Chem 790.1  
Laboratory Techniques for Analytical/Inorganic/Physical Chemistry  
Queens College and the Graduate Center of CUNY, Spring 2020

**Instructors**  
Dr. Jianbo Liu (Lecture)  
jianbo.liu@qc.cuny.edu (718) 997-3271  
http://chem.qc.cuny.edu/~jliu/Liu_page/Liu_main.htm  
Office Hours: Wednesday 5:30 pm - 6:30 pm or by appointment, NSB B312

Dr. Ed Look (Lab)  
edward.Look@qc.cuny.edu (718)997-4186

**Lectures**  
Monday  9:25 am – 11:15 am  REM 205

**Labs**  
Monday  1:40 pm – 5:30 pm  REM 354

**Textbook**  
3) PowerPoint slides are available at  
http://chem.qc.cuny.edu/~jliu/Liu_page/teaching.htm

**Grading**  
1) Lab reports – 40 %  
2) Project design based on literature review and original research idea  
   Written report – 30%  
   Oral defense – 10%  
3) Homework – 20%

**Others**  
Attendance: It is your responsibility to attend and to be punctual. *Do not come late.*  
Every unexcused absence will result in a 5% grade penalty. To avoid the penalty, you must obtain the instructor's permission. No make up for missed laboratory/lecture.

Plagiarism: Any student caught plagiarizing a report from any source will receive a zero on the assignment in question and a warning. The second time that a student is caught will result in the automatic failure of the course.
<table>
<thead>
<tr>
<th>Date</th>
<th>Meeting</th>
<th>Lecture Topics</th>
<th>Assignments Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 27</td>
<td>1</td>
<td>Topic 1 (Chapters 1-5): Instrumentation basics: Signals, noises, and DAQ</td>
<td></td>
</tr>
<tr>
<td>Feb 3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 10</td>
<td>3</td>
<td>Topic 2 (Chapter 6-7): Optical instruments and techniques</td>
<td>Report topics for project design</td>
</tr>
<tr>
<td>Feb 24</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar 2</td>
<td>5</td>
<td>Topic 3 (Chapters 13-18): Molecular Spectroscopy: Electronic and vibrational</td>
<td>Homework 1</td>
</tr>
<tr>
<td>Mar 9</td>
<td>6</td>
<td>spectroscopy</td>
<td></td>
</tr>
<tr>
<td>Mar 16</td>
<td>7</td>
<td>Topic 4 (Chapters 11&amp;20): Mass spectrometry: Principles, techniques and</td>
<td>Outline for project report</td>
</tr>
<tr>
<td>Mar 23</td>
<td>8</td>
<td>applications</td>
<td></td>
</tr>
<tr>
<td>Mar 30</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr 6</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr 20</td>
<td>11</td>
<td>Topic 5 (Chapters 26-28): Chromatographic separation techniques</td>
<td>Project report (first version)</td>
</tr>
<tr>
<td>Apr 27</td>
<td>12</td>
<td></td>
<td>Homework 1</td>
</tr>
<tr>
<td>May 4</td>
<td>13</td>
<td>Topic 6 Project presentation</td>
<td>Revised project report (R1)</td>
</tr>
<tr>
<td>May 11</td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Project Design

Written Report for Project Design (30% of course grade)

NSF proposal style, single-line spaced, 1-inch margin, font size #11 Times New Roman or Arial

Include in the project design a brief introduction describing the field in general and the significance of the science proposed. However, include only the details which are relevant to your proposed research. Avoid paraphrasing articles. Do not copy or plagiarize the articles. Assessment of the work is based on your original research idea. The report will be reviewed and sent back for revisions!

Project Summary (1 page) including

Section 1 Overview
Section 2 Intellectual Merits
Section 3 Broader Impacts

Project Description (10 - 15 pages, with figure and table embedded in the text) including

Section 1 Intellectual Merit
   Introduction and Significance
   Experimental facilities and methodologies
   Proposed experiments (and computation)
Section 2 Broader Impacts
   Development of novel instrumental techniques
   Enhance understanding of XYZ
Section 3 Summary
   The priorities of a variety of experimental (and computational) work is proposed.
   Project Timeline
   Concluding sentences

References Cited (no page limitation)

Citations of journal paper, book and software


Oral defense (10% of course grade)

Each student will deliver an oral presentation based on the revised project design. The presentation should be 45 minutes in length, including 5 – 10 minutes of Q&A. The oral presentation should include an introduction of the relevant background information, a summary of techniques and methods, detailed project design and expected outcomes, and conclusions. Presentation should be prepared using Power Point slides. A paper copy of the slides should be provided to each student and the instructor before the start of the presentation. Be prepared to answer questions on your proposal.