

**Senior Research (CHEMISTRY LABORATORY IVA-CTW)**

Dr. Ray

**Chemistry 4160 (CRN 52889)****Summer 2016**

Prerequisites:	Chem 4000 and Chem 4600 with grades of C or higher, or equivalent
Instructor:	<b>Dr. Gigi B. Ray, 212 Courtland North, Tel. (404) 413-5540, <a href="mailto:gbray@gsu.edu">gbray@gsu.edu</a></b> <b>Jackie Werner, Library South 5, Suite 542, Tel. (404) 413-2869, <a href="mailto:jwerner3@gsu.edu">jwerner3@gsu.edu</a></b>
Class:	<b>Tuesdays and Thursdays 9:00 am – 11:45 am, 311 Petit Science Center (3-credit hr)</b> <b>Also meet individually with instructor weekly to discuss writing/presentations, mostly on Tuesday/Thursday afternoons.</b>
Office Hours:	<b>Tuesdays and Thursdays 1:00 – 3:00 pm in 212 Courtland North</b>
Course Objectives:	<b><i>Independent research on special topic related to chemistry. Capstone project that integrates different aspects of chemistry (biological, organic, physical, analytical).</i></b> Become proficient in the use of: SciFinder Scholar, Web of Science, Medline (Pub Med), ChemBioDraw Ultra, Accelrys Visualizer, PDB (Protein Data Bank), and EndNote. Develop oral presentation skills. Develop critical thinking & writing skills - rewriting and improving reports. Molecular Modeling project using Accelrys Visualizer for protein structure analysis. Careers: resumes, cover letters, and explore jobs & internships.
Grading:	<b><i>Total points: 200 (see grading rubric)</i></b> <b>25 points each:</b> Final Semester Report, Final Oral Presentation, Molecular Modeling Report <b>15 points:</b> Resume (8pts), Cover Letter (4pts), Job Adds (3pts) <b>15 points each:</b> Class attendance/participation, Responsible Conduct in Research #4 <b>10 points each:</b> Report #1, Report #2, 1 <sup>st</sup> Oral Presentation, Final PPT #4 <b>5 points each:</b> Web of Science assignment #1, Semester Outline/Articles/Research Topic assignment #2, SciFinder Scholar #3, ChemBioUltra Draw #5, NMR Spectra #6, EndNote reference list #7, PPT #1, PPT #2, PPT #3
Grading Scale:	<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>

**TENTATIVE CLASS SCHEDULE (Subject to change)**

Date	Day	Topics	Meeting
Jun 7	T	Introduction to Course <b>Searching Scientific Literature - SciFinder Scholar &amp; Web of Science</b> Select Chemistry Research Project Topic (related to current issues)	1
Jun 7-9	T- R	→ meet with Dr. Ray to finalize semester topic (outside class appointment)	
Jun 9	R	<b>Searching Structure &amp; Reaction Information - SciFinder Scholar</b> <b>Discuss Good Writing Skills and How to Avoid Plagiarism</b> → submit Web of Science assignment #1 and Research Topic assignment #2	2
Jun 9-13	R-M	→ meet with Librarian about literature search (outside class appointment)	

Jun 14	T	<b>Drawing Structures &amp; Reaction Mechanisms - ChemBioDraw Ultra</b> → submit 1page detailed <b>Outline</b> of entire semester's Research Project → submit 6 – 8 <b>PowerPoint slides #1</b> (topic Introduction and Scientists) → submit printouts of 1 review article & 1 research article on semester topic → submit SciFinder assignment #3	3
Jun 16	R	<b>Searching for NMR/IR Spectra</b> <b>Discuss Writing in the Sciences</b> → submit <b>Report #1</b> (Introduction to <i>entire</i> semester's Topic; 3 - 4 pages) → submit <b>Responsible Conduct of Research Report (#4)</b> by this date	4
Jun 21	T	<b>Reference and Database Management (Introduction to EndNote)</b> → submit 10 – 12 <b>PowerPoint slides #2</b> (including Synthesis / Mechanism, and revised Introduction slides) → submit ChemBioDraw Ultra Drawing assignment #5 (detailed Synthesis and Mechanism relating to your research topic)	5
Jun 23	R	<b>1<sup>st</sup> Oral Presentations using PowerPoint (20 min each, 6 students)</b> → submit <b>Report #1 Revisions (with Figs &amp; Refs)</b> → submit NMR Spectra assignment #6 (with peaks assigned & labeled)	7
Jun 28	T	<b>1<sup>st</sup> Oral Presentations using PowerPoint (20 min each, 6 students)</b> → submit 14 – 16 <b>PowerPoint slides #3</b> (including Introduction, Revised Synthesis/Mechanism, and NMR Spectra analysis slides)	8
Jun 30	R	<b>Accelrys Visualizer Molecular Modeling Activity #1 – Tripeptide</b> → submit <b>Report #2</b> (including revised Introduction, and Synthesis / Reaction Mechanism, and NMR Spectra analysis, with References formatted in ACS style using EndNote; 6 – 8 pages plus Figures that clarify text)	9
<b>Jul 1</b>	<b>F</b>	<b>Last day to Withdraw and possibly receive a W</b>	
Jul 5	T	<b>Accelrys Visualizer Modeling Activity #2 – Protein Active Sites</b> Review Endnote usage/formatting, address Oral Presentation questions → submit Molecular Modeling Preliminary Exercises (#7) → submit final, properly formatted EndNote Reference List for entire semester	10
Jul 7	R	<b>Accelrys Visualizer Modeling Activity #3 – Protein Identification and Structure/Function Analysis</b> → submit 18 – 22 <b>Final PowerPoint slides #4</b> (including all revised slides, plus how the drug or system works)	11
Jul 12	T	<b>Accelrys Visualizer Activity #4 – Introduction to Protein Data Bank</b> → submit <b>Final Report #3</b> (including Introduction, Revised Synthesis / Mechanism, NMR Spectra & Protein Structure analysis, and how the drug or systems works (8–12 pages text, plus Figures & References)	12
Jul 14	R	<b>Careers in Chemistry: Resumes, Cover Letters, and Internships</b> → submit completed Molecular Modeling Project Report & Computer Files	12
Jul 19	T	<b>Final (2<sup>nd</sup>) Student Oral Presentations (30 min each, 6 students)</b> Semester Wrap Up	13
Jul 21	R	<b>Final (2<sup>nd</sup>) Student Oral Presentations (30 min each, 6 students)</b> → submit by <b>FRI 7/22/16 at 12 noon</b> : 3 job adds for related positions, with different educational qualifications (BS, MS, PhD or Professional Degree) → submit <b>Cover Letter</b> for one specific internship or job application → submit <b>Technical Resume</b> –hardcopy printout	14
Jul 25	M	→ submit <b>Revised Final 4160 Report (hardcopy printout and electronic copy), in lieu of Final Exam, by 1pm</b> → submit final Resume and Cover Letter Revisions	