

CHEM 4470 & 5470: Principles of Medicinal Chemistry Spring 2021

Version 1 – Published January 21, 2021

The instructor reserves the right to modify the syllabus as needed. Any changes will be communicated via email and posted to Blackboard.

Wednesdays 6:00-8:30 pm

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Office hours (via Zoom)
by appointment

Class Time and Place: Wed 6:00–8:30 pm, Lecture Hall 1 and synchronous via Zoom. *Face masks are required in class* (see full policy at the end of this document).

Mode of Delivery: This course is considered a hybrid/flex mode for the Spring of 2021. This means that you can attend the lecture on-campus or you can participate electronically in a synchronous fashion (via Zoom). All lectures will be recorded and uploaded to the Blackboard site so if you cannot make it to class (either on-campus or on Zoom) you will be able to access the lecture at a later date. We are doing this to make sure you can attend class (in-person or electronically) no matter your circumstances. *Please do not come to the on-campus course if you have any COVID symptoms (rather you should attend synchronously via Zoom if you are well enough to do so).*

Zoom Meeting Link for CLASS

Office Hours: Office hours are by appointment only and will be conducted on Zoom at XXXX. Please make an appointment for 9am-4pm via email at least 24 hours in advance. Please do not wait until the day before or day of an exam to make an appointment. Many questions can be addressed by email and I will post a reply via Announcements in Blackboard if the question is general in nature .

Attendance and Participation: Students are expected to make every effort to attend class EITHER in-person OR synchronously via Zoom. Participation in class lectures via asking or answering questions or in group discussions and problem solving is strongly encouraged. If you attend online via Zoom, please use your video camera and mute your microphone. You may speak up at any time to ask a question as it may be difficult for me to monitor the chat/raise hand while speaking to the class simultaneously.

If you must miss class, please contact me by e-mail to inform me of your absence. Notification should be provided at least one hour before class, if possible. Students who are unable to physically attend class but are well enough to participate remotely are expected to do so. If you are a student registered to take the class in-person but need to participate in class remotely, notify the instructor by e-mail at least one hour before class begins. This class is being live-streamed on Zoom; the Zoom link is available on the course home page in Blackboard.

Students must notify instructors in writing by the end of the first week of the semester of all religious holidays they observe that conflict with their course meetings and activities.

Recording

Lectures will be recorded via Zoom and posted to Blackboard. You must request permission publish these and other materials related to this course, sell them, or otherwise distribute them

Course Description: This course will provide the students with a comprehensive introduction to medicinal chemistry. Topics will include drug discovery, biological targets, drug-target interactions, drug structure

optimization, drug metabolism, structure-based drug design, drug synthesis, and select specific drug classes. Case studies and student presentations will be used to illustrate these and related topics.

Course Learning Outcomes: The student will be able to:

- Understand and analyze the principles that govern the interactions between a drug molecule, its physicochemical environment, its biological target and the organism.
- Understand the drug discovery and optimization process
- Understand how major classes of drugs work
- Apply the principals and tools of medicinal chemistry towards solving real world problems encountered in drug discovery.

Students will demonstrate mastery of the concepts through course examinations, projects, and weekly assignments.

Text: “An Introduction to Medicinal Chemistry” (6th edition) by Graham L. Patrick (required)

Course Materials: Class materials will be made available on <http://blackboard.slu.edu>, including the class syllabus, PowerPoint slide presentations, assignments, and other materials. Additional student resources are available online <http://global.oup.com/uk/orc/chemistry/patrick6e/>

Grading:

		Cutoffs:			
Assignments	15%	A	92%	C+	71%
Project	15%	A-	88%	C	67%
Quizzes	10%	B+	83%	C-	63%
Exams	60%	B	79%	D	59%
		B-	75%	F	<59%

Weekly Assignments & Discussion: Students are expected to complete the assigned reading and study questions. These will be assigned by the instructor weekly on Blackboard. These assignments will be turned in on Blackboard before the beginning of the next class period to be given credit. Assignments will be graded as Satisfactory (10 points) or Unsatisfactory (0-5 points). Assignments turned in late will be given a maximum of 5 points. Assignments not turned in before the first day of finals will be given a zero. Portions of assignments will be used for group discussion in class. Reading assignments include completing the online multiple choice questions found at <http://global.oup.com/uk/orc/chemistry/patrick6e/>. These will help ensure understanding of the concepts presented and are good preparation for the exams.

Group Project (CHEM-4470 ONLY)

Students will work in groups to develop their own drug discovery “project”. A group presentation of the project will be given later in the semester. Full instructions will be given separately.

Individual Project (CHEM-5470 ONLY)

Students will write a paper on a topic in medicinal chemistry and prepare a presentation to be given in class. Full instructions will be given separately.

Exam Policies: Test will be given online only via Blackboard while logged into Zoom with video on. You will have a defined time period to complete the test. NO CELL PHONES OR GROUP TEXTING. **If you have internet/computer issues before/during the exam, notify the instructor immediately by text at 314-606-0361. No makeup exams will be given.** If you miss an exam for a valid reason such as illness (doctor’s note required) or a death in the family, contact the instructor as soon as possible **before** the exam is given. There may be other extenuating circumstances, and must be discussed with the instructor. If you miss an exam and do not have a valid excuse, a grade of zero will be given. Cell phones and watches must be stored out of site during the exam period. The final exam must be taken during the scheduled time. The only exceptions are designated by the University.

Tentative Schedule:

Week	Date	Topics	Reading Assignment (Patrick 6 th edition)
Structure and Targets of Drugs			
1	Feb 3	Intro to medicinal chemistry Drugs and drug targets (binding) Drug structure (functional groups)	1-2
2	Feb 10	Protein structure Enzymes as drug targets	3,7
	Feb 17	No Class – University Break	
3	Feb 24	Quiz 1 (in class via Blackboard) Enzymes as drug targets (cont.) Receptors as drug targets	4-5
4	Mar 3	Receptors as drug targets (cont.) <i>5470 Paper Topics Due</i>	6,8
5	Mar 10	Quiz 2 (in class via Blackboard) Oligonucleotides as drug targets; Misc drug targets	9-10
6	Mar 17	Exam 1 (Weeks 1-5; online Zoom only)	
Pharmacodynamics, Pharmacokinetics & Drug Discovery			
7	Mar 24	Finding a lead Optimizing target interactions (Pharmacodynamics)	12-13
8	Mar 31	Quiz 3 (in class via Blackboard) Pharmacokinetics (PK) & Metabolism	11
9	Apr 7	Optimizing access to the target (PK)	14
10	Apr 14	Quiz 4 (in class via Blackboard) Drug Synthesis; Case studies; Getting the drug to market	15
11	Apr 21	Exam 2 (weeks 7-10; online Zoom only)	
Special Topics			
12	Apr 28	Structure-based drug design QSAR <i>5470 Papers Due</i>	17 (p.349-369 sect 17.12.2) 18 (p.395-412)
13	May 5	Drug classes: antibacterial and antiviral agents <i>4470 Video Presentations Due</i> <i>5470 Video Presentations Due</i>	19, 20
14	May 12	Final Exam (comprehensive) - 6:30-8:30 pm (online Zoom only)	

Cell Phone Policy: Cell phones must be turned OFF when you enter the classroom. Talking on the phone, checking for messages, and texting are not allowed in the classroom. If your phone rings/vibrates or you are using your phone during class, you will be asked to leave the classroom.

Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is “the pursuit of truth for the greater glory of God and for the service of humanity.” Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care, and community service through which SLU fulfills its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern. The full University-level Academic Integrity Policy can be found on the Provost's Office website at: https://www.slu.edu/provost/policies/academic-and-course/policy_academic-integrity_6-26-2015.pdf.

Additionally, each SLU College, School, and Center has its own academic integrity policies, available on their respective websites.

Disability Accommodations

Students with a documented disability who wish to request academic accommodations must formally register their disability with the University. Once successfully registered, students also must notify their course instructor that they wish to use their approved accommodations in the course.

Please contact Disability Services to schedule an appointment to discuss accommodation requests and eligibility requirements. Most students on the St. Louis campus will contact Disability Services, located in the Student Success Center and available by email at Disability_services@slu.edu or by phone at 314.977.3484. Once approved, information about a student’s eligibility for academic accommodations will be shared with course instructors by email from Disability Services and within the instructor’s official course roster. Students who do not have a documented disability but who think they may have one also are encouraged to contact Disability Services. Confidentiality will be observed in all inquiries.

Student Success Center

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available. The Student Success Center utilizes Zoom to assist students with academic-related services. Students can visit the Student Success Center website to learn more about Tutoring Services, University Writing Services, Disability Services, and Academic Coaching.

Link: <https://www.slu.edu/life-at-slu/student-success-center/index.php>

University Writing Services

Students are encouraged to take advantage of University Writing Services in the Student Success Center; getting feedback benefits writers at all skill levels. Trained writing consultants can help with writing projects, multimedia projects, and oral presentations. University Writing Services offers one-on-one consultations that address everything from brainstorming and developing ideas to crafting strong sentences and documenting sources. Students have the option to complete an online submission (for asynchronous feedback) or to schedule a live video conference. Both can be scheduled through EAB Navigate. For more information, visit the Student Success Center or email writing@slu.edu.

Link: <https://www.slu.edu/life-at-slu/student-success-center/academic-support/university-writing-services/index.php>

Title IX

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual harassment, including sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. If you speak with a faculty member about an incident that involves a Title IX matter, **that faculty member must notify SLU's Title IX Coordinator and share the basic facts of your experience.** This is true even if you ask the faculty member not to disclose the incident. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

Anna Kratky is the Title IX Coordinator at Saint Louis University (DuBourg Hall, room 36; anna.kratky@slu.edu; 314-977-3886). If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK or make an anonymous report through SLU's Integrity Hotline by calling 1-877-525-5669 or online at <http://www.lighthouse-services.com/slu>. To view SLU's policies, and for resources, please visit the following web addresses: <https://www.slu.edu/here4you> and <https://www.slu.edu/general-counsel>.

IMPORTANT UPDATE: SLU's Title IX Policy (formerly called the Sexual Misconduct Policy) has been significantly revised to adhere to a new federal law governing Title IX that was released on May 6, 2020. Please take a moment to review the new policy and information on the following web address: <https://www.slu.edu/about/safety/sexual-assault-resources/index.php>. Please contact the Anna Kratky, the Title IX Coordinator, with any questions or concerns.

Mandatory Statement on Face Masks (Fall 2020)

The University's [*Interim Policy on Face Masks*](#) governs all students, faculty, staff, and campus visitors in all University-owned, leased, or operated facilities. All persons physically present in any such University facility associated with this course shall comply fully with this policy at all times. Masks must be worn before entry to all such University facilities (as well as outdoors on all University property when six feet of distance is unpredictable or cannot be maintained).

Saint Louis University is committed to maintaining an inclusive and accessible environment. Individuals who are unable to wear a face mask due to medical reasons should contact the Office of Disability Services or Human Resources to initiate the accommodation process identified in the University's [*ADA Policy*](#). Inquires or concerns may also be directed to the [*Office of Institutional Equity and Diversity*](#). Notification to instructors of SLU-approved ADA accommodations should be made in writing prior to the first class session in any term (or as soon thereafter as possible).

As the instructor of this course, I shall comply fully with SLU's policy and all related ADA regulations.

Students who attempt to enter a classroom without wearing masks will be asked by the instructor to wear masks prior to entry. Students who remove their masks at any time during a class session will be asked by the instructor to resume wearing their masks.

Note: Accordingly, no consumption of any food will be allowed in class.

Students who do not comply with a request by a SLU instructor to wear a mask in accordance with the University's *Interim Policy on Face Masks* may be subject to disciplinary actions per the rules, regulations, and policies of Saint Louis University, including but not limited to the *Student Handbook*. Non-compliance with this policy may result in disciplinary action, up to and including any of the following:

- dismissal from the course(s)
- removal from campus housing (if applicable)
- dismissal from the University

To immediately protect the health and well-being of all students, instructors, and staff, instructors reserve the right to cancel or terminate any class session at which any student fails to comply with faculty or staff request to wear a mask in accordance with University policy.

Students are strongly encouraged to identify to their instructor any student or instructor not in compliance. Non-compliance may be anonymously reported via the SLU Integrity Hotline at 1-877-525-5669 (or confidentially via the Integrity Hotline's website at <http://www.lighthouse-services.com/slu>).

Attendance

The health and well-being of SLU's students, staff, and faculty are critical concerns. Accordingly, the following University policy statements on in-person class attendance are designed to preserve and advance the collective health and well-being of our institutional constituencies.

1. Students who exhibit any [potential COVID symptoms](#) (those that cannot be attributed to some other medical condition the students are known to have, such as allergies, asthma, etc.) shall absent themselves from any in-person class attendance or in-person participation in any class-related activity until they have been evaluated by a qualified medical official. Students should contact the [University Student Health Center](#) for immediate assistance.
2. Students who exhibit any [potential COVID symptoms](#) (those that cannot be attributed to some other medical condition the students are known to have, such as allergies, asthma, etc.) but who feel well enough to a) attend the course synchronously in an online class session or b) participate in asynchronous online class activities, are expected to do so. Those who do not feel well enough to do so should absent themselves accordingly.
3. Students (whether exhibiting any of potential COVID symptoms or not, and regardless of how they feel) who are under either an isolation or quarantine directive issued by a qualified health official must absent themselves from all in-person course activity per the stipulations of the isolation or quarantine directive. They are expected to participate in synchronous or asynchronous online class activities as they feel able to do so, or absent themselves accordingly.
4. Students are responsible for notifying each instructor of an absence as far in advance as possible; when advance notification is not possible, students are responsible for notifying each instructor as soon after the absence as possible.
5. As a temporary amendment to the current [University Attendance Policy](#), all absences due to illness or an isolation/quarantine directive issued by a qualified health official shall be considered "Authorized" absences (effective August 2020 through May 2021).

Distance Education Etiquette

Your actions in distance education contexts are just as important as in on-ground, face-to-face educational contexts – and sometimes require additional attention and commitment, as some distance education technologies might be less familiar to us. Accordingly, all students are expected to follow the guidelines below:

Synchronous Video Contexts (Zoom, etc.)

1. Mute your microphone when you are not speaking. Remember to "un-mute" yourself just prior to speaking. Identify yourself when you begin speaking.
2. Expect a few seconds of delay in getting a response from the instructor or another class member to a question; wait before repeating your question or assuming it was not heard.

3. If possible, position your camera such that your video feed does not capture too much of your surroundings or other activity/sound from your home/location. Be conscious of posters, art, or other surroundings that others might find offensive or inappropriate for an educational context.
4. Use the “Raise Hand” and “Chat” (or similar) features of your video-conferencing tool. This limits verbal interruptions and the confusion generated when multiple people try to speak at once.
5. Just as in an on-ground, face-to-face class, limit side conversations, multi-tasking (on your computer or otherwise), and use of your cellphone.
6. Temporarily turn off your video feed and mute your microphone when engaged in any non-class conversation or activity.
7. Respect and be attentive to the diversity of your classmates and instructor. Before communicating, consider your message in the context of the class’ diversity in race, ethnicity, religion, disabilities, gender, sexual orientation, age, social class, marital status, geography, etc. Consider the diversity you can see or know – as well as that you cannot.
8. Remember that video-based class sessions (including chat transcripts) may be recorded and retrieved for later viewing.

Non-Video & Asynchronous Contexts (Blackboard, Canvas, Online Chats, Discussion Boards, etc.)

1. When using the “Chat” or “Discussion Board” (or similar) features of your course management system, remember that your course-related communications to the instructor or other students should be considered “professional” (they are not like texts to your friends). Remember that course context and all related written work – including chat and discussion board transcripts – can be recorded and retrieved.
2. Be cautious when using humor or sarcasm; without the context of facial expressions or other body language, your tone or intent could be missed or misunderstood by others.
3. Respect and be attentive to the diversity of your classmates and instructor. Before communicating, consider your message in the context of the class’ diversity in race, ethnicity, religion, disabilities, gender, sexual orientation, age, social class, marital status, geography, etc. Consider the diversity you can see or know – as well as that you cannot.
4. Respect others’ time and life circumstances, which often don’t allow for an immediate response to a question or comment.