) on the slide and talk.		
<b>Chemical Structures/Equations</b> - correctly written with correct naming where appropriate.		
<b>FLOW OF PRESENTATION</b>		
Well organized, smooth transition, correct grammar.		
Emphasizes main points of focus without unnecessary detail. Stays on track on the topic theme.		
<b>KNOWLEDGE OF SUBJECT/ LIBRARY RESOURCES</b>		
Knowledge of subject- strongly understands the information, does not need to read from slides.		
<b>Awareness</b> -of literature with the topic.		
<b>Citations</b> -Tables, charts, drawings, quotes are cited and correctly.		
<b>QUESTION RESPONSE</b>		
Presentation generates questions.		
Answers questions well in a clear, concise way.		

Comments: