Welcome to CHEMISTRY 4472a - academic year "ADVANCED ANALYTICAL CHEMISTRY"

~ COURSE OUTLINE ~

Notice from the Registrar: Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites (chemistry 3372B or the former chemistry 362B, 322).

Description: This course encompasses selected topics at the advanced level of analytical sciences. They include computer titrations, electroanalytical chemistry, simulations for electrochemistry and chromatography, and analytical instrumentation and its applications to research.

Instructor: ***contact information***
Secretary: Clara Fernando - In the Main Office - ChB 119 (x 86342)

Lectures: schedule

IMPORTANT DATES	
First Lecture in the Fall semester	date and place
Last Fall Lecture -	date
Chem 4472a final exam-presentation	Before date to be announced (TBA)

In-class labs: There are plenty in-class labs with softwares LabVIEW, Femlab and Excel. Theses will be done in SH 1310.
(Please be prompt for all labs).

Office hours: time and place.

Chem 4472 web: WebCT/OWL. Go to http://webct.uwo.ca/ and log in using your UWO user name and password.
Check this website on a regular basis for updates and important information on the lectures, labs, tutorials.

Required materials: Edited study materials. Several reference textbooks might be reserved in Taylor Library. Please get a USB key for file storage.

Accessibility: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Course evaluation: There will be two in-class midterm exams (see below for dates). The midterm exams will be

weighted 20 % each. There will be 6 assignments, each of which is 5 % worth. The final will be a presentation (15 minutes, see the detail in the specific section of this outline), which is weighted 30 %.

Tests and exam schedule		
In-Class Midterm (Open Book) Materials: computer titrations	(20%)	–time and place make sure you check here: .....
In-Class Midterm (Closed Book) Materials: Electrochemistry	(20%)	time and place0 - make sure you check here: .....
Final Exam (project presentation)	(30%)	

★★ THERE ARE NO MAKE-UPS FOR LABS, OR MIDTERM EXAMS ★★

- Exams are short answer questions.

Illness and missed labs, midterm, or final project presentation:

- Failure to complete or write a homework, a midterm, or the final, will result in a mark of zero for the missed item, and potential failure in the course, unless a valid medical or compassionate reason has been approved and an exemption has been granted. The Policy of accommodation for Medical Illness can be found at https://studentservices.uwo.ca/secure/index.cfm
- For further policy information please visit http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf

  (notice the underscore in accomodation_medical.pdf in the above web address).
- If you miss an item for a valid reason, present documentation to an academic counselor in your Dean's office. If your documentation is approved, the grade for that component will be re-weighed such that your mark will be based on the other items. **There are no make-ups.**
- The lectures and/or in-class labs are a vital part of this course. Critical scheduling and organizational information (including content, times and locations of all exams) will only be given out at the lectures. Missing a lecture where information is given out is not sufficient reason to appeal loss of marks from missed scheduled classes, problem sets, laboratory assignments or even exams. It is your responsibility to attend all lectures. If you have to miss a lecture with a valid reason, please contact Dr. Ding for missed information, and please arrange with others in the class to obtain the missed lecture notes.
- If you miss the final presentation, contact your Dean's office to obtain an SPC form.

Anticipated behavior:

- Students are reminded of the university's *Code of Conduct* found on the university website. To maintain a high standard of learning environment in our classrooms, laboratories, help rooms, and tutorial rooms for the students, those who are disruptive, rude, or show unacceptable behavior, either to the instructor, or the other students, will be asked to leave.

Chemistry 4472a Final Presentation

1. Lectures continue till time and place.

2**. The final presentation will be on time and place Everyone has to be there all the time; otherwise a penalty will be applied.** In the event of illness or emergency, the usual procedures will apply.

3. The presentation will be 12 to 15 min (maximum) for each student and 3 to 5 min questions follow. The presentation event will be from time and place. The duration depends on the number of students. Coffee and treats might be provided by the department.

4. At the end of the presentation event, please return the NI USB 6008 device, the voltmeter and the tool. Otherwise, your final marks will not be released.

5. Choose a topic on instrumentation based on LabVIEW or on simulation based on Femlab. You are encouraged to select a project which is related to your 4491E.

The scientific level should be equivalent to chem 3372b poster, less high than your 4491 project but higher than 4472 assignments. Please come to Dr. Ding's office to discuss your choice if needed.

For LabVIEW topic, please study the CV6008.vi I have emailed you. Basically the VI uses one of the two sub VIs I showed in class (472ai.vi) to do data acquisition (recording the electrochem current and potential, we call it as passive usage of the AD/DA converter). Note that the device number may change with your USB device(NI 6008) and your computer. It will be a bonus if you can use the AD/DA converter to drive a device using 472ao.vi. For example, switch on your light source or high voltage and then switch off, integrate the detection signals within certain time, sweep a potential etc. You should have data acquisition, data analysis and data presentation in your VI you are going to make.

Sure, you can do a simulation project with Femlab. For instance, as we explained in the class, you can simulate a cyclic voltammogram for a species which can be reduced and oxidized. You can also simulate a voltammogram for a species which has an electrochemical reaction at the electrode and then the reduced species or the oxidized species can go for a chemical reaction (EC mechanism). You can also simulate analytical chromatogram for two components (A and B) while we practiced preparative chromatograph in class. You can also do a project of electrophoresis simulation but you can not just use the Femlab examples on this topic, which were shown in the class.

The project you are going to do is by no means limited to the examples describe above.

Highlights of the presentation

Title and outline of your talk

INTRODUCTION describes the background to the instrument or simulation.

MATERIALS & METHODS what you prepared; what instrument you used; what you did. Might include a schematic diagram and/or photo of the

instrument.
Or, what is your model of simulation.
RESULTS of your measurement or simulation
DISCUSSION can be the analyzed results

● DISCUSSION OF RESEARCH PAPER or BOOK FROM THE LITERATURE , or the present situation/problems...Summarize what was done, may be include a diagram of best results.

● REFERENCES here must be a list (short) or key references -books -research papers that you used -best to use numbers (1) etc. in the text
● ACKNOWLEDGEMENTS who helped -who you wish to thank -financial support

●It is required to present a paper and it is a good idea to select a paper with topic related to your 4491 project. It will make your presentation more focused and coherent.)

You must decide on your choice of the title by tie

CHEMISTRY 4472a
PRELIMINARY LECTURE SEQUENCE 2011-2012
By Dr. Zhifeng Ding

1. Chemistry 4472 ***approximate number of lectures:***

1 lecture

- Operation of the course
- The first experiments:
- Check your computer account numbers
- Electronic Mail
- Midterm Exams, the Final Exam-presentation.

2. Computer Titrations **8 lectures**

-Aqueous Solutions and Chemical Equilibria.
- Titrimetric Methods; Precipitation Titrimetry.
- Neutralization Titrations.
- Complexation Reactions and Titratrions.

3. Electrochemical methods **6 lectures**

- Introduction to Electrochemistry.
- Applications of Standard Electrode Potentials.
- Applications of Oxidation/Reduction Titrations.
- Potentiometry.
- Voltammetry.

4. Simlations for Electrochemistry and Chromotography **6 lectures**

- Introduction to Femlab software.
- Chronoamperametry
- Cyclic Voltametry.
- Chromatography.

5. Analytical Instrumentation **6 lectures**

- Introduction to LabVIEW.
- Data acquisition.
- Instrument Control.
- Data Analysis

7. Presentation