

Chemistry 524: Biochemistry II
MWF 9:00-9:50 Sims 302**Faculty Contact Information****Professor:** Dr. Takita F. Sumter**Phone:** 323-4991**Email:** sumtert@winthrop.edu**Office:** Sims 314A**Office Hours:** MW 1:30-2:30 R 1:30-2:30**Course Overview**

Course Goals: This course is designed to provide a survey of the chemistry and metabolism that occurs in living systems. The major topics include integration and regulation of carbohydrate metabolism, lipid metabolism, and nitrogen metabolism. We will reinforce and apply essential concepts from CHEM 523 to study the chemistry of metabolism. Successful students in CHEM 524 will understand the structural and macromolecular aspects of biochemistry as it relates to biological systems. In addition, students will refine their critical thinking and study skills in efforts to apply the material learned in this course to solve problems encountered by practicing biochemists.

Student Learning Outcomes: In accordance with the goals of the American Chemical Society's Biochemistry Program and the Winthrop University Touchstone program, you should be able to do the following upon completion of this course:

- Understand the function of living systems
- Understand the kinetic and energetic transformations associated with biochemical processes (i.e. enzymatic reactions, binding interactions, and conformational changes) required for the synthesis and degradation of macromolecules.
- Be able to evaluate, critically analyze, and make logical inferences from biochemical data published in primary literature.
- Effectively communicate their knowledge of the various biochemical transformations that occur during integrative metabolism.

Prerequisites: Chem 523 and Chem 525 with grade of C or better.

Required Text: *Biochemistry* by Garrett and Grisham, 4th edition.

Course Requirements

Class Preparation: This is a rigorous upper level course and you should expect to spend at least 9 hours per week preparing for class. The most reasonable way to spend your time is to **pre-read the chapter before class so that you will be able to actively engage in lecture discussions and take good notes.** After the lecture, it is wise to review material covered while it is fresh in your memory and complete relevant homework problems at the end of the chapter. Your questions are welcomed, so feel free to use the beginning of class (or office hours) as a time to clarify any material from the previous lecture that you did not understand. With this type of preparation, you may only need to spend about 12 hours studying for each exam.

Quizzes: Quizzes will most often cover the single most important topic of the previous lecture. The questions will be directly related to the assigned reading and homework problems. The lowest quiz grade of the semester will be dropped. **No makeup quizzes will be given.**

Exams: There will be three exams worth 150 points each. The tentative dates for these exams are outlined on the syllabus. These exams are designed to test your ability to apply concepts covered to solve real biochemical problems. Therefore, it is important that you focus on understanding concepts. **Makeup exams will not be given. Students who miss an exam will have that grade replaced by 33% of their final exam grade.**

There will be a comprehensive final exam worth 250 points covering all topics from CHEM 523 and 524. You must take the final exam in order to pass the course. The final will be given on Tuesday, **May 4th at 3:00 pm.** **The multiple choice portion of this exam will be taken from the American Chemical Society's Standardized**

Exam while the remaining portion will emphasize critical thinking and problem solving in a short answer format.

Report/Oral Presentation (YFMP): Your favorite metabolic pathway (YFMP) project provides an opportunity for students to clearly identify an area of interest to them and conduct a thorough investigation of the topic. Students will submit a written report and present an oral presentation of current research related to their FMP. Details of the assignment are available on the course website. In addition, class participation is essential to the success of this course. Please come prepared to participate in each lecture as your participation will count toward your final oral presentation grade.

Additional Requirements for Graduate Credit: Because of the advanced nature of the course and the level of rigor that it presents, this course may be taken for graduate credit. Students receiving graduate credit (both non-degree seeking and those working toward a degree) will be required to develop a 5-7 page scientific proposal designed to investigate a novel aspect of your favorite metabolic pathway. This proposal must cite at least 7 primary literature sources and must be submitted along with the YFMP document. A 20 minute oral presentation of your proposal will be presented to the class on April 23rd. The paper and presentation are each worth 50 points to give the course total for graduate students 1100. 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: 93%-100% A; 85%-92% B, 76%-84% C, 59%-75% D, 58% or below F.

Grading:	YFMP Project	200 pts.
	Exams (3 x 150)	450 pts.
	Final Exam	250 pts.
	Quizzes	100 pts.
		1000 pts

Grading Scale: A = 920-1000 pts. B⁺ = 880-910 pts. B = 800-879 pts. C⁺ = 770-799 pts. C = 660-769 pts. D⁺ = 600-659 pts. D = 560-599 pts. F = 559 pts. Or lower

Class Attendance: Required. In accordance with University policy, students must attend at least 75% of the classes to pass the course. Attendance will be considered in the case of borderline grades.

Academic Responsibility: Winthrop University has a strict Student Conduct Code printed in the Winthrop University Student Handbook. Students should read it carefully and avoid any infractions such as cheating and plagiarism. Violations of Winthrop's Student Conduct Code will result in failing grade for the entire course. Details of the policy can be found online (<http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf>)

Students with Disabilities: Winthrop University is dedicated to providing access to education. If you have a disability and need accommodations, please contact Gena Smith, Coordinator, Services for Students with Disabilities, at 323-3290, as soon as possible.

* **Note:** This schedule is tentative and subject to change at the professor's discretion. Changes to exam dates will be announced in lectures and sufficient notice will be given.

DATE	TOPIC	READING
1/11	Introduction/Review of Allostery	(15.1-15.4)
1/13	Metabolism (cont'd)	(17.1-2; 17.4)
1/15	Glycolysis	Ch. 18
1/18	MLK HOLIDAY--NO CLASS	
1/20	Glycolysis	Ch. 18
1/22	Glycolysis	
1/25	Quiz 1/ The Citric Acid Cycle (TCA)	19
1/27	TCA Energetics/Regulation	
1/29	Gluconeogenesis (Sect. 1 and 2)	Ch.22
2/1	Quiz 2/ Glycogen Metabolism (Sect 3-4)	Ch. 22
2/3	Glycogen Regulation	Ch. 22
2/5	Electron Transport	Ch. 20
2/8	EXAM I	
2/10	Electron Transport	Ch. 20
2/12	Electron Transport Due Date: Pentose Phosphate Pathway Assignment	
2/15	Electron Transport	
2/17	Quiz 3/ Oxidative Phosphorylation	
2/19	Cont'd	
2/22	Fatty Acid Catabolism	Ch. 23
2/24	Fatty Acids (cont'd)	Ch. 24
2/26	Fatty Acid Biosynthesis	
3/1	Quiz 4/ Cont'd	
3/3	Cont'd	
3/5	Nitrogen Acquisition	Ch. 25
3/8	Amino Acid Synthesis Due Date: Proposals for YFMP projects	
3/10	Amino Acid Metabolism	
3/11	EXAM II	
3/15-19	SPRING BREAK---NO CLASS	
3/22	Purine Synthesis	Ch. 26
3/24	Pyrimidine Biosynthesis	
3/26	Quiz 5/ Nucleotide Metabolism	
3/29	Nucleotide Metabolism Due Date: Literature summaries for YFMP	
3/31	Integration of Metabolic Pathways	Ch. 27
4/3	Cont'd	
4/5	Signal Transduction Pathways	Ch. 32
4/7	Signal Transduction Pathways	
4/9	Quiz 6/ Neurotransmission	
4/12	Neurotransmission	
4/14	Neurotransmission	
4/16	Special Topics	

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4/19	EXAM III
4/21	Student Presentations-- DUE DATE FOR METABOLISM PAPERS
4/23	(cont'd)
4/26	No class
5/4	FINAL EXAM 3:00PM

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