Instructor: Michael Massiah, PhD
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Office Hour: By appointment.

Course Website: Desire2Learn (D2L): http://oc.okstate.edu. Use your okey username and password to access site. Call 4-HELP if you have problem.

Prerequisites:
Biochemistry 3653, 4113, or 5753, or consent of the Instructor. You need to refresh on your organic chemistry, amino acids, and protein structures.

Text Materials:

Course Objectives:

1. Goal and Expectation: You will develop an appreciation for the processes that fuel life and gain an understanding of the mechanism and chemical logic of some of the underlying principles and reactions in metabolism. You should/will be able to extrapolate this knowledge to understand related material and/or be stimulated to pursue areas related to questions about metabolism. However, only an overview of metabolism and its regulation in microbial, plant, and animal systems can be presented, because covering everything would be daunting.

2. Problem solving skills: You will be given assignments/quizzes and exam that will challenge your problem solving skills.

3. Exams: Will be based on understanding and extrapolating material in the textbook, class notes, and class discussion. Questions will require thoughtful answers, and not necessarily be based on the concept of memorization and recapitulation. So an understanding of the material is essential. I will also use student questions.

4. Writing Assignment: You will write a detailed one-page abstract/summary on any topic that can include specific enzyme/protein, pathway, or concept related to metabolism not covered in class. This exercise helps prepare you to research the literature, write a concise summary, and gain vital presentation skills.

5. Cheating and Plagiarism: Cheating and going against the spirit of the exams and assignments will result in a zero (0) for that exam/assignment for the cheater and accomplice. Deliberate plagiarism and multiple cheating will result in a fail (F!) for the course. Student will have the opportunity for mediation to resolve accusation of plagiarism.
Course Outline:

I. Introduction (Ch 16)
   A. Metabolism
      Types of reactions
      Review of Organic chemistry
      Methods of studying metabolism
      Energetics
      Thermodynamics

II. Carbohydrate Catabolism (ch 17)
   A. Glycolysis
   B. Other sugars
   C. Fermentations
   D. Pentose phosphate pathway
   E. Gluconeogenesis (ch 23)

III. Glycogen metabolism (Ch 18)
   A. Regulation
   B. Allosterism
   C. Cascades
   D. Diseases associated with glycogen metabolism

IV. Membrane transport (Ch 20)
   A. Regulation of transport
   B. Mechanism of transport

V. Central Metabolism: Krebs Cycle (Ch 21)
   A. Enzymes and reactions

VI. Oxidative Phosphorylation (Ch22)
   A. Mitochondrion
   B. Electron Transport Enzymes
   C. Q-cycle
   D. ATP synthesis

VII. Photosynthesis (Ch24)
   A. Light reactions
   B. Dark reactions

VIII. Lipids (Ch25)
   A. Catabolism (909-930)
      1. Enzyme mechanism
   B. Biosynthesis
      1. Fatty acids (930-942)
      2. Polyketides (935-936)
      3. Phospholipids (969-979)
      4. Sterols (942-959)
      5. Eicosanoids (959-969)
   C. Lipoproteins and Transport (439-449)

IX. Nitrogen Metabolism
   A. Nitrogen Fixation (1044-1049, 1031-1033, 1034-1037, 985-988)
B. Amino Acids
   1. Biosynthesis (1030-1044, 1027-1030)
   2. Catabolism (1352-1365, 988-1013)
C. Porphyrins (1013-1023)
D. Other things (1024-1027)
E. Purines and Pyrimidines (1069-1101)
   1. Biosynthesis
   2. Salvage
   3. Catabolism

X. Integration and Whole Organism Control (1054-1067)

XI. Cell Signaling (tentatively)
Areas of cell signaling will be discussed throughout course

**Style/Mode of Teaching:**
Lecture and Open Class discussion

**Exams (Tentative Dates):**
- Exam 1 – February 1st
- Exam 2 – February 22nd
- Exam 3 – March 12th
- Exam 4 – April 12th
- Presentation: TBA
- Final exam – May X (Any new material after Exam 4 + material throughout semester)

**Exams:**
- Maximum Points (100 total)
  - Exam 1 15%
  - Exam 2 15%
  - Exam 3 15%
  - Exam 4 15%
  - Written Assignment 5% (Rubrics will be given outlining expectations)
  - Homework + online quizzes: 10%
  - Final exam 25%

Final grades are assigned as follows:
- 80-100 % = A
- 60-79.9 % = B
- 40-59.9 % = C
- 20-39.9 % = D

**Required statement on Disabilities**
Any individual needing special accommodations with this course should inform the instructor and the Office of Student Disability Services, 326 Student Union, about the disability and desired accommodations at some point before, during, or immediately after the first scheduled class period, so that these needs can be addressed.

**Semester Schedule**
- Classes begin Monday, January 11
- University holiday Monday, January 18
Last day to add a course (nonrestrictive), January 19
Last day to drop** a course with no grade and no fees for course, January 19
Last day to add a course (restrictive: requires instructor approval), January 22
Last day to drop** a course or withdraw* from all courses with 50% fees, January 22
Drop by petition only after this date
Students' Spring Break Saturday through Sunday, March 15-19
Last day to withdraw* from all courses with automatic grades of “W”, April 9
Last day to withdraw* from all courses with assigned grades of “W” or “F”, April 23
Pre-finals week Monday through Friday, April 23-April 30th
Finals week Monday through Friday, May 3-7

Final grades due electronically from faculty Tuesday, May 11