

**Chemistry 655/Biology 599**  
**METABOLIC BIOCHEMISTRY OF HUMAN DISEASE**  
**Course Syllabus – Fall 2018**

**Instructor:** Dr. Caryn E. Outten  
**Dept:** Chemistry & Biochemistry  
**Office:** Palms Center for Grad. Sci. Res. 308  
**Office Hrs:** T/Th 10-10:50 AM or by  
appointment (best option)

**Class:** T/Th 8:30-9:45 AM, PSC 214  
**Email:** [outten@sc.edu](mailto:outten@sc.edu)  
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**Prerequisite:** Grade of C or higher in CHEM 555/BIOL 545 or CHEM 550/BIOL 541

**Bulletin Description:** The goal of this course is to apply the core concepts of biochemistry to understanding human health and disease using a patient-oriented approach. The course will focus on case studies in order to examine the basic science, diagnosis, and treatment of human metabolic diseases. The topics discussed are especially appropriate for those students preparing for careers in human and veterinary medicine and other health professions.

**Approach:** This course will use an active learning or “flipped classroom” approach. This means that lectures or other course materials providing fundamental background information on metabolic pathways will be posted on Blackboard (Bb), while the class period will be used for exploring real-world medical problems and cases related to the lecture material. Recorded lectures and/or readings will be posted on Bb for you to view and digest before class. After viewing and/or reading these materials, you are required to perform an activity that will be specified on Bb. Activities include taking a short quiz, completing a homework assignment, or answering/posing questions on a discussion board. These activities must be completed BEFORE the accompanying lesson and will be graded for participation and accuracy. During the class period, we will work through medical biochemistry case studies and solve problems together using iClickers to demonstrate the real-world applications of the lecture material.

**REQUIRED Course Materials:** [iClicker](#), [iClicker+](#), [iClicker 2](#), or [iClicker Reef](#). iClicker is a response system that allows you to respond to questions in class. You will be graded on your in-class participation so you need to bring your iClicker remote or Reef-enabled mobile device to every class period. You must answer at least **85%** of the clicker questions each class period to receive in-class participation credit (regardless of whether or not your answers are correct). We will begin using them for credit on **Tuesday, August 28, 2018.**



You must register your iClicker on Blackboard (or add this course to your Reef account) before that date. Please use the same unit consistently once you have registered it.

**Recommended (not Required) Textbook:** *Marks' Basic Medical Biochemistry: A Clinical Approach*, Lieberman and Peet, 5<sup>th</sup> Edition (2018) Wolters Kluwer, Philadelphia, PA

**iClicker Registration:** Every student is required to have his/her own clicker or Reef account. For iClicker registration, please visit the Chem 655/Biol 599 course page on Blackboard. Click on “Information” and click on “iClicker Student Registration”. The remote ID is the 8-digit number below the barcode on the back of the clicker.

### Chem 655/Biol 599 LESSON & EXAM SCHEDULE

Day	Date	Topic	Textbook
1	TH, 8/23	Lesson 1: Course overview & Medical Terminology	Med. Term. worksheet
2	T, 8/28	Lesson 2: Fuel Metabolism	Chapters 1-3
	W, 8/29	Last day to drop/add without grade of "W"	
3	TH, 8/30	Lesson 3: Daily Energy Expenditure and Caloric Balance	Chapter 1-3
4	T, 9/4	Lesson 4: Carbohydrate Digestion and Absorption	Chapter 21
5	TH, 9/6	Lesson 5: Glycolysis	Chapter 22
	T, 9/11-13	Hurricane Florence – class cancelled	
6	T, 9/18	Lessons 6&7: Fructose/Galactose & Glycogen Metabolism	Chapter 22, 26
7	TH, 9/20	<b>Exam 1 (Lessons 1-7)</b>	
8	T, 9/25	Lesson 8: Citric Acid Cycle	Chapter 23
9	TH, 9/27	Lesson 9: Oxidative Phosphorylation (ETC)	Chapter 24
10	T, 10/2	Lesson 10: Oxidative Phosphorylation (ATPase)	Chapter 24
11	TH, 10/4	Lesson 11: Oxygen Toxicity and Free Radical Injury	Chapter 25
12	T, 10/9	Lesson 12: Pentose Phosphate Pathway	Chapter 27
	TH, 10/11	Hurricane Michael – class cancelled	
13	T, 10/16	Lesson 13: Gluconeogenesis	Chapter 28
	TH, 10/18	Fall Break – no classes, Last day to drop without grade of "WF"	
14	T, 10/23	Lesson 14: Maintenance of Blood Glucose Levels	Chapter 19, 28
15	TH, 10/25	<b>Exam 2 (Lessons 8-14)</b>	
16	T, 10/30	Lesson 15: Glycoconjugates	Chapter 27
17	TH, 11/1	Lesson 16: Lipid Digestion and Absorption	Chapter 29
	T, 11/6	General Election Day – no classes	
18	TH, 11/8	Lesson 17: Fatty Acid & Ketone Oxidation	Chapter 30
19	T, 11/13	Lesson 18: Fatty Acid & Triglyceride Synthesis	Chapter 31
20	TH, 11/15	Lesson 19: Hormone Regulation of Metabolism	Chapter 34
21	T, 11/20	Lesson 20: Ethanol Metabolism	Chapter 33
	TH, 11/22	Thanksgiving Break – no classes	
22	T, 11/27	Lesson 21: Iron/Heme Metabolism	Chapter 16, 42
23	TH, 11/29	<b>Exam 3 (Lessons 15-21)</b>	
24	T, 12/4	In-Class Preparation of Wiki Projects/Presentations	
25	TH, 12/6	Groups 1,2 Presentations	
26	S, 12/8	Groups 3,4 Presentations	
27	T, 12/11	Groups 5,6,7 Presentations (no final exam)	
	TH, 12/13	Finished Wikis Due	

## **Learning Outcomes:**

After successfully completing this course, students will be able to:

- Comprehend human metabolic biochemistry at the molecular, cellular, organ, and whole body level.
- Understand the relevance and utility of biochemistry in the diagnosis and management of disease.
- Evaluate clinical symptoms and test results to construct a diagnosis and treatment for metabolic diseases.

## **Course Grading:**

Exam 1 (9/18):	100 pts
Exam 2 (10/16):	100 pts
Exam 3 (11/20):	100 pts
Bb quizzes/activities:	100 pts
iClicker participation:	100 pts
<u>Group Wiki:</u>	<u>100 pts</u>

Total for the course: 600 pts

## **Grading Scale**

A	=	90–100%
B+	=	85–89%
B	=	80–84%
C+	=	75–79%
C	=	70–74%
D+	=	65–69%
D	=	60–64%
F	=	< 60%

*Bb quizzes/activities:* 22 quizzes/activities @ 5 pts each – drop two lowest grades = 100 pts

*iClicker participation:* 20 lessons/in-class wiki prep @ 5 pts each = 100 pts

Please note that all of the iClicker participation points can be obtained by simply coming to and participating in the in-class lessons and wiki prep. You must answer at least 85% of the questions in class to receive full participation points for each lesson.

The instructor may choose to lower the final grade cutoffs systematically at her discretion if the class average at the end of the semester is below 82.5%.

**Graduate Credit:** To receive graduate credit for this course, an additional written assignment worth 100 pts must be completed and submitted at the end of the semester (bringing the course total to 700 pts). Graduate students should contact the instructor to receive additional details about this assignment.

**Group Wiki Projects/Presentations:** The class will be divided into groups to work together on a case study presented in a wiki format. Each group will choose a metabolic disease/condition (not previously covered in class) to research and present to the class as a case study. More information of these projects (format, grading, etc.) will be provided later in the semester.

**Blackboard Site:** This course is cross-listed as Chem 655 and Biol 599. To simplify distributing course materials, both courses are merged under the **CHEM655** Blackboard site. The **CHEM655** site will be used exclusively for posting lecture videos, online quizzes, class assignments, and other course materials. ALL students should be able to access this site to view and download course materials.

**Exam Make-Up Policy:** Students are required to notify the instructor *by e-mail and/or phone* prior to an exam if circumstances will prevent them from attending. In the case of accidents or illness, a **valid excuse is required** before you can take a makeup exam. In the event classes are officially cancelled on the day of an exam, the exam will be administered during the *next regularly scheduled class period*.

**Academic Integrity:** You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment, and will result in additional disciplinary measures. This includes improper citation of sources, using another student's work, and any other form of academic misrepresentation. Please be aware that it is a violation of the USC Honor Code to enter responses on any iClickers other than your own (for example to give another student participation credit when they are absent).

**Disability Statement:** Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email [sasds@mailbox.sc.edu](mailto:sasds@mailbox.sc.edu), or stop by LeConte College Room 112A. All accommodations must be approved through the Office of Student Disability Services.

**Hazardous Weather:** In case of emergency class cancellations and/or closure of the university, any syllabus changes will be posted on Blackboard. Emergency closures are announced on the university's Carolina alert website: <http://carolinaalert.sc.edu/>