CHEM 443 Physical Chemistry Lab

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Text: There is a lab manual available in the bookstore for this course, and you should have a copy of the CHEM 441 textbook available. A lab notebook is required.

General Information

The experiments in CHEM 443 draw on the same body of knowledge covered in the CHEM 441 lecture, although the experiments are not precisely synchronized with the lecture course. It cannot be stressed enough that you MUST carefully study the theory and experimental procedures before carrying out the experiment in the lab. Some of the experiments are not experiments in the strict sense of the word but are tutorial guides in areas that are important to a physical chemist. It is sincerely hoped that the course will be both educational and fun.

1) The aims of this course are:

- To equip you with practical skills used in experimental physical chemistry
- To develop your scientific judgment and your ability to innovate and think critically
- To encourage you to assess methods and procedures in a constructive and critical manner
- To improve your skills of research and communication by teaching you how to fully document a scientific experiment and to present the information in a competent and professional laboratory report

2) A word about safety:

You have a legal obligation to work safely in the laboratory, to insure that you do not expose yourself or your co-workers to hazard. You will be instructed as to the safe handling of all chemicals and equipment used in the experiments and are encouraged to ask questions if you are unsure about procedures. Safety goggles are required at all times in the lab.

3) Grades:

The final grades will be calculated on a normal grade scale (93%=A, 90% =A-, 87%=B+, 83%=B, 80%=B-, 77%=C+, 70%=C, 60%=D). There are a total of eight lab reports due that are worth 100 points each. All lab reports will be due one week after the day of the experiment. The dates are given below with the schedule. All labs must also be turned in by the Friday before finals week to receive any credit. (There will be no final in the class.) There will be a penalty of 5 points per day (weekends and holidays, including the week of spring break, do not count) for reports turned in after the due date. Copies of lab notebook pages for each lab should be turned in with each lab.
4) **Schedule:**
The course consists of eight experiments, divided into two sets. Each section will be divided into four groups (1-4 in table). The rotation for carrying out the experiments for each group is as follows. Note that the TA assignments are nominal, and there will be team teaching for some labs.

<table>
<thead>
<tr>
<th>SET 1</th>
<th>2/13</th>
<th>2/20</th>
<th>2/27</th>
<th>3/6</th>
<th>TA</th>
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<tbody>
<tr>
<td>iodine clock</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>JM</td>
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<tr>
<td>dye-bleach kinetics</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>JM</td>
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<tr>
<td>Aggregation number of SDS</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>SC</td>
</tr>
<tr>
<td>CO₂ solubility</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>SET 2</th>
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<th>4/3</th>
<th>4/10</th>
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<tbody>
<tr>
<td>FTIR spectra of HCl</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>SC</td>
</tr>
<tr>
<td>Charge – transfer spectroscopy</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>SC</td>
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<tr>
<td>Powder X-ray spectroscopy</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>JM</td>
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<tr>
<td>Quantum chemistry with Spartan</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>JM</td>
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</table>

**Prelab Preparation**
You should be familiar with the theory behind an experiment before you attempt the experiment. In many cases, there is a lab handout you should have read and understood. In addition, the class will meet on February 8 for lab check-in and a lecture on the upcoming experiments. This should take two hours or less. Following are recommended section of the 441 text for some of the labs:

- **Aggregation number of SDS** Atkins section 17C2a on micelles
- **FTIR spectra of HCl** Atkins section 12D
- **Charge – Transfer Spectroscopy** Atkins section 13A2a
- **Powder X-ray Spectroscopy** Atkins section 18A1,2,3
- **Spartan** If you have not done the lab involving Spartan from CHEM 442, see me to get prepared.
**Academic Integrity**: Good academic work must be based on honesty. The attempt of any student to present as his or her own work that which he or she has not produced is regarded by the faculty and administration as a serious offense. Students are considered to have cheated if they copy the work of another during an examination or turn in a paper or an assignment written, in whole or in part, by someone else. Students are responsible for plagiarism, intentional or not, if they copy material from books, magazines, or other sources without identifying and acknowledging those sources or if they paraphrase ideas from such sources without acknowledging them. Students responsible for, or assisting others in, either cheating or plagiarism on an assignment, quiz, or examination may receive a grade of F for the course involved and may be suspended or dismissed from the university. (Note that working together on homework is not considered plagiarism in this class; copying another's homework is.)

**Accessibility Statement**: Northern Illinois University is committed to providing an accessible educational environment in collaboration with the Disability Resource Center (DRC). Any student requiring an academic accommodation due to a disability should let his or her faculty member know as soon as possible. Students who need academic accommodations based on the impact of a disability will be encouraged to contact the DRC if they have not done so already. The DRC is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu

**Preferred Gender Pronoun Statement**: This course affirms people of all gender expressions and gender identities. If you prefer to be called a different name than what is on the class roster, please let me know. Please also inform me and feel free to correct me and your classmates on your preferred gender pronouns. If you have any questions or concerns, please do not hesitate to speak with me in person, or email me. The Gender and Sexuality Resource Center also has a webpage designed to help support people of all genders as they navigate NIU’s system: http://niu.edu/gsrc/audience/trans.shtml

**Multilingual Student Statement**: I am committed to making course content accessible to all students. If English is not your first language and this causes you concern about the course, please speak with me.

**Student Sexual Misconduct Policy**: Title IX prohibits sex discrimination to include sexual misconduct: harassment, domestic and dating violence, sexual assault, and stalking. If you or someone you know has been harassed or assaulted, you can receive confidential support and advocacy at the Counseling & Consultation Service’s Advocacy Services, which can be contacted on at 815-753-1206, or in Campus Life Building-room 200. Alleged violations can be reported non-confidentially to the Affirmative Action & Equity Compliance Office in Lowden Hall-room 101, at 815-753-1118, or online at http://www.niu.edu/sexualmisconduct/help/form.shtml. Reports to law enforcement can be made to NIU Police & Public Safety at 815-753-1212. For an emergency, call 911. For more information about Sexual Misconduct Prevention & Resources, visit http://niu.edu/sexualmisconduct/index.shtml

Note: As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as an instructor and a faculty advisor to a student organization. I am required to share information regarding sexual misconduct or information about a crime that may have occurred on NIU’s campus with the University. Students may speak to someone confidentially by contacting Counseling & Consultation Service’s Advocacy Services at 815-753-1206, or in Campus Life Building-room 200.