Biology 718 / Chemistry 752 REGULATION AND INTEGRATION OF METABOLISM

Time: (1/17-2/14 & 4/16-4/30) Mondays, Wednesdays 8:05-9:20 AM (Dr. Outten's lessons)
Time: (2/13-4/7) Mondays, Wednesdays, Fridays 8:30-9:20 AM (Dr. Bolander's lectures)
Place: PSC 205
Professors: Caryn E. Outten, Dept. of Chem. & Biochem., GSRC 308, 777-8783, outten@sc.edu
Franklyn F. Bolander, Jr., Dept. of Biological Sciences, SUM 352, 777-7656, bolander@sc.edu
Textbook: Voet & Voet, Biochemistry, 4th Edition.

Date	Instructor	Lecture Topic (Background Reading – Chp. 11)
Part I	**Outten#**	**Carbohydrate Metabolism & Regulation**
Wed. Jan. 17	Outten	Lesson 1 – Bioenergetics & Fuel Metabolism (Chp. 16)
Mon. Jan. 22	Outten	Lesson 2 – Glycolysis (Chp 16-17)
Wed. Jan. 24	Outten	Lesson 3 – Glycogen (Chp. 18)
Mon. Jan. 29	Outten	Lesson 4 – Citric Acid Cycle (Chp. 21)
Wed. Jan. 31	Outten	Lesson 5 – Oxidative Phosphorylation (ETC) (Chp. 22)
Mon. Feb. 5	Outten	Lesson 6 – Oxidative Phosphorylation (ATPase) (Chp. 22)
Wed. Feb. 7	Outten	Lesson 7 – Gluconeogenesis (Chp. 22)
Mon. Feb. 12	Outten	Lesson 8 – Hormonal Regulation of Fuel Metabolism (Chp. 19)
Wed. Feb. 14	Outten	Exam I (Lessons 1-8)

#Dr. Outten's materials (videos, quizzes, powerpoints, etc) will be posted on Blackboard under Chem 752. Dr. Outten uses a flipped classroom approach. This means that lectures providing fundamental background information on metabolic pathways will be posted on Blackboard (Bb), while the class period will be used for exploring real-world biochemistry problems and cases related to the lecture material. After viewing these lecture materials, you are required to take a short quiz on Bb. The quiz must be completed BEFORE the accompanying lesson and will be graded.

Part II	**Bolander***	**Amino Acid & Nucleotide Metabolism and Other Topics**
Mon. Feb. 19	Bolander	Lecture 9 – Pentose Phosphate Pathway (Chp. 23.4)
Wed. Feb. 21	Bolander	Lecture 10 – Lipid Metabolism (Chp. 25)
Fri. Feb. 23	Bolander	Lecture 11 – Nitrogen Fixation (Chp. 26)
Mon. Feb. 26	Bolander	Lecture 12 – Sulfur Fixation (Chp. 26)
Wed. Feb. 28	Bolander	Lecture 13 – Amino Acid Metabolism I (Chp. 26)
Fri. Mar. 2	Bolander	Lecture 14 – Amino Acid Metabolism II (Chp. 26)
Mon. Mar. 5	Bolander	Lecture 15 – Amino Acid Metabolism III (Chp. 26)
Wed. Mar. 7	Bolander	Lecture 16 – Amino Acid Metabolism IV (Chp. 26)
Fri. Mar. 9	Bolander	Lecture 17 – Amino Acid Derivatives (Chp. 26)
Mar. 12-16		Spring break – no class
Mon. Mar. 19	Bolander	Exam II (Lectures 9-17)
Wed. Mar. 21	Bolander	Lecture 18 – Nucleotide Metabolism I (Chp. 28)
Fri. Mar. 23	Bolander	Lecture 19 – Nucleotide Metabolism II (Chp. 28)
Mon. Mar. 26	Bolander	Lecture 20 – Nucleotide Metabolism III (Chp. 28)
Wed. Mar. 28	Bolander	Lecture 21 – Integration of Metabolism I (Chp. 27)
Fri. Mar. 30	Bolander	Lecture 22 – Integration of Metabolism II (Chp. 27)
Mon. April 2	Bolander	Lecture 23 – Integration of Metabolism III (Chp. 27)
Wed. April 4	Bolander	Lecture 24 – Integration of Metabolism IV (Chp. 27)
Fri. April 6	Bolander	Lecture 25 – Photosynthesis I (Chp. 24)
Mon. April 9	Bolander	Lecture 26 – Photosynthesis II (Chp. 24)
Wed. April 11	Bolander	Lecture 27 – Photosynthesis III (Chp. 24)
Fri. April 13	Bolander	Exam III (Lectures 18-27)

*Dr. Bolander's handouts are available at ww2.biol.sc.edu/~bolander; click on BIOL 718/CHEM 752.

Part III Outten Special Topics in Metabolism
A list of topics/papers to choose for the presentation will be available on March 15th

Mon. April 16	Outten	Student Presentations
Wed. April 18	Outten	Student Presentations
Fri. April 20	Outten	Student Presentations
Fri. April 27	Outten	Student Presentations
Mon. April 30	Outten	Student Presentations

Learning Outcomes:

At the end of this course the student will be able to outline and describe:

1. The thermodynamics and kinetics of metabolism.
2. The citric acid cycle.
3. Oxidative phosphorylation.
4. Glycolysis.
5. Glycogen metabolism.
6. Gluconeogenesis.
7. The nitrogen cycle.
8. The sulfur cycle.
9. The pathways for amino acid synthesis and degradation.
10. The pathways for nucleotide synthesis and degradation.
11. The mechanisms of action of hormones.
12. How metabolism is coordinated by hormones.
13. Photosynthesis.
14. How plants handle excessive light stimulation.
15. How desert plants store carbon dioxide.
16. How photosynthesis is regulated.

Grades:

Grades to be determined as follows: CEO: 50% of Grade, FFB: 50% of Grade

CEO quizzes	=	20 pts (5 quizzes @ 4 pts each)
CEO Exam 1	=	100 pts
FFB Exam 2	=	100 pts
FFB Exam 3	=	100 pts
CEO Presentations	=	80 pts
Total:		400 pts

The assignment of letter grades will be based on the percentage of total points earned during the semester, according to the following ranges: A = 90-100%; B^+ = 85-89%; B = 80-84%; C^+ = 75-79%; C = 70-74%; D = 65-69%; F = < 65%. Students with total points in these ranges are assured of at least the indicated letter grade. At our discretion, we may choose to lower these cutoffs systematically if the class average at the end of the semester is below 85%.

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.

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, 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/