Syllabus


II. Other Required Materials: Scientific (not necessarily graphing) calculator, bound laboratory notebook, USB flash drive

III. Schedule: *Schedule is subject to change as semester progresses.*

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2/2</td>
<td>Introduction-Check-in; Safety Lecture; group assignment; SOPs and Lab Reports, group assignments</td>
<td>Lab 1</td>
<td>Lab 2</td>
<td>Lab 4</td>
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<tr>
<td>2-5</td>
<td>2/9-3/2</td>
<td>Lab 1</td>
<td>Lab 2</td>
<td>2-4</td>
<td>2/9-2/23</td>
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<td>3/2</td>
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<td>6</td>
<td>3/9</td>
<td>Lab 2</td>
<td>Lab 3</td>
<td>Lab 6</td>
<td>Lab 5</td>
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<tr>
<td>7</td>
<td>3/16</td>
<td>Lab 3</td>
<td>Lab 4</td>
<td>Lab 6</td>
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<td>8-10</td>
<td>3/23-4/13</td>
<td>Lab 4</td>
<td>Lab 6</td>
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<tr>
<td>11</td>
<td>4/20</td>
<td>Lab 5</td>
<td>Lab 1</td>
<td>Lab 2</td>
<td>Lab 3</td>
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<tr>
<td>12</td>
<td>4/27</td>
<td>Lab 6</td>
<td>Lab 5</td>
<td>Lab 3</td>
<td>Lab 1</td>
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<td>13</td>
<td>5/4</td>
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<tr>
<td>14</td>
<td>5/11</td>
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</tbody>
</table>

**REQUIRED ATTENDANCE:** Final papers due, Checkout; Cleanup- all groups

Experiment List

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Programming a NXT LEGO Mindstorms Robot with LabVIEW</td>
</tr>
<tr>
<td>2</td>
<td>Building a Digital Thermometer Using a DAQ in LabVIEW</td>
</tr>
<tr>
<td>3</td>
<td>UV-Vis Determination of Vanillin in Natural and Synthetic Vanillia Extracts</td>
</tr>
<tr>
<td>4</td>
<td>IR Spectroscopy: Determination of Xylenes Using an Internal Standard</td>
</tr>
<tr>
<td>5</td>
<td>Fluorescence Determination of Quinine in Tonic Water</td>
</tr>
<tr>
<td>6</td>
<td>Identification of Some Constituents Using HPLC</td>
</tr>
</tbody>
</table>
IV. Attendance: Both laboratory and lecture (recitation) sessions are required. Excessive absences in either will adversely affect your grade. Class participation will positively affect your grade. The last meeting is mandatory.

V. Suggested Reference Sources:

Harris *Quantitative Chemical Analysis, seventh (or any) ed.* W. H. Freeman and Company New York 2001 (On reserve in Rosenthal Library)


Atkins, de Paula *Physical Chemistry, ninth ed. (or any)* W. H. Freeman and Company New York 2002 (On reserve in Rosenthal Library)

Bishop *Learning with LabVIEW 8* Prentice-Hall New York 2006 (On reserve in Rosenthal Library)

VI. Safety: Goggles (issued by Department), long pants or skirts, closed toe shoes, and long hair tied back are required. Eating, drinking, gum chewing, horseplay, stunt experiments, and contact lenses are not allowed; wear glasses to lab if needed. Safety shower, eyewash, and fire extinguisher locations must be noted. Points will be deducted for unsafe practices and you may be ejected from lab and receive a zero (0) for that experiment. Chemical waste handling protocols must be observed; if in doubt ask!

VII. Grading

A. All Reports and SOPs- are due on the dates listed in the lab schedule. Each is graded for completeness and succinctness of content, clarity and effectiveness of presentation, and proper formatting on the basis of 100 points. Be aware that the SOP schedules differ for different groups.

B. SOPs- There are two; the LabVIEW SOPs are weighted to be 17% of grade total and the other is weighted to be 13%, together, 30%.

C. Reports- There are four, and together are weighted to be 30% of grade.

D. Literature Presentation- There is one, oral, based on a ten-page review of an article from an analytical chemistry journal, and weighted to be 40% of grade.

E. Safety- Violations of safety rules will result in points deducted from course total at my discretion.

F. Course Grade- *Chem 79001*- The course grade will be based on 60% from your written laboratory submissions, 40% from your article review and presentation, less any deductions. *Chem 341.1*- The laboratory grade will be 30% of your course grade. It is comprised of the LabVIEW SOP for 25%, the other SOP for 20%, four reports together for 40%, and a subjective laboratory performance score for 15%. This will be forwarded to the lecture instructor, who will assign your total course grade.
VIII. Format of Submissions and Presentations

A. Reports

1. Format- Reports must be written in the style of a scientific journal article. Refer to ACS or APS style guides, or to examples in papers published in chemistry or physics journals.

   a. Heading- title, author(s: your name, name of people in your group), department and college

   b. Introduction- Explain what the various approaches that can be taken to perform the experiment and any theoretical and background information. The last paragraph should describe the procedure and objective.

   c. Experimental section- describe what you did– you may insert figures, graphs, references, tables, if this will better elucidate your text.

   d. Results- include data here. While the original data is to be recorded in your lab notebook, they must be reproduced in this section of the paper.

      i. Calculations- do include figures (graphs, charts, diagrams) and tables.

      ii. Error Analysis- discuss your calculations, accuracy, including error analysis. Error analysis should be included for all calculations.

   e. Discussion- What do your results mean? (This is where you make your scientific conclusions.)

   f. Conclusions or Summary- This is more than just a simple synopsis. What is noteworthy or can be learned from the work?

   g. References- Reference citations are to be listed in this section, with the annotation superscripts in appropriate places throughout the paper. Do NOT use Internet sources for your citations. Use actual scientific literature, as peer-reviewed journals, textbooks, etc. (Of course, you may use the Internet to locate, for example, a journal article or book.)

2. Submission of Reports- Hard copies of assignments must be submitted for credit and are due the next lab meeting, unless otherwise scheduled or notified. Do not submit your papers late; late papers are not acceptable. Electronic copies are not acceptable for credit.

B. Standard Operating Procedures (SOP)

1. Heading- Name, model and manufacturer (or vendor) of the instrument, author(s), date, location (dept. & college).

2. Theory- Give just enough of the theoretical principles of the instrument necessary for proper operation of the instrument. Include figures, etc., if necessary.

3. Procedure- List the correct procedure(s) involved in the proper operation of the instrument, and any variations for different cases, if necessary. Again, also include figures, etc., if necessary.
VIII. B. 4. References- When relevant and appropriate, list your citations or notes in this section.

C. Oral Presentation-

1. Source- The presentation to the class will be based on a paper in a topic from analytical chemistry, chosen from a peer-reviewed scientific journal. Begin searching for a paper for presentation around the 1st week of class; papers must be subject to my approval and therefore must be shown to me by the 4th week. (You should not wait until the last minute to start your preparations.)

2. Structure- It will be a maximum of fifteen (15) total minutes: ten (10) for the talk, and up to five (5) for a question and answer period.

IX. Work in the Laboratory

A. Computers - There are Departmental computers in the laboratory for use with the experiments and related work. They are not for personal recreational use. If a logon is required, please log off when finished for the day.

B. Safety- observe all safety requirments and exercise caution; see Sec. VI and VII above.

C. Equipment Usage- You will likely be assigned to work with other students in small groups or teams on the same experiment or equipment. However, your submissions to me are to be solely your own. (See Section VIII. D. below.) You must leave the equipment and work areas at the end of the lab period clean and neat; again observe safety protocols. Put away all glassware, other equipment and chemicals after use.

D. Code of Conduct

1. Plagiarism- Plagiarism or any other form of cheating is not tolerated. The student perpetrating such an act will receive a zero (0) for the assignment in question and a warning, along with other possible penalties, for a first offense. A second offense by the student will result in automatic failure of the course (F) and referral to the Chairman and/or the Dean. A failure to properly cite any sources, including figures, charts, tables, and artwork, in a submission or work is also considered plagiarism.

2. Laboratory Conduct- No horseplay. No offensive language. No other activities in the laboratory or classroom that are not relevant to the coursework. Return all items used to proper places, keep equipment and work areas clean and neat. Strictly observe all safety protocols.

X. Communication: Preferred off-hours contact is via the discussion group for our course on BlackBoard, and secondarily via e-mail only for messages that don’t belong on BlackBoard. Do ask questions, discuss course topics, and answer each other’s questions there, too! (Of course, I will check the answers.) Course materials, such as manual of experiments, this syllabus, and other, ancilliary materials will be posted on Blackboard.