Syllabus – The Chemistry of Enzymes

Course Instructor

Instructor: Dr. Graham Moran
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Weekly Schedule

Lecture: Tu/Th 8:30-9:46 AM
Flanner Hall 07
Office Hours: drop by anytime

Email

You must use your Loyola email address for all communication during this course, especially official communication regarding grades. Emails from outside sources can be blocked by spam filters.

Course Materials

Please download and install Kintek Explorer 7: https://www.kintekexplorer.com/downloads/
Course materials will be made available from: sakai.luc.edu

Optional textbooks:

1. Biomolecular Kinetics: A Step-by-Step Guide **Clive R. Bagshaw. CRC Press**
2. Organic Chemistry of Enzyme-Catalyzed Reactions**. Richard B. Silverman. Elsevier**

Grading

2 Problem Sets	50 points each
2 Mid-term Exams	100 points each
Final Exam	200 points
Total	500 points

Problem Sets

Problem Sets will give you the opportunity to practice/prepare for the exams. You may work together to discuss solutions, but you must turn in your own work.

Tentative Problem Set Due Dates: October 15th, November 21st

Midterm Exam

There are **two** midterm exams during the semester. They will cover lecture topics and will be held during the Lecture period.

Midterm Exam Dates: October 10th, December 3rd

Final Exam

The final exam will take place on **Saturday, Dec 14 at 9AM-11AM.**
The final exam is cumulative. All topics discussed are fair game on the final.

You will have exactly 2 hours to complete the exam. Additional time will not be granted, even if you arrive late. There will be no make-up final exams given under any circumstance, and the exam will not be given early, either.

Instructors may not reschedule final exams for a class for another day and/or time during the final exam period. There can be no divergence from the posted schedule of dates for final exams. Individual students who have four (4) final examinations scheduled for the same date may request to have one of those exams rescheduled. If a student reports having four final examinations scheduled for the same date, students should be directed to e-mail a petition to Lester Manzano, Assistant Dean for Student Academic Affairs, CAS Dean's Office (lmanzan@luc.edu).

Course Repeat Rule
Effective with the Fall 2017 semester, students are allowed only THREE attempts to pass Chemistry courses with a C- or better grade. The three attempts include withdrawals (W).

After the second attempt, the student must secure approval for a third attempt. Students must come to the Chemistry Department, fill out a permission to register form or print it from the Department of Chemistry & Biochemistry website:http://www.luc.edu/chemistry/forms/ and personally meet and obtain a signature from either the Undergraduate Program Director, Assistant Chairperson, or Chairperson in Chemistry. A copy of this form is then taken to your Academic Advisor in Sullivan to secure final permission for the attempt.

Final Grades
Final grades will be given after combining both parts of this course. A guideline for grades is shown below. At minimum, you will receive the grade indicated.

A = 90–100%	C+ = 65-69%
A– = 85-89%	C = 60-64%
B+ = 80-84%	C– = 55–59%
B = 75-79%	D = 50-54%
B– = 70–74%	F = 0-49%

THERE ARE NO MAKE-UPS FOR ANY COURSE REQUIREMENTS. PLAN ACCORDINGLY

Class time
Lecture: Class periods will be the *primary* of information for this course. Remember, any questions not addressed during lecture can be addressed via office hours or email. If you miss a period, please get the notes from another student in class.

Class Etiquette
- Come to class on time.
- No talking during lecture.
- Mute electronic devices.
- No eating. No sleeping.
- Multiple violations of classroom etiquette will result in point deductions.

Course Topics

Section 1

Topic 01: What the heck is going on ? I
Topic 02: What the heck is going on ? II
Topic 03: Kinetic Simulation – Learning KinTek Explorer
Topic 04: Computer Modeling of Kinetic Data
Topic 05: Ligand Binding
Topic 06: Transient State Kinetics I
Topic 07: Transient State Kinetics II
Topic 08: Physical Interactions in Enzymes
Topic 09: Notions of Enzyme Catalysis
Topic 10: The Use of Isotopes in Enzymology
Topic 10: The Use of Isotopes in Enzymology
Topic 11: Absorption Spectroscopy

Section 2

Topic 12: Group Transfer, Redox, Monooxygenation
Topic 12: Group Transfer, Redox, Monooxygenation
Topic 13: Case Study-Kynurenine monooxygenase
Topic 14: Case Study-Renalase
Topic 15: Case Study-Dihydropyrimidine dehydrogenase
Topic 16: Dioxygenation, Substitution, Carboxylation
Topic 16: Dioxygenation, Substitution, Carboxylation
Topic 17: Case Study-HPPD
Topic 18: Decarboxylations, Isomerizations, Eliminations & Additions
Topic 18: Decarboxylations, Isomerizations, Eliminations & Additions
Topic 19: Case Study - Cytosolic Isocitrate Dehydrogenase
Topic 20: Aldol Reactions, Formylations, Methylations, Rearrangements
Topic 21: Case study-TrmFO

Final Exam

The University sets the schedule for all final exams. The final will be held **December 14th 9:00-11:00 am Flanner Hall Room 7.** You will have exactly 2 hours to complete the exam. Additional time will not be granted, even if you arrive late. There will be no make-up final exams given under any circumstance nor will the exam be offered at an earlier time.

Academic Integrity

All students in this course are expected to have read and to abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences, which can be viewed at:

http://www.luc.edu/cas/advising/academicintegritystatement/

> A basic mission of a university is to search for and to communicate the truth as it is honestly perceived. A genuine learning community cannot exist unless this demanding standard is a fundamental tenet of the intellectual life of the community. Students of Loyola University Chicago are expected to know, to respect, and to practice this standard of personal honesty. Academic dishonesty

can take several forms, including, but not limited to cheating, plagiarism, copying another student's work, and submitting false documents.

Any instance of dishonesty (including those detailed on the website provided above or in this syllabus) will be reported to The Chair of The Department of Chemistry & Biochemistry who will decide what the next steps may be.

Anything you submit that is incorporated as part of your grade in this course (problem set, exam, etc.) must represent your own work. Any students caught cheating will, **at the minimum**, receive a grade of "zero" for the item that was submitted and this grade will be incorporated into your final grade. If the cheating occurred during a course exam, the incident will be reported to the Chemistry Department Chair and the College of Arts and Sciences administration. Depending on the seriousness of the incident, additional sanctions may be imposed.

Dropping and Withdrawal

Be aware of the following dates in the semester:
September 4th : Last day to withdraw without a mark of a "W."
September 9th: Last day to withdraw with a 100% Bursar credit
September 23rd: Last day to withdraw with a 50% Bursar credit
September 30th: Last day to withdraw with a 20% Bursar credit
November 2nd: Last day to withdraw with a "W" grade, thereafter a "WF" will be assigned

Disabilities

Students with a university-documented disability should contact me immediately. If your disability requires that quizzes and exams be taken outside of the scheduled time or place, please consult: www.luc.edu/sswd/. Services for Students with Disabilities (SSWD) serves students with disabilities by creating and fostering an accessible learning environment.

Student Accommodations

If you have any special needs, please let me know in the first week of classes. The university provides services for students with disabilities. Any student who would like to use any of these university services should contact the Student Accessibility Center (SAC), Sullivan Center, (773) 508-3700. Further information is available at http://www.luc.edu/sac/.

Loyola University Absence Policy for Students in Co-Curricular Activities (including ROTC):

Students missing classes while representing Loyola University Chicago in an official capacity (e.g. intercollegiate athletics, debate team, model government organization) shall be allowed by the faculty member of record to make up any assignments and to receive notes or other written information distributed in the missed classes.
Students should discuss with faculty the potential consequences of missing lectures and the ways in which they can be remedied. Students must provide their instructors with proper documentation (develop standard form on web) describing the reason for and date of the absence.
This documentation must be signed by an appropriate faculty or staff member, and it must be provided as far in advance of the absence as possible. It is the responsibility of the student to make up any assignments. If the student misses an examination, the instructor is required to give the student the opportunity to take the examination at another time.
(https://www.luc.edu/athleteadvising/attendance.shtml)

Accommodations for Religious Reasons

If you have observances of religious holidays that will cause you to miss class or otherwise effect your performance in the class you must alert the instructor ***within 10 calendar days of the first class meeting of the semester*** to request special accommodations, which will be handled on a case by case basis.

Changes to Syllabus
There may be changes to the syllabus during the semester. These changes will generally involve progression, the sequence of topics will remain unchanged.

The Syllabus Schedule

Section 1

Aug.	27	Topic 01: What the heck is going on ? I	
	29	Topic 02: What the heck is going on ? II	Problem Set I
Sep.	3	Topic 03: Kinetic Simulation – Learning KinTek Explorer	
	5	Topic 04: Computer Modeling of Kinetic Data	
	10	Topic 05: Ligand Binding	
	12	Topic 06: Transient State Kinetics I	
	17	Topic 07: Transient State Kinetics II	
	19	Topic 08: Physical Interactions in Enzymes	
	24	Topic 09: Notions of Enzyme Catalysis	
	26	Topic 10: The Use of Isotopes in Enzymology	
Oct	1	Topic 10: The Use of Isotopes in Enzymology	
	3	Topic 11: Absorption Spectroscopy	
	8	Review	
	10	Mid-term Exam I	

Section 2

	15	Topic 12: Group Transfer, Redox, Monooxygenation	Problem Set I Due
	17	Topic 12: Group Transfer, Redox, Monooxygenation	Problem Set II
	22	Topic 13: Case Study-Kynurenine monooxygenase	
	24	Topic 14: Case Study-Renalase	
	24	Topic 15: Case Study-Dihydropyrimidine dehydrogenase	
	29	Topic 16: Dioxygenation, Substitution, Carboxylation	
	31	Topic 16: Dioxygenation, Substitution, Carboxylation	
Nov.	5	Topic 17: Case Study-HPPD	
	7	Topic 18: Decarboxylations, Isomerizations, Eliminations & Additions	
	12	Topic 18: Decarboxylations, Isomerizations, Eliminations & Additions	
	14	Topic 19: Case Study - Cytosolic Isocitrate Dehydrogenase	
	19	Topic 20: Aldol Reactions, Formylations, Methylations, Rearrangements	
	21	Topic 21: Case study-TrmFO	Problem Set II Due
	26	Review	
Dec.	28	Review	
	3	Mid-term Exam II	
	5	Review	
	14	Final Exam (9:00 – 11:00 am)	