Chem 3393B: Medicinal Chemistry

2021–2022 Course Outline

Course and Instructor Information

Your Professor for CHEM 3393B is Dr Len Luyt (lluyt@uwo.ca). Dr. Luyt holds appointments at Western University in the Departments of Chemistry, Oncology and Medical Imaging. His laboratory is located in the London Regional Cancer Program at Victoria Hospital.

CHEM 3393B for winter 2022 will start as an online course. CHEM 3393B will follow lesson plans and learning activities using the OWL class page. While lesson content will be predominately asynchronous, students in CHEM 3393B must keep Fridays 9:30 to 10:30 available for synchronous activities as required.

CHEM 3393B will be taught in-person once permitted and accounting for sufficient time to transition to in-person content. Any changes to the delivery of CHEM 3393B will be made through an OWL Announcement. Changes to the method for content delivery is at the discretion of the instructor.

Regardless of CHEM 3393B being in-person or online, lesson plans must be followed and learning activities completed, using the OWL class page. The course starts Monday January 10, 2022.

Questions related to course material can be posted on the CHEM 3393B OWL forums. Administrative questions of a general nature may be posted in the ‘Administration’ folder on CHEM 3393B OWL forums. Resource room hours will be available through CHEM 3393B OWL Zoom or in-person and will be announced in advance. If these approaches to answering your question are unsuccessful, please email the course instructor from your Western email account with “CHEM 3393B” in the subject line. Email sent from accounts other than Western will not be responded to.

News and updates will be posted on OWL (http://owl.uwo.ca). This is the primary method by which information will be disseminated to everyone in the class. Please remember that it is your responsibility to check OWL on a regular basis.

Anticipated Topics

Medicinal chemistry is a broad topic that spans many disciplines. Since this is a chemistry course, we will focus primarily on the chemical aspects of drugs and less on the biological and clinical aspects. Topics covered will include:

- Drugs and the body (textbook chapters 1-4 to 6-11)
What are drugs?
What are the common drug targets?
How are drugs transported and metabolized?

- Discovery and optimization (textbook chapters 12–18)
  - Generation of lead compounds
  - Optimization of pharmacodynamics and pharmacokinetics
  - Chemical & process development, synthesis methods
  - Computational approaches to drug discovery

- Selected topics (time-permitting; various textbook chapters and supplemental information)
  - Antibiotics (e.g. β-lactams, macrolides)
  - Opioids (e.g. morphine, heroin, fentanyl)
  - Cholinergic system and chemical weapons
  - The discovery of sorafenib
  - Peptide drugs for diabetes

**Course Materials**


It is also possible to rent a digital version for six months for $31.50:


The textbook’s website, which has a collection of student resources such as additional practice questions, is available without charge at:

[https://global.oup.com/uk/orc/chemistry/patrick6e/](https://global.oup.com/uk/orc/chemistry/patrick6e/)

All course material will be posted to OWL, [http://owl.uwo.ca](http://owl.uwo.ca). **You are required to follow the course content pages on a weekly basis.**

If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

**Learning Outcomes**

Broadly speaking, a student receiving credit for the course will be expected to demonstrate competence in their ability to:

- Describe the role of medicinal chemists and chemistry in drug design.
- Explain and apply chemical principles, laws and theories.
• Critically analyze and solve Medicinal Chemistry problems.
• Draw scientific conclusions from experimental results or data.
• Synthesize and evaluate information from various sources.
• Communicate scientific thoughts and ideas in writing.
• Develop time management and organization skills.

Evaluation

Components

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.

<table>
<thead>
<tr>
<th>Component</th>
<th>Notes</th>
<th>Normal Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Three assignments throughout the course</td>
<td>30</td>
</tr>
<tr>
<td>Participation</td>
<td>Attending and participating in discussions during in-class learning sessions and online forums.</td>
<td>10</td>
</tr>
<tr>
<td>Test #1</td>
<td>Friday February 4, 2022 starting at 9:30 am</td>
<td>10</td>
</tr>
<tr>
<td>Test #2</td>
<td>Friday March 11, 2022 starting at 9:30 am</td>
<td>10</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Cumulative. Scheduled by the Registrar.</td>
<td>40</td>
</tr>
</tbody>
</table>

Assignments are to be submitted through OWL Gradescope. Marks will be deducted for assignments handed in late, at 10% deducted per day. If not submitted within three days of the deadline, the assignment is considered incomplete and a mark of zero is assigned. In the event of accommodation being provided for a delayed assignment deadline, the latest the assignment can be submitted is one week late. Accommodation that extends beyond one week results in the assignment being “excused” and the marks distributed onto the remaining assignments.

Participation marks will be assigned based upon your attendance and participation in learning activities and group discussions during our regular Friday class time. In some instances, discussion topics will be assigned with details provided as part of the course content on OWL. In the instance of transitioning to online learning, participation will be through contributions to OWL Forums.

Tests will be held in-person during regular class times.

Final Exam will be held in-person and is scheduled by the Registrar. The final exam covers all material presented in class and material from the assigned learning activities on the OWL class page.

To be fair to everyone in the class, none of the components will be “dropped,” and it is not possible to have the components reweighted unless accommodation is approved.
In order to obtain credit for the course, all three of the following requirements must be met:

1. Miss no more than one assignment, whether excused or not. In the event of accommodations reducing the number of assessments completed successfully below this minimum, you will be required to complete the items missed the next time the course is offered.

2. Obtain a minimum weighted average of 50% on the combined grade for Test #1, Test #2 and the Final Exam.

3. Obtain a minimum of 50 out of 100 on the overall course grade. Students who meet this requirement, but fail to meet one or more of the above requirements, will receive a course grade no greater than 40 out of 100 (even if the calculated course grade is higher) and will not receive credit for the course.

**Prerequisite Requirements**

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. The prerequisite for this class is either Chem 2283G or Chem 2213A. For those who took Chem 2213A it is helpful if you have taken Chem 2223B, but this is not required.

**Accommodation and Accessibility**

**Accommodation Policies**

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf

**Academic Consideration for Student Absence**

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student’s final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student’s final grade,
- if a student has already used the self-reporting portal twice during the academic year
If the conditions for a Self-Reported Absence are not met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student’s Home Faculty.

For policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs, see: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf and for the Student Medical Certificate (SMC), see: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Religious Accommodation
Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar: https://multiculturalcalendar.com/ecal/index.php?s=c-univwo

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).

Missed Course Components

There are no make-up assignments, and it is not possible to reschedule them. If you miss an assignment for any reason, you will be assigned a mark of zero for that assignment. If you receive accommodation (self-reported or through your counseling office) for the missed assignment, an extension may be arranged based upon the length of the accommodation. If the accommodation exceeds one week, then the zero will be replaced by a mark of EXCU (excused), which shifts the weight of the missed assignment onto all of the other assignments.

There are no make-up tests. If you receive accommodation (self-reported or through your counseling office) for the missed test, then the value of the test will be shifted to the combined value for the remaining Test and Final Exam.

If you miss the Final Exam, contact your faculty’s Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (SPC).
COVID Planning and Guidelines

Masking Guidelines

Students will be expected to wear triple layer, non-medical, paper masks at all times in the classroom as per University policy and public health directives. Students who are unable to wear a mask must seek formal accommodation through Western Accessible Education, and present medical documentation. Students are not permitted to eat or drink while in class to ensure masks stay in place. Students will be able to eat and drink outside of the classroom during scheduled breaks. Students unwilling to wear a mask as stipulated by Western policy and public health directives will be referred to the Dean, and such actions will be considered a violation of the student Code of Conduct.

Course Absences due to Daily COVID Screening Questionnaire

Missed assessments (e.g., assignments, tests, etc.) require formal academic considerations (typically self-reported absences and/or academic counselling). Methods for dealing with missed work and course content are at the discretion of the instructor(s). Students should be aware that some learning outcomes cannot be easily made up and may need to be completed in a subsequent year. Your instructor will provide you with further information as to how this applies within this course. Students who demonstrate a pattern of routinely missing coursework due to self-reported COVID symptoms, and therefore do not demonstrate mastery of the learning outcomes of the course, will not receive credit for the course.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered online, asynchronously (e.g., posted on OWL for students to view at their convenience). Synchronous components are the resource room, which is an optional activity, and the mandatory tests. The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor. In the event that online learning is required, a stable internet connection with working microphone and webcam will be required. As has been the case in the past, the decision to pivot to online learning will be made by Western, and not individual instructors or departments (excepting temporary online instruction in the event of instructor illness).

Academic Policies

The website for Registrarial Services is [http://www.registrar.uwo.ca](http://www.registrar.uwo.ca).

In accordance with policy, [http://www.uwo.ca/its/identity/activatenonstudent.html](http://www.uwo.ca/its/identity/activatenonstudent.html), the centrally administered e-mail account provided to students will be considered the individual’s official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Participants in this course are not permitted to record resource room sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.
Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

All work submitted for a grade in this course must be your personal work; use of answers obtained externally is prohibited. Multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Completion of this course will require you to have a reliable internet connection and a device that meets the system and technical requirements for OWL and Gradescope. Information about the system and technical requirements are available at the following link:

https://wts.uwo.ca/services/owl.html
https://help.gradescope.com/category/czisb9ar5e

Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/

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 Student Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

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.