

Chemistry 1302A Course Outline (2015–16)

Discovering Chemical Energetics

Welcome to Chem 1302A! Please read and keep this course outline handy, because it is an official document that contains important course information.

Course Description & Prerequisite Requirements

Calendar description: *An examination of how the fundamentals of energetics influence chemical processes. Topics include: gases, thermodynamics and thermochemistry, chemical equilibria, solubility, weak acids and bases, electrochemistry, and chemical kinetics.*

Extra information: 3 lecture hours, 3 laboratory/tutorial hours, 0.5 course.

Prerequisite: Grade 12U Chemistry or equivalent. Antirequisites: Chem 1024A/B or the former Chem 1100A/B or 1050.

Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you may 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.

Dates to Note

For your convenience, a summary of some of the important dates is provided below.

Date	Event
Friday, September 18	Last day to make registration changes, such as lecture and lab sections. This is the last day to de-register from the course and remove it from your academic record.
Week of September 21 st	First week of laboratory and tutorial rotations
Saturday, October 3, 7:00 pm	Test #1 (topic cut-off will be announced by Sept. 28)
Thursday, November 5	Last day to drop the course without academic penalty. If you drop the course on or before this date, it will remain on your academic record along with a WDN (withdrawn). If you drop the course after this date, it will result in an automatic F.
Friday, November 6, 7:00 pm	Test #2 (topic cut-off will be announced by Nov. 2)

How to Achieve Your Goals in Chem 1302A

You will be more successful in the course if you recognize the following:

1. Like many sciences, chemistry is a cumulative subject. Because one topic acts as a foundation for the next, it is essential to stay up-to-date by studying the material and doing practice problems.
2. Learn *why* something is the way it is, not just *what* it is. Please realize that memorization is not the same as learning and understanding. When working on questions from the workbook, focus on the concepts, the thought process, how to arrive at the answer, and why the answer is the answer.
3. Don't just come to class – get something out of coming to class. Be attentive. Participate. Think. Write down important points, but avoid spending so much time writing that you're not thinking.
4. Labs are intended to be an enjoyable experience. Prepare for each lab in advance by reading the lab manual and doing the prelab exercise. Study the theory and the concepts behind the experiment. Pay attention during the prelab video. When completing your lab report, refer to the marking scheme so that you are aware of what is expected in the lab report.
5. Use us – we're here to help! If you have questions about the course material, ask them well in advance. Ask questions at the tutorials as soon as they arise.
6. To assist in learning and understanding, you are encouraged to study in small groups, where you can challenge yourself by defending your work and ideas and also challenge others.

Support Services

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

Accessibility

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

Learning Expectations

The course has an emphasis on the development of skills such critical-thinking, problem-solving, analysis, and quantitative reasoning; these “soft skills” are essential to success in not just chemistry but also in other courses and many occupations. Any student receiving credit for Chem 1302A will be expected to demonstrate competence in his or her ability to:

Course-Specific Expectations	Soft-Skill Expectations
Recognize the importance of chemistry in everyday life and the interdisciplinary nature of chemistry.	Analyze and critically assess problems, and take a systematic approach to solve them.
Think critically about, explain, integrate, and apply chemical principles, laws, and theories.	Work independently.
Examine, integrate, and assess any provided or collected chemical data.	Form productive and collaborative working relationships with other individuals.
Solve a variety of novel problems, both qualitative and quantitative.	Obtain, evaluate, and integrate information from various sources, and determine its relevance.
Draw scientific conclusions from experimental results or data.	Prioritize a set of tasks and manage the use of his or her time.
Use a variety of laboratory equipment and instrumentation.	Execute mathematical calculations accurately.
Learn a variety of experimental techniques and the theory behind them.	Communicate thoughts, ideas, and observations verbally and in writing.
Safely perform experimental procedures.	Recognize when to seek assistance.
	Develop respect for, and comply with, regulations and policies.
	Learn to accept responsibility for his or her decisions, actions, and non-actions.

Code of Student Conduct

To foster a supportive and enriching academic environment that is conducive to learning and free inquiry, Western has a Code of Student Conduct (<http://www.uwo.ca/univsec/pdf/board/code.pdf>).

You can expect your instructor to promote this environment and also respect each student’s unique views and opinions. Because Western is also a part of *your* environment, we expect the same from you. Activities that disturb another student’s right to this environment will not be tolerated; these include talking in class about matters irrelevant to the course and using electronic devices inappropriately.

You can also expect your instructor to come prepared, on time, and eager to help you learn. In turn, we expect that you will come prepared, on time, and ready to learn.

Lecture Sections

Lecture Section	Time (MWF)	Room	Instructor	Office	Email
003	10:30–11:20	NS 1	Dr. Felix Lee	MSA 1202	flee32@uwo.ca

Laboratory and Tutorial Sections

Laboratory and tutorial sections are shown below. The laboratory and tutorial sections both have the same section number.

Labs are held in MSA 1220. Tutorials are held in MSA 1205 (the Resource Room).

Lab/Tutorial Sections	Day	Time
015 and 016	Monday	6:00 pm – 8:50 pm
022	Tuesday	9:30 am – 12:20 pm

Email Policies

Please note that email should be used only for administrative matters and not for questions related to course material. Questions regarding course material should be taken to the tutorials or posted on the OWL forum.

If you email your instructor, you must use your Western email address and include *Chem 1302A* in the subject line. Messages from a non-Western account or those that do not include *Chem 1302A* may be blocked by the university's anti-spam system.

Constructive feedback is very valuable to us. Please do not hesitate to contact any one of the instructors if you have any comments or feedback on any aspect of *Chem 1302A*. We are always trying to improve the course so that we can improve your experience!

Course Website

News and course updates will be posted on Western's OWL system (<http://owl.uwo.ca>). This is the primary method by which information will be disseminated to all students in the class, so you are responsible for checking OWL on a frequent basis.

Course Materials

All the materials below are required and are available at the Western Bookstore, located in the UCC.

Chemistry 1302A/B Course Workbook, 2015–16 edition

- The workbook is complete lecture package designed by the Department of Chemistry with you and your learning in mind. There is nothing else that you need to bring to class.
- Lectures are designed to help you understand material from the workbook and develop problem-solving skills. To obtain the maximum benefit from the workbook and from lectures, it is recommended that you read the relevant topics before coming to class.
- “Lecture slides” will not be posted on OWL, because the workbook, along with what you will write in it while in class, constitutes a complete set of notes for the course.
- Old editions may not be used. Topic coverage varies from year to year. All lectures, tests, and exams will be based on this year’s edition.

Chemistry 1302A/B Laboratory Manual and Past Exams, 2015–16 edition

- Old editions may not be used. Students must bring this year’s edition to every experiment.

Lab Coat

- For your protection, a proper lab coat is required. Designer lab coats, which are often sold as hospital scrubs or consultation coats, are not acceptable, because they are too short or do not offer sufficient protection to the upper body.

Safety Glasses

- If you do not already have a pair of safety glasses, they may be purchased from the Western ChemClub for \$10.00. Details will be posted on OWL.

Sharp EL-510R(B) or Sharp EL-510RN(B) scientific calculator

- To ensure fairness to everyone in the course, the Sharp EL-510R(B) and Sharp EL-510RN(B) are the only calculator models permitted in the labs and during tests and exams. All other brands and Sharp models will be confiscated. Proctors and instructors for tests and exams do not lend calculators. It is your responsibility to bring the correct calculator and to ensure that it is in proper working order. It’s not a bad idea to bring a spare calculator of the same model. Obviously, you will not be allowed to share calculators during tests and exams.

Outline of Lecture Topics

Chapter	Class Topic	Approx # of Classes
	Administration	1
1	Gases	1
1	Ideal Gas Law	2
2	Heat, Work, and Energy	1
2	Enthalpy	4
2	Entropy and Spontaneity	1
2	Free Energy	1
3	Equilibrium	2
3	Solubility of Ionic Compounds	3
3	Weak Acids and Bases	4
3	Buffers and Titrations	3
4	Redox Reactions	1
4	Redox Potential and Voltaic Cells	3
4	Electrolytic Cells	2
4	Batteries	1
5	Rate and Rate Laws	3
5	Arrhenius Equation and Reaction Mechanisms	3

In all of the topics, the primary focus is on the *understanding* of the concepts. Please try to garner a thorough, in-depth understanding of the material, because that is what allows success in chemistry. Accordingly tests and exams will be designed to evaluate your comprehension of the material and your ability to apply it to new and different scenarios, and not simply your ability to regurgitate memorized facts or substitute numbers into formulas.

Laboratory and Tutorial Schedule

Every course has its own lab/tutorial schedule. Do not assume that because another course does not have a lab/tutorial during a certain week, this course does not have one either. Missed labs/tutorials will result in a mark of zero unless academic accommodation has been granted.

Dates	Lab 015 (Mon night)	Lab 016 (Mon night)	Lab 022 (Tue am)
Sep 21–22	Expt #1: Volumes	Tutorial	Tutorial
Sep 28–29	Tutorial	Expt #1: Volumes	Expt #1: Volumes
Oct 5–6	Expt #2: Calorimetry	Tutorial	Tutorial
Oct 12–13	<i>none</i>	<i>none</i>	Expt #2: Calorimetry
Oct 19–20	Tutorial	Expt #2: Calorimetry	Tutorial
Oct 26–27	Expt #3: Equilibrium	Tutorial	<i>none</i>
Nov 2–3	Tutorial	Expt #3: Equilibrium	Expt #3: Equilibrium
Nov 9–10	Expt #4: Spec	Tutorial	Tutorial
Nov 16–17	Tutorial	Expt #4: Spec	Expt #4: Spec
Nov 23–24	Expt #5: Electrochem	Tutorial	Tutorial
Nov 30–31	Tutorial	Expt #5: Electrochem	Expt #5: Electrochem

Laboratory Information

Laboratory Zone

The laboratory in Materials Science Addition 1220 contains four zones: A, B, C, and D. Your zone assignment will be posted on OWL by the evening of Sunday, September 20.

Preparation

Before coming to the first experiment, read the Safety Regulations, Safety Contract, Introduction, and Significant Figures sections of the lab manual; read the Volumes Experiment; and view the relevant materials on OWL. **Bring your lab manual and calculator. Proper attire, including safety glasses and lab coat, is required for all labs. If you wish to purchase safety glasses from the ChemClub, check OWL for details.**

Prelab exercises must be completed before the lab period.

When you arrive at your lab, there will be additional questions on the video screen. These questions will cover experimental information as well as information from the relevant *Tools of Chemistry* sections, which you must read prior to coming to the lab.

Lateness Policy

Any student who arrives after the doors to the lab have closed is considered to be late and will not be permitted to do the experiment. A mark of zero will be assigned for that experiment. No credit will be given for the prelab exercises.

Safety and Dress Code

Western is committed to workplace health and safety, and has strict safety regulations. Even your instructor has to follow them! Lab TAs and technical staff will remove students who, in their opinion, do not meet the safety requirements or are not prepared, as described below. **These students, and those who arrive late, will receive a zero for the entire experiment, and no credit will be given for the prelab exercise.**

Eye Protection

Safety glasses or goggles must be worn by everyone whenever laboratory work, including the getting, cleaning, and returning of glassware, is being performed. Students who wear prescription glasses must wear appropriate safety glasses or goggles over their regular glasses. If you wear contact lenses, you must inform the lab TA that you are wearing contact lenses.

Safety glasses can be rented for \$2 per lab period.

Lab Coat, Pants, Socks, and Footwear

The Occupational Health & Safety Office at Western mandates “shoulder-to-toe” coverage. A detailed description of the dress code is available in the Lab Manual. For hygienic reasons, we do not rent shoes, socks, pants, or lab coats.

Lab coats must be worn, buttoned up. Students must have a lab coat to enter the laboratory. They may not leave after the video or the prelab talk to get a lab coat or have one delivered.

Students must wear ankle-length pants, socks that cover the ankle, and shoes that cover the whole foot (top, sides, and back) without any “cutout holes.” Shorts, sandals, and capris are among the items of clothing that are not acceptable. No skin may show at the ankles even when you are seated.

Submitting Lab Reports

Lab reports for Experiments #1 through #4 are to be submitted in the proper slot of the mailbox located in MSA 1205 (the Resource Room). Lab reports are due one week after your experiment at 10:00 am and 6:30 pm for lab periods that start at 9:30 am and 6:00 pm, respectively. Of course, you're welcome to submit your report at any time before the deadline. Reports placed into the wrong slot of the mailbox will be considered late.

The report for Experiment #5 will be completed and submitted during the lab period.

Tutorial Information

Tutorials will be delivered in an open-access, help-room format. This provides you with an informal environment for you to ask questions related to lecture material, and get some assistance in solving problems. Group work and peer-to-peer support are strongly encouraged.

Attendance is optional, but we recommend that you use the tutorials to help build your knowledge base and problem-solving ability.

All tutorials take place in MSA 1205 (the Resource Room) and run during the normal lab times indicated on page 4. If you find that attending your scheduled tutorial section is insufficient, you are welcome to attend other sections.

Tutorials are staffed by a highly qualified teaching assistant.

Evaluation

Components

Tests and exams are necessary to assess your mastery of core concepts. The overall course grade, out of 100, will be calculated as listed below. Listed next to the respective components are their maximum contributions toward the course grade.

Component	Notes	Normal Value	Test #1 Missed	Test #2 Missed	Both Tests Missed
Test #1	Saturday, October 3, 7:00–9:00 pm	18	--	18	--
Test #2	Friday, November 6, 7:00–9:00 pm	22	40	--	--
Final Exam	3.00 hours	45	45	67	85
Laboratory	Five experiments (3.00 each)	15	15	15	15

To obtain credit for the course, all three requirements below must be met:

1. Obtain a minimum of 50% on the overall course grade, as calculated above.
2. Obtain a minimum of 50% on the laboratory component (7.50 out of 15). This mark is calculated from all five experiments. A missed experiment is assigned a mark of zero unless it has been “excused” (see section on Missed Course Components).
3. Miss no more than two experiments, whether excused or not.

Students who fail to meet requirement #2 or #3 will receive a course grade no greater than 40% (even if the calculated course grade is higher) and will not receive credit for the course.

Important Legalities

It is Department of Chemistry policy that any student repeating a chemistry course must repeat the entire course, including the lab component. There are no lab exemptions.

It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered. There is no opportunity for a reweight of the other course components after the test or exam has been written. *The reason of “I did not want to write a heavily weighted final” is not a valid reason for writing the midterm test while ill.*

Students who arrive late for a lab will receive a zero for that lab. No credit will be given for the prelab exercises. Students are deemed late if they arrive after the lab doors have closed. Lab technicians and teaching assistants have the right to remove students from the lab.

It is university policy that a regularly scheduled class (lecture, lab, or tutorial) takes precedence over tests and exams. Therefore, if another course schedules a test or exam that takes place during your lab or tutorial, the instructor for that course must accommodate you.

Aside from the specified calculator, no other electronic devices (phones, iPods, etc.) may be in your possession during tests and exams, even for timekeeping purposes.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Computer-marked, multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Missed Course Components and Late Lab Reports

If you are unable to meet a course requirement due to illness, death in the family, or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty (or affiliated college) as soon as possible.

All requests for academic accommodation must go through your faculty's Academic Counselling Office, so please contact them and *not your instructor*.

If you are an engineering student, the Academic Counselling Office of the Faculty of Engineering is located in SEB 2097, and can be contacted at 519-661-2130 or engugrad@uwo.ca. Their website is http://www.eng.uwo.ca/undergraduate/about_us/index.html.

A student requiring academic accommodation due to illness must use the Student Medical Certificate (https://studentservices.uwo.ca/secure/medical_document.pdf) when visiting an off-campus medical facility.

For further information, please consult the university's medical illness policy at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

Missed Labs

There are no make-up labs, and it is not possible to reschedule them. If you miss a lab for any reason, you will be assigned a mark of zero for that lab. If the missed lab is due to a reason that is approved by your faculty's Academic Counselling Office, the zero will be replaced by a mark of EXCU (excused), which shifts the weight of the missed lab onto all of the other labs.

You must, **as soon as you're able to do so**, submit documentation to your faculty's Academic Counselling Office. If they approve your circumstances, we will be notified.

Tests and exams will contain questions related to the theoretical aspects of the experiments. You are responsible for the material pertaining to the missed labs.

Late Lab Reports

Labs are each marked out of 5. Details of the marking scheme will be posted on OWL.

Late reports are to be placed in the designated slot in the mailbox in the Resource Room (MSA 1205). All late reports will be graded as if on time but assigned a mark of 1.00 out of 5.00, and returned to you at your next lab.

If your reason for not being able to hand in your lab report on time has been approved by your faculty's Academic Counselling Office, print out a copy of the email from your faculty's Academic Counselling Office, staple it to your "mark of 1.00" lab report, and resubmit it in the appropriate slot. Your mark will then be changed to the actual mark.

Missed Tests or Final Exam

If you are unable to write a test, contact your faculty's Academic Counselling Office as soon as possible. If your circumstances are approved, your performance in the course will be evaluated as described on page 9. **There are no make-up tests.**

If you are unable to write the Final Exam, contact your faculty's Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam) in January of 2016.

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

Equal Opportunity and Evaluation Policy

We are here to help you achieve your goals. We want you to do well in the course. We were, at one time, students ourselves, so we understand the importance of course grades and the hard work that you will invest into this course.

Most importantly, we also have to be fair. The university is committed to academic integrity and has high ethical and moral standards. All students will be treated equally and evaluated using the criteria presented in this course outline and their respective weights. The evaluation criteria are based strictly on actual achievement, not on effort or how hard the student tried. Claims of an excellent academic history, of attendance in the course components, or of personal issues (family, relationship, financial, etc.) cannot be used to justify a higher grade in the course because they are not criteria for evaluation. There is no extra work available for extra credit or to "make up" another grade. We do not offer any extra assignments, essays, experiments, or other work of any kind to any student.

The requirement for a higher grade in order to, for example, maintain a scholarship, enter a program, or obtain a higher GPA for various reasons, is not a justifiable reason for increasing your grade. If we increased or "bumped" your grade (*i.e.* gave you a grade that you did not legitimately earn), it would be unfair to the other students and also a great disservice to the scholarships and programs who are evaluating all students on the basis of their grades.

This course is supported by the Science Student Donation Fund. If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students' Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing paperwork in the Faculty of Science's Academic Counselling Office. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the chair of the department or email the Science Students' Council at ssc@uwo.ca.