

**INTRODUCTION TO CELL STRUCTURE AND METABOLISM**  
**BMS 602**  
**Fall 2015**

**COURSE POLICY**

**Course Director:**

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**Required Textbooks**

Lehninger Principles of Biochemistry, 6<sup>th</sup> Edition, Nelson and Cox, W.H. Freeman and Company, New York, 2013.

Molecular Cell Biology, 7<sup>th</sup> Edition, Lodish et al., W.H. Freeman and Company, New York, 2012.

Textbooks are available at the Marshall University Bookstore. There are companion websites at <http://bcs.whfreeman.com/lehninger> and <http://bcs.whfreeman.com/lodish7e>.

## **Classes**

BMS 602 is a 3 credit hour course. Classes will be held from 1:00 - 2:50 PM on Mondays, Wednesdays and Fridays in Room 102 at the Biotechnology Science Center (BSC). While not required, attendance at all classes is strongly recommended. There is a possibility that there will be changes in the course schedule. You will be notified in advance if any changes occur.

## **Examinations**

Three examinations will be given in this course, each during regularly scheduled class time. Only under **truly exceptional circumstances** will a student be permitted to take an examination at a time other than during the scheduled examination period. Exceptional circumstances include: death or serious illness in the immediate family, childbirth, illness requiring hospitalization and illness serious enough to warrant a written dispensation from a physician. Minor illnesses are **NOT** exceptional circumstances. A written doctor's excuse stating the nature of the illness will be required. If arrangements have not been made beforehand, the student **MUST** contact the course director within 24 hours after the scheduled exam period to discuss rescheduling the exam.

The format of each exam will consist of 50% multiple-choice and 50% of one or more of the following – essay, fill-in-the-blank, matching and short answer.

There will be available on MUOnline quizzes consisting of 2-3 short multiple-choice questions on each week's material to help in learning.

## **Homework**

There will homework assignments throughout the course for a total of **65 points**.

## **Grades**

Student performance is based on the scores achieved on three block exams and the homework. There is no cumulative final. The block exams will be based on 10 points/lecture. There are 36 lectures in the course. The point totals for each exam are as follows.

|        |                    |                   |
|--------|--------------------|-------------------|
| Exam 1 | 12 lectures        | 120 points        |
| Exam 2 | 10 lectures        | 100 points        |
| Exam 3 | 14 lectures        | 140 points        |
|        | <b>36 lectures</b> | <b>360 points</b> |

Grades are calculated on a straight percentage scale, based on a total of **425 points (exams = 360 points, homework = 65 points)**. Final letter grades will be assigned as follows based upon the average percentage obtained on the three exams and the homework. Grades will be posted on MUOnline as soon as reasonably possible after each exam.

|   |           |
|---|-----------|
| A | 90-100%   |
| B | 80-89%    |
| C | 70-79%    |
| D | 60-69%    |
| F | Below 60% |

## **Class Policies**

University policies can be viewed at

<http://www.marshall.edu/president/board/policies.html>.

### Academic Dishonesty

Academic dishonesty will not be tolerated. Policy AA-12 defines academic dishonesty and describes the sanctions associated with it.

### Inclement Weather

Policy GA-9 describes the policy on weather-related and/or emergency closings and delays. As this is an afternoon class, we will not be affected by delays. To find out if the University is closed, please call Audix at 696-6245.

### Students with Disabilities Policy

Students with disabilities are required to prepare a notice either from the Help Center, Myers Hall, or Sandra Clements, PH 117, before a special accommodation can be honored. The link describing this policy is <http://www.marshall.edu/disabled>.

### University Computing Services Acceptable Use Policy

MUBOG Policy IT-1 explains this policy

(<http://www.marshall.edu/president/board/policies.html>).

### Cell Phone Use

Cell phone use, including texting, will not be tolerated in the class, unless authorized by the instructor. If special circumstances exist such that a student needs to be in communication with family members or friends during a class, please inform the instructor before the class begins. Permission will be granted on a case-by-case basis and at the sole discretion of the instructor. If a student persists in using cell phones, including texting, after they have been asked to stop, the student will be removed from the class.

## **Course Objectives**

After completing this course, students should have a thorough understanding of the biochemistry, metabolism and structure of cells, and the molecular mechanisms that determine the function of cells. The student should be able to describe:

- 1) The components and organization of a cell including:
  - a. Membranes
  - b. Organelles
  - c. Molecular traffic of cellular components
  - d. Cytoskeleton and motility
- 2) The structure of lipids and lipoproteins, how they are synthesized, and how they are degraded.
- 3) The structure of carbohydrates, how they are synthesized and how they are broken down.
- 4) How to design experiments and analyze data.
- 5) Advanced techniques for studying DNA, RNA, and proteins.

| <b>Student Learning Outcomes</b>   | <b>How Outcome Will Be Practice</b>    | <b>How Outcome Will Be Assessed</b> |
|--|--|-------------------------------------|
| Know the structure and function of membranes                               | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |
| Know the structure and function of cell organelles.                        | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |
| Know how components are transported to different parts of the cell.        | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |
| Know the structure and function of the cytoskeleton.                       | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |
| Know how cells move.   | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |
| Know the structure, synthesis, and degradation of lipids.                  | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |
| Know the structure, synthesis, and degradation of carbohydrates.           | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |
| Analyze and assess advanced techniques for studying DNA, RNA, and protein. | In-class discussion,<br>Online quizzes | Exam questions,<br>Homework         |

**BMS 602 2015 LECTURE SCHEDULE**  
**MWF 1:00 – 2:50 PM**

|    |           |             | <b>CELL STRUCTURE &amp; FUNCTION I</b>  |  |
|----|-----------|-------------|---|--|
| 1  | Wednesday | October 14  | How to design experiments               |  |
| 2  |           |             | How to analyze data                     |  |
| 3  | Friday    | October 16  | Fatty acid structure                    |  |
| 4  |           |             | Fatty acid function                     |  |
| 5  | Monday    | October 19  | Membrane structure                      |  |
| 6  |           |             | Membrane composition                    |  |
| 7  | Wednesday | October 21  | Membrane Transport 1                    |  |
| 8  |           |             | Membrane Transport 2                    |  |
| 9  | Friday    | October 23  | ER; Golgi                               |  |
| 10 |           |             | ER; Golgi                               |  |
| 11 | Monday    | October 26  | Microarrays                             |  |
| 12 |           |             | Genomics, proteomics, etc.              |  |
| 13 | Wednesday | October 28  | Vesicular Transport                     |  |
| 14 |           |             | Secretion, Endosomes                    |  |
|    | Friday    | October 30  | <b>EXAM 1</b> (Lectures 1-12)           |  |
| 15 | Monday    | November 2  | Cytoskeleton 1                          |  |
| 16 |           |             | Cytoskeleton 2                          |  |
| 17 | Wednesday | November 4  | Cytoskeleton 3                          |  |
| 18 |           |             | Cell culture and transfections          |  |
| 19 | Friday    | November 6  | ECM and Cell-Matrix Adhesion            |  |
| 20 |           |             | Cell-Cell Adhesion                      |  |
|    |           |             | <b>CELL STRUCTURE &amp; FUNCTION II</b> |  |
| 21 | Monday    | November 9  | Cloning of DNA                          |  |
| 22 |           |             | Chromatin assays                        |  |
| 23 | Wednesday | November 11 | Fatty acid synthesis 1                  |  |
| 24 |           |             | Fatty acid synthesis 2                  |  |
|    | Friday    | November 13 | <b>EXAM 2</b> (Lectures 13-22)          |  |

|    |           |                       |   |  |
|----|-----------|-----------------------|---|--|
| 25 | Monday    | November 16           | Fatty acid synthesis 3                        |  |
| 26 |           |                       | Flow cytometry                                |  |
| 27 | Wednesday | November 18           | Fatty acid metabolism 1                       |  |
| 28 |           |                       | Fatty acid metabolism 2                       |  |
| 29 | Friday    | November 20           | Carbohydrate structure & function             |  |
| 30 |           |                       | Glycolysis                                    |  |
|    |           | <b>November 23-27</b> | <b>FALL BREAK</b>                             |  |
| 31 | Monday    | November 30           | Gluconeogenesis                               |  |
| 32 |           |                       | Detecting modified proteins and nucleic acids |  |
| 33 | Wednesday | December 2            | Glycogen metabolism                           |  |
| 34 |           |                       | Carbohydrate lecture                          |  |
| 35 | Friday    | December 4            | Citric acid cycle                             |  |
| 36 |           |                       | Mitochondria                                  |  |
|    | Wednesday | December 9            | <b>EXAM 3</b> (Lectures 23-36)                |  |