

The format for this course is similar to that used in Intermediate Laboratory. You are expected to work on this course every Tuesday and Thursday afternoon 1:30-4:30 PM. Depending on circumstances, your work may be conducted in any one of several rooms (e. g., Vacuum Lab, Wet-Chemistry Lab, Library, etc.).

**You must be present for every scheduled laboratory period. Please be on time.**

Each student is expected to complete five laboratory experiments from the list of possible experiments. You are to work in groups of two and will be given five laboratory periods to complete each experiment. Everyone will start a new experiment on the same day. For four of the experiments you are required to individually write (and turn in) a formal research paper describing the basic phenomenon which you investigated, the experimental procedure, and the key results that were obtained. Typically, these reports will constitute 3-5, double-spaced pages. A graph (or other appropriate summary) of your data must be included as well as references to the key literature sources. Lab reports are due on the dates shown in the table below. In-lieu of a 5<sup>th</sup> report you will be asked to make an oral presentation of your work. We will devote the last lab class to mini conference in which each student makes a 15 minute oral presentation on his or her work. Lastly, you are required to rewrite a final research paper, (most likely a rewrite of one of the earlier papers) that is due at the end of the exam period.

### **Learning Goals**

- 1) Develop and exhibit good skills in the following areas:
- 2) Safe laboratory procedures
- 3) Experimental planning
- 4) Experimental technique
- 5) Data analysis
- 6) Technical writing and presentation of experimental results
- 7) Library research
- 8) Laboratory documentation (notebook)

### **Course Requirements**

- 1) Attend all classes
- 2) Complete five experiments
- 3) Maintain a bound lab notebook throughout the semester
- 4) Write four "research like" papers
- 5) Make one oral presentation
- 6) (Re)Write one final paper

### **Class Format**

**You will not be given detailed instructions for conducting any of the experiments.** Instead, you will be directed to some equipment, given a brief information sheet about the experiment, along with the appropriate manuals for the apparatus. From there, you are expected to familiarize yourself with the equipment, decide on a plan of action, and devise a suitable procedure for achieving your goals. After discussing this procedure with the instructor, you are then to conduct the experiment and analyze your data.

**Each student must keep a, laboratory notebook that is to serve as a daily journal for this course.** All data, comments, diagrams, graphs, etc. should be kept in this laboratory notebook. Your notebook must have consecutively numbered pages so that it is not possible to add or delete a page and it should be large enough to tape graphs, diagrams etc. **As a rule you should never erase anything from your notebook.** I will check your notebooks from time to time throughout the semester

**Grading**

As far as possible your final grade should reflect how well you performed in the categories listed above. You will receive a grade for each experiment, that reflects the quality of your lab report/oral presentation and the quality of your lab work. In many cases, it is difficult to evaluate lab performance independent of the presentation of the report.

Laboratory Work	25 %
Laboratory Reports	40 %
Oral presentation	10 %
Final paper	25 %

**Course Schedule**

<b>Week</b>	<b>Tuesday</b>	<b>Notes</b>	<b>Thursday</b>	<b>Notes</b>
<b>1</b>	Feb 6		Feb 8	
<b>2</b>	Feb 13		Feb 15	
<b>3</b>	Feb 20	End Lab 1	Feb 22	
<b>4</b>	Feb 27	<b>Draft 1 due</b>	Mar 1	
<b>5</b>	Mar 6	<b>Report 1 due</b>	Mar 8	End Lab 2
<b>6</b>	Mar 13		Mar 15	<b>Report 2 due</b>
<b>Spring recess</b>				
<b>7</b>	Mar 27		Mar 29	
<b>8</b>	Apr 3	End Lab 3	Apr 5	
<b>9</b>	Apr 10	<b>Report 3 due</b>	Apr 12	
<b>10</b>	Apr 17		Apr 19	End Lab 4
<b>11</b>	Apr 24		Apr 26	<b>Report 4 Due</b>
<b>12</b>	May 1		May 3	
<b>13</b>	May 8		May 10	Oral presentation

**Final Paper due Noon on Saturday May 14<sup>th</sup>**