

CHEM 523 Section 001, Fall 2017 Course Syllabus

Instructor: Dr. Nicholas Grossoehme
Office: Sims 302A
Office hours:
 Officially - W 10:00 -11:30 and R 12:30-2:00
 Unofficially, I'm in my office or around 3rd floor Sims a lot. Come find me anytime
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Meeting Times: Wednesday and Friday, 12:30 – 1:45 AM, Owens 201

Credit Hours: 3

Course Website: [Blackboard](#) is the primary site.

Textbook: Fundamentals of Biochemistry, 4th ed., Voet and Voet

Web Resources: Information (e.g. lecture notes, videos, problem sets) will be distributed through [Blackboard](#).

Course Objectives and Student Learning Outcomes *Upon completion of this course, the successful student will be able to:*

- Understand and appreciate the chemical properties of biological molecules including amino acids, nucleotides, lipids and carbohydrates.
- Understand and apply basic chemical concepts to biological systems.
- Understand protein, lipid, DNA/RNA and polysaccharide structure on a physical level.
- Understand the general relationship between structure and function of biological molecules.
- Understand basic principles of catalytic strategies used by biological macromolecules.
- Understand mechanisms by which biological systems have evolved to regulate protein function.
- Understand and apply enzyme kinetics.
- Describe the biochemistry behind the transfer of genetic information.
- Completely describe mechanisms of transcriptional and translation control.

University Level Competencies Winthrop's University-Level Competencies (ULCs) identify learning outcomes that apply across all undergraduate programs and that all Winthrop graduates attain. These capacities are essential preparation for working productively and living meaningfully in the contemporary and emerging world. The ULCs were approved by Faculty Conference in October 2010.

Competency 1: Winthrop graduates think critically and solve problems. Winthrop University graduates reason logically, evaluate and use evidence, and solve problems. They seek out and assess relevant information from multiple viewpoints to form well-reasoned conclusions. Winthrop graduates consider the full context and consequences of their decisions and continually reexamine their own critical thinking process, including the strengths and weaknesses of their arguments.

Competency 2: Winthrop graduates are personally and socially responsible. Winthrop University graduates value integrity, perceive moral dimensions, and achieve excellence. They take seriously the perspectives of others, practice ethical reasoning, and reflect on experiences. Winthrop graduates have a sense of responsibility to the broader community and contribute to the greater good.

Competency 3: Winthrop graduates understand the interconnected nature of the world and the time in which they live. Winthrop University graduates comprehend the historical, social, and global contexts of their disciplines and their lives. They also recognize how their chosen area of study is inextricably linked to other fields. Winthrop graduates collaborate with members of diverse academic, professional, and cultural communities as informed and engaged citizens.

Competency 4: Winthrop graduates communicate effectively. Winthrop University graduates communicate in a manner appropriate to the subject, occasion, and audience. They create texts – including but not limited to written, oral, and visual presentations – that convey content effectively. Mindful of their voice and the impact of their communication, Winthrop graduates successfully express and exchange ideas.

Grading for the Course:

Class Preparation: Books are meant to be read and this book is a heck of a good read – you should definitely read it. In fact, I want to make sure you're reading it, so I'll be giving you an opportunity to earn really easy points. 10% of your grade will come from completing questions about the appropriate section of the book. Let me be clear, if you do not read the assigned material and answer the questions, you will not be prepared for class. It will be very common for the professor to give a 15-20 minute recap of the reading assignment with special emphasis on important concepts followed by group activities for the rest of the class period (see below).

Homework: Homework problems are assigned regularly and will be available on the course website. While group work on these problems is largely encouraged, remember that the point is to help **you** master the material. Therefore, make sure that you understand the important concepts and thought process behind which

Class Activities: The data is clear ([click here to see the article](#)) – if I stand up in front of the room and talk at you for 150 minutes each week, I am hurting your potential to learn. Alternatively, by encouraging you to think through problems related to the course content and to seek extra information to course content, you will learn more. Consequently, we will regularly be breaking up into small groups to work on activities related to the content. Daily projects will contribute to 25% of the grade for this category and the three end of section assignments will each contribute 25%. **If you are not prepared to contribute (preparation means completing the reading assignment and answering the class prep questions), your group may abandon you for the day and you forfeit all points associated with the activity.**

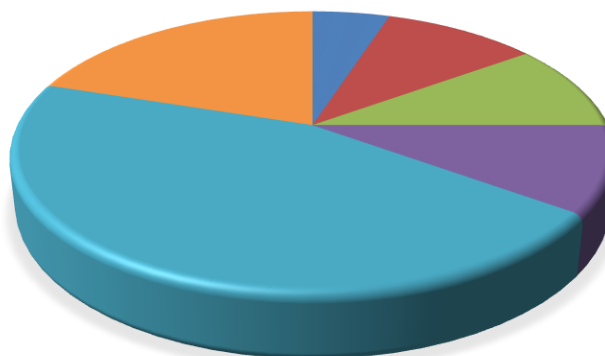
Term Long Project: Each student will be assigned a unique protein to study this term. As the term progresses and you begin to understand biochemistry on a more profound level, activities will be assigned for you to do with your protein. You will also be responsible for developing a deep understanding of the role that this specific protein has in the metabolic function of the organism it is present in. In most cases, homologues or orthologues of these proteins will be present in other species. You will be responsible for learning about the role it plays in these cases and exploring the effect that inhibition or mutation of the protein has on the fitness of humans (or other organisms). You will be required to submit a 10 page paper that describes all aspects of this project (bioinformatics, structure, catalytic mechanism, etc.). The instructor will read and comment on the paper one time prior to the final submission. To take advantage of this opportunity, the draft must be submitted at least one week before the due date.

Tests: The exams, worth 150 points each, are designed to assess your mastery of the material. They will be concept based and will require you to apply what you have learned to a variety of different scenarios. Keep in mind that they are specifically designed to be difficult.

Final Exam - December 6, 8:00 – 10:30 AM The final exam is cumulative and worth 200 points. This exam is mandatory; **you will fail the class if you don't show up.**

Point Distribution

Class Preparation	50
Homework	100
Class Activities	100
Term Paper	100
Midterm Exams	450
Final Exam	200
Total possible points	1000



Grades:

A	B+	B	C+	C	D	F
90-100	87-89	80-86	77-79	70-76	60-69	< 59

Additional Information for Graduate Students: Students receiving graduate credit (both non-degree seeking and those working toward a degree) will not be assigned a protein for the Term Project. Instead, graduate students are required to identify an appropriate protein to explore. The final paper must be 20 pages and a 20 minute presentation must be given to the class during the last class period.

The paper is worth and additional 100 points and the presentation is worth 100 points to give the course total for graduate students 1200 points. Graduate students should also be aware that Winthrop's +/- grading system is not applicable to courses taken for graduate credit. Grades will be assigned as follows: 89%-100% A; 78%-98% B, 65%-76% C, 55%-64% D, 55% or below F.

Attendance: I will not take attendance, however I will notice if you are consistently absent. You will be responsible for anything covered during the lectures. **Absence from a test without a verifiable excuse is inexcusable and the student will receive a zero for that test.** Absence from a test with a doctor's excuse will be accepted and a makeup exam will be arranged. Please be on time. I find tardiness disrespectful and chronic tardiness will not be tolerated.

Technology in the Classroom: Out of respect for everyone in the room, please turn your cellular telephones to 'Silent' and (if applicable) mute your laptop computers. Laptop computers or tablet computers (e.g. I pads) may only be used for taking notes during the class period or interactive activities. Students failing to adhere to these rules will be asked to leave should their behavior prove disruptive to the class. No telephones or laptops may be used during exams or quizzes.

Drop Policy: As described in the Winthrop University Undergraduate catalog

Student code of conduct: As noted in the Student Conduct Code: "Responsibility for good conduct rests with students as adult individuals." The policy on student academic misconduct is outlined in the "Student Conduct Code Academic Misconduct Policy" in the online *Student Handbook* (<http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf>).

Students with Disabilities: Winthrop University is committed to providing access to education. If you have a condition which may adversely impact your ability to access academics and/or campus life, and you require specific accommodations to complete this course, contact the Office of Accessibility (OA) at 803-323-3290, or, accessibility@winthrop.edu. Please inform me as early as possible, once you have your official notice of accommodations from the Office of Accessibility.

Study Tips:

- Ask questions.
- Prepare for the lectures. Know what we will talk about.
- Attend class, take good notes and ask questions
- Read all assigned material before and after hearing a lecture on it.
- Review other sources of information (textbooks, online, etc). Ask for extra material.
- Regularly review lecture notes. Think you understand...review the notes one more time.

Tentative Course Schedule (subject to change):

Date	Topic	Textbook Reading
Aug-23	Intro and Pretest	
Aug-25	Review of Critical Concepts	Chapters 1-2
Aug-30	Nucleic Acid Structure - Intro to Biomolecule Visualization	Chapter 3.1-3.2 and 24.1-24.2
Sep-1	Nucleic Acid Function and Sequencing	Chapter 3.3-3.5
Sep-6	Amino Acids and Primary Structure	Chapter 4
Sep-8	3D Structure of Proteins	6.1-6.2
Sep-13	Energetics of Folding and Stability	6.4-6.5
Sep-15	Protein Purification and Sequencing	Chapter 5
Sep-20	Sugars and Polysaccharides	Chapter 8
Sep-22	Fatty Acids and Biological Membranes	Chapter 9
Sep-27	Biomolecules Activity	
Sep-29	Exam 1	
Oct-4	Non-Enzymatic Proteins	Chapter 7
Oct-6	Enzymes: classes and chemistry	Chapter 11
Oct-11	Enzyme Mechanism Strategies	Chapter 11
Oct-13	Enzyme Kinetics	Chapter 12
Oct-18	Enzyme Kinetics	Chapter 10
Oct-20	Membrane Transport	Chapter 10
Oct-25	Introduction to Biochemical signaling	Chapter 13
Oct-27	Protein Function Activity	
Nov-1	Exam 2	
Nov-3	Replication	Chapter 25
Nov-8	Transcription	Chapter 26
Nov-10	The Ribosome and Translation	Chapter 27
Nov-15	Regulation of Gene Expression	Chapter 28
Nov-17	DNA Repair	Chapter 25
Nov-22	<i>Thanksgiving Break - no class</i>	
Nov-24	<i>Thanksgiving Break - no class</i>	
Nov-29	Exam 3	
Dec-1	Intro to Metabolism - Glycolysis Project	
Dec-6	Final Exam 8AM	