CHE 382: Metabolic Biochemistry  
Spring 2019 Syllabus  
Class meets Tuesday/Thursday 9:20 to 10:50 in Hoyt 369

Professor: Dr. Patrick Lackey  
Office: Hoyt 363  
Email: lackeyp@westminster.edu  
Phone: 724-946-7295

Office hours: Monday, 10:00 – 11:30; Wednesday, 2:00 – 3:00; Thursday, 2:00 – 3:30; or by appointment

COURSE OVERVIEW

Course description: As described by the Westminster Course Catalog: A course examining the metabolism of carbohydrates, lipids, proteins, and nucleic acids in a biological context. Specific metabolic pathways and genetic informational flow in plants and animals will be addressed. In other words, if we spend the first semester of biochemistry building things, we spend this semester tearing them apart and using them to stay alive.


Website: Course material can be found on the CHE 382 D2L page.

Course outcomes: (By the end of this course, students should be able to…

• discuss basic concepts and terminology of metabolism and bioenergetics  
• describe the regulation of metabolic pathways  
• compare and contrast glycolysis and gluconeogenesis and the pentose phosphate pathway  
• diagram and describe the citric acid cycle  
• describe the catabolism of fatty acids and amino acids  
• compare and contrast oxidative phosphorylation and photophosphorylation  
• explain the biosynthesis of lipids, amino acids, and nucleotides  
• describe the regulation of mammalian metabolism through hormones  
• provide an overview of information pathways including DNA, RNA, and protein metabolism

Expectations: This course covers a large amount of challenging material and requires significant time from you outside of class. I expect you to read your text before and after lecture, review your class notes, and actively participate.
COURSE GRADING

Grade distribution:
- Exams (3@15% each): 45%
- Final exam: 15%
- Informational pathways assignments: 15%
- Homework: 10%
- Quizzes/in-class work/other assignments: 15%

Grading scale:
- A 90–100%
- B+ 87–89%
- C+ 77–79%
- D+ 67–69%
- F 0–59%
- B 83–86%
- C 73–76%
- D 63–66%
- B– 80–82%
- C– 70–72%
- D– 60–62%

ASSIGNMENTS

Exams: There will be three exams throughout the semester. The exams will be a combination of multiple choice, short answer and written response. Each essay question will be primarily focused on one or more areas to reflect the course outcomes. Cramming for exams will be futile. Instead, review material on a weekly (or daily) basis.

Final Exam: The final exam is an ACS standardized exam that follows a two-course sequence on Biochemistry. The exam will be multiple choice and will be graded based on the class performance and national norms.

ACS Biochemistry exam: The ACS biochemistry exam will be administered during the semester and is a required part of the course, though your grade on the exam will be used to benefit your overall grade in some fashion, commensurate with your performance on the exam.

Homework: Homework will be due periodically throughout the semester, both for use as an exam review and to ensure you are keeping up on the material. Homework will be generally checked for completion, but may be partially checked for correctness as well.

Just-in-Time homework: On topic-introduction days (Tuesdays), there will usually be a short homework question posted on Monday and due before class on Tuesday to begin our discussion of the topic.

Informational pathways: The final weeks of the semester will involve discussion of various ways information is passed in the body; these will be combined lecture/assignments that will be graded separately.

Quizzes/In-class work/other: Due to the nature of the subject material in this course, certain information-heavy topics will be quiz subjects, to ensure that you are familiar with the key components of the pathway. Some class time will be spent applying the knowledge from lecture/your reading to solve problems and answer questions. This in-class work will range from individual to group effort. It may take the form of textbook questions, case studies, journal reading, quizzes or other assignments as the instructor deems appropriate for your learning. Part of the in-class work grade will be an evaluation of your active participation in the course.
COURSE POLICIES

Attendance:
• In-class work and assignments may be unannounced; unexcused absences on these days will result in a zero for that day’s assignment.
• If you plan to miss any classes, make arrangements for completion of coursework before you leave. Acceptable completion of work after course deadlines is at the discretion of the instructor (which includes reasonable emergencies but does not include poor planning.)
• Late work will not be accepted unless you have an excused absence and work out details with the instructor.
• Bring your notes and calculator to each class period because we will use them often.

Working in Groups: Discussion of coursework may include brainstorming and verbally walking through possible solutions, but should not include one person telling the others how to solve the problems. Each student must write independent solutions to all assignments. You may not look at another student’s written solutions to prepare your own!

Academic Integrity Policy: Students should refer to the Westminster Course Catalog, which lists violations to the Academic Integrity Policy as including, but not being limited to: plagiarism, cheating, misrepresentation of facts or experimental results, unauthorized use of or intentional intrusion into another’s computer files and/or programs, intentional damage to a computer system, and unauthorized use of library materials and privileges. There are extensive examples of each these behaviors in the catalog, but it is important to remember that copying or significantly replicating online material is plagiarism. Academic dishonesty will not be tolerated. The first citation of academic dishonesty will result in a grade of zero for the assignment. The second citation will result in a failing grade for the course. All citations of academic dishonesty will be reported to the Dean of the College, in accordance with the College policy.

Available Support Services: Westminster College makes every effort to accommodate and serve students with a variety of support services. Please visit me outside of class if you are not performing at your desired level. The Learning Center is also a great place to get additional free tutoring; contact the director, Sally Huey at x 6700 to make an appointment with a well-qualified peer tutor. Students with disabilities who require access to solutions for environmental or curricular barriers should contact Disability Resources by contacting the director, Faith Craig at 724-946-7192.
**COURSE SCHEDULE** (subject to change)

<table>
<thead>
<tr>
<th>Tuesday</th>
<th>Thursday</th>
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<tbody>
<tr>
<td>1/14 Ch 13: Bioenergetics and reaction types</td>
<td>1/16 Ch 13: Bioenergetics and reaction types</td>
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<tr>
<td>1/21 Ch 14: Glycolysis, gluconeogenesis, PPP</td>
<td>1/23 Ch 14: Glycolysis, gluconeogenesis, PPP</td>
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<tr>
<td>Homework 1 due</td>
<td>Homework 1 due</td>
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<td>1/28 Ch 15: Principles of metabolic regulation</td>
<td>2/30 Ch 15: Principles of metabolic regulation</td>
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<td>Quiz: Glycolysis</td>
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<td>2/5 Review/catch-up</td>
<td>2/7 Exam 1: Ch 13-15</td>
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<td>Homework 2 due</td>
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<td>2/12 Ch 16: Citric acid cycle</td>
<td>2/14 Ch 16: Citric acid cycle</td>
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<td>2/19 Ch 17: Fatty acid catabolism</td>
<td>2/21 Ch 17: Fatty acid catabolism</td>
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<tr>
<td>Homework 3 due</td>
<td>Quiz: Citric Acid Cycle</td>
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<td>2/26 Ch 18: AA oxidation and urea</td>
<td>2/28 Ch 18: AA oxidation and urea</td>
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<td>3/5 Review/catch-up</td>
<td>3/7 Exam 2: Ch 16-18</td>
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<td>Homework 4 due</td>
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<td>3/12 NO CLASS Spring Break</td>
<td>3/14 NO CLASS Spring Break</td>
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<td>3/19 Ch 19: Oxidative phosphorylation</td>
<td>3/21 Ch 19: Oxidative Phosphorylation</td>
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<td>3/26 Ch 21: Lipid biosynthesis</td>
<td>3/28 Ch 21: Lipid Biosynthesis</td>
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<tr>
<td>Homework 5 due</td>
<td>Quiz: Oxidative Phosphorylation</td>
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<td>4/2 Ch 22: Amino acid, nucleotide biosynthesis</td>
<td>4/4 Review/Catch-up</td>
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<td>Homework 6 due</td>
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<td>4/9 Exam 3: Ch 19, 21, 22</td>
<td>4/11 Information Systems: DNA</td>
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<td>4/16 Information Systems: RNA</td>
<td>4/18 No class Easter break</td>
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<td>4/23 No class</td>
<td>4/25 Information Systems: Gene Expression</td>
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<td>Monday schedule</td>
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<td>4/30 Information Systems: CRISPR</td>
<td>5/2 Final exam review</td>
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*Cumulative Final Exam: Thursday May 9th, 8 AM – 10:30 AM*