

Biochemistry 200 (BMB200)

Fall 2007

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|----------------|--|-----------------------|---|---|
| Faculty | Jon Stoltzfus Course Coordinator | 305 Biochemistry | M&W 11:00-12:00 T&R 1:00-3:00 or by appointment | 432-8775 stoltzfu@msu.edu |
| | Susanne Hoffmann-Benning | 120 Biochemistry | R 1:00-3:00 or by appointment | 355-9644 or 432-9281 hoffma16@msu.edu |
| | Michael Feig | 218B Biochemistry | T&R 10:00-11:00 | 432-7439 feig@msu.edu |
| T.A. | Susan Spotts | 306 Natural Resources | T 12:30-1:30 | spottss1@msu.edu |
| | | 111 Biochemistry | R 4:10-5:10 | |

Text: *Biochemistry*, 5th ed., 2006, Mary Campbell and Shawn Farrell, Brooks/Cole (Thomson).

Prerequisites: General chemistry and one term of organic chemistry.

Lectures: Lectures are from 8:00 A.M. to 9:50 A.M. on Tuesdays and Thursdays in Biochemistry room 101. Attendance at lecture is expected.

ANGEL: For course information, lecture notes, grades, and announcements, go to <http://angel.msu.edu> and sign in with your MSU NetID and password. Double click on the course name. If you encounter trouble with ANGEL, please contact Dr. Stoltzfus.

Absence from examinations and quizzes: There are no makeup quizzes or exams during the semester as a missed quiz or a missed exam will be dropped as the lowest grade.

Grading: Final grades will be based on the assessments shown below:

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|------------------|-----|---|
| Quizzes | 10% | (best 5 of 6 at 2% each) |
| "Clicker" Points | 10% | (75% of the total points possible equals full credit) |
| Exams | 80% | (best 4 of 5 at 20% each) |

The course grades will be determined based on the scale shown below. Note that 89.99 is < 90 and will **NOT** be rounded up. No matter where the cutoffs are drawn, someone will always be just below the cutoff. If you are just below a cutoff, do not ask for your grade to be adjusted.

| Percentage | Grade | Percentage | Grade |
|--------------------|-------|--------------------|-------|
| 90.00% or above | 4.0 | < 68.00% to 60.00% | 2.0 |
| < 90.00% to 83.00% | 3.5 | < 60.00% to 55.00% | 1.5 |
| < 83.00% to 75.00% | 3.0 | < 55.00% to 50.00% | 1.0 |
| < 75.00% to 68.00% | 2.5 | < 50.00% | 0.0 |

Assessments:

Quizzes: There will be six unannounced "mini-exam" quizzes. These will be short (5-10 question ~ 10 minute) quizzes designed to acquaint you with the style of examination questions you may be ask on an upcoming exam. Your best five scores on the six unannounced quizzes will count as 10% of your grade. There will be no make-up quizzes. If you are sick or cannot attend class for any reason, this is the quiz score that will be dropped.

"Clickers": This course will use a classroom response system. You will receive 2/3 of a point for sending in any answer and an additional 1/3 point for sending in the correct answer for each question posed during class. If you receive 75% of the possible "clicker" points, you will receive full credit for the "clicker" portion of your grade. "Clicker" points will make up 10% of your grade. It is your responsibility to bring your clicker to class each day. If you forget to bring your clicker or miss class for any reason, you will receive no points for that day. Because you only need 75% to get full credit, you can miss one or two days without penalty. If your clicker malfunctions during class, please notify the TA immediately.

Exams: On Sept 20, Oct 23, Nov 15, Dec 6 there will be midterm exams. On Thursday, Dec 13 at 7:45 A.M. in BCH101 (the normal lecture room) there will be a comprehensive final. The best four of these five exams will count as 80% your grade (20% for each exam). There will be no make-up exams. If you are sick or cannot attend class for any reason, this is the exam score that will be dropped.

Course Rational: In this course, you can learn the basics of how what you eat lets you live. All food can be broken down into four major components, the same components required for life. This class will systematically present the physical and chemical properties of these components, the role of each of these components in your body, and the processes by which your body utilizes these components.

Course Goals: When you successfully complete this course, you will have a conceptual understanding of how the basic components found in the food you eat function in your body.

Course Objectives:

Explain the roles water, chemical equilibrium, and pH play in your body.

Recognize the chemical structure of the of the molecular building blocks found in the food you eat and identify the important chemical and physical properties of these building blocks.

Describe how these molecular building blocks polymerize into larger molecules and organize into cellular structures.

Compare and contrast the functions of these building blocks and their polymers in living cells.

Explain how the chemical and physical properties of these building blocks cause them to carry out their specific functions in your body.

Explain how information is stored and passed on based on the chemical and physical properties of the molecules found in living cells.

Explain how our understanding of biochemistry and molecular biology are changing the way society approaches food production and medical problems.

Describe the basic cellular pathways used to break down the food you eat and produce the cellular building blocks and energy your body needs.

Discuss the relationship between coenzymes and vitamins and the role of coenzymes in metabolism.

Explain basic physical and chemical concepts that underlie cellular processes and apply these to problems involving your body's utilization of food.

Lecture Schedule

BMB 200-Fall 2007

| Date | Day # | Topic | Instr. | Reading |
|--------|-------|--|--------|------------|
| 28-Aug | Tu | 1 Are you what you eat? - An overview of biochemistry. | JS | Chapter 1 |
| | | 2 Course Mechanics | JS | Handout |
| | | | | |
| 30-Aug | Th | 3 Cell composition and compartmentalization; animal/plant cells | SHB | Handout |
| | | 4 Water; acid/base/pH; buffers | SHB | Chapter 2 |
| | | | | |
| 4-Sep | Tu | 5 Amino acids, peptides, proteins and their synthesis | SHB | Chapter 3 |
| | | 6 | SHB | |
| | | | | |
| 6-Sep | Th | 7 Three-dimensional structure of proteins; protein function | SHB | Chapter 4 |
| | | 8 Folding and disease | SHB | |
| | | | | |
| 11-Sep | Tu | 9 Protein purification and characterization techniques | SHB | Chapter 5 |
| | | 10 Intoduction to enzymes | SHB | |
| | | | | |
| 13-Sep | Th | 11 The behavior of proteins: Enzymes | SHB | Chapter 6 |
| | | 12 | SHB | |
| | | | | |
| 18-Sep | Tu | 13 The behavior of proteins: Enzymes, Mechanisms, and Control | SHB | Chapter 7 |
| | | 14 | SHB | |
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| 20-Sep | Th | Exam I - Lectures 1-14 | SHB | |
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| 25-Sep | Tu | 15 Lipids and membranes | SHB | Chapter 8 |
| | | 16 | SHB | |
| | | | | |
| 27-Sep | Th | 17 Lipids and membranes | SHB | Chapter 8 |
| | | 18 | SHB | |
| | | | | |
| 2-Oct | Tu | 19 Introduction to Molecular Biology/Nucleic Acids | MF | Chapter 9 |
| | | 20 | MF | |
| | | | | |
| 4-Oct | Th | 21 Nucleic Acid Structure | MF | Chapter 9 |
| | | 22 | MF | |
| | | | | |
| 9-Oct | Tu | 23 DNA Replication and DNA Repair | MF | Chapter 10 |
| | | 24 | MF | |

| Date | Day # | Topic | Instr. | Reading |
|--------|-------|--|----------|------------|
| 11-Oct | Th | RNA Synthesis and Transcription | MF | Chapter 11 |
| | | | MF | |
| 16-Oct | Tu | 27 Protein Synthesis | MF | Chapter 12 |
| | | 28 | MF | |
| 18-Oct | Th | 29 Biotechnology | MF | Chapter 13 |
| | | 30 | MF | |
| 23-Oct | Tu | Exam II - Lectures 15-30 | SHB & MF | |
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| 25-Oct | Th | 31 Sugars | JS | Chapter 16 |
| | | 32 Can your body store sugar? | JS | |
| 30-Oct | Tu | 33 Why does food equal energy? | JS | Chapter 15 |
| | | 34 Niacin and Folic Acid | JS | |
| 1-Nov | Th | 35 What happens when you eat sugar? | JS | Chapter 17 |
| | | 36 | JS | |
| 6-Nov | Tu | 37 Can your body make sugar? | JS | Chapter 18 |
| | | 38 What else can your body do with sugar? | JS | |
| 8-Nov | Th | 39 Why do you exhale carbon dioxide? | JS | Chapter 19 |
| | | 40 | JS | |
| 13-Nov | Tu | 41 Why must you breath in oxygen? | JS | Chapter 20 |
| | | 42 | JS | |
| 15-Nov | Th | Exam III - Lectures 31-42 | JS | |
| | | | | |
| 20-Nov | Tu | 43 What happens when you eat fats? | JS | Chapter 21 |
| | | 44 Can your body make fat from sugar? | JS | |
| 22-Nov | Th | Thanksgiving | | |
| | | | | |
| 27-Nov | Tu | 45 Where does sugar come from? | JS | Chapter 22 |
| | | 46 | JS | |

| Date | Day # | Topic | Instr. | Reading |
|--------|-------|---|-------------|------------|
| 29-Nov | Th | 47 Why is it an essential amino acid? | JS | Chapter 23 |
| | | 48 Do you need to eat DNA? | JS | |
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| 4-Dec | Tu | 49 Putting it all together! | JS | Chapter 24 |
| | | 50 | JS | |
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| 6-Dec | Th | Exam IV - Lectures 43 - 50 | JS | |
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| | | | | |
| 13-Dec | Th | Comprehensive Final - 7:45 to 9:45 A.M. in BCH 101 | SHB, MF, JS | |

Please note that material covered on each date may deviate slightly from this schedule and topics on each exam may change based on the rate the material is covered in class.