

## **BMB/MICRB251 Section 002, Fall 2018 (3 Credits)**

**Course Name:** "Molecular and Cell Biology I"

**Lecture Times:** MWF from 12:20-1:10pm, August 20<sup>th</sup> to December 7<sup>th</sup>, 2018

**Lecture Location:** Chambers Building 108



### **Professor Contact Information:**

**Name:** Joyce Jose, Ph.D., Assistant Professor of Biochemistry & Molecular Biology

**Email:** [jj321@pasu.edu](mailto:jj321@pasu.edu)

**Office:** W206 Millennium Science Complex (MSC).

### **Office Hours:**

Standing Office Hours: Tuesdays from 1:00-2:30pm in W206 Millennium Science Complex. This time was chosen to span two (2) lecture times to enable more students to attend.

By Appointment. Please request appointments by Canvas/email, and please specify the question/concept to be addressed and listing dates/times when you are available.

### **Course Management Software: Canvas**

Canvas will be used for this course and will also be used for our exams. Exams will be held at the Pollock Testing Center (<http://testing.psu.edu/>) and in class.

Official correspondence, lecture slides, study guides and other material will be provided through Canvas. Please check Canvas for important messages and to send messages to me.

### **Course Description:**

The purpose of this course is to introduce you to fundamental principles of molecular and cell biology. This course covers fundamental knowledge of molecular biology that will prepare you for more advanced study in the Biochemistry and Molecular Biology, Biotechnology or Microbiology majors. It also lays the foundation to prepare students to embark on independent research in molecular and cell biology. For other life science-related majors, it provides an overview of basic principles of cell and molecular biology.

Topics covered will include elementary biochemistry; structure and function of biological macromolecules; the eukaryotic cell and its organelles; the role of biological membranes in bioenergetics and sub-cellular compartments. There will be a particular emphasis on the molecular mechanism of heredity; the organization and expression of genetic information; experimental methods used in the analysis of gene expression and the relationship between gene/protein structure and function.

### **Learning Objectives:**

There are detailed Learning Objectives for BMB/MICRB251 that are available on Canvas. Please review these to know what content is especially helpful to understand from this course.

### **Course Schedule:**

Schedule: Please see the end of this syllabus for the planned schedule of lectures and the related sections of the textbook. Periodically we will have lectures dedicated to catching up to the planned schedule.

Exams will be held in the Pollock Testing Center (PTC) on fixed dates and will not be moved. Please plan accordingly. You will schedule your own exam through the PTC (<http://testing.psu.edu/>), which can be taken anytime between 8am and 10pm.

**Schedule: subject to change if necessary**

Lecture #	Day of Week	Date	Lecture Topic	Reading: Chapter, Page Range
1	Mon	20-Aug	Universal Features of Cells	1, p. 1-30
2	Weds	22-Aug	Chemistry of the Cell	2, p. 43-75,81-86,90-101
3	Fri	24-Aug	Energetics and Cellular Metabolism	2, p. 43-75,81-86,90-101
4	Mon	27-Aug	Protein Structure	3, p. 109-123
5	Weds	29-Aug	Proteins as Enzymes	3, p. 134-141, 144-148, 150-155, 157,158,162-166
6	Fri	31-Aug	DNA, Genomes, Chromosomes	4, p. 173-186, 100-101
	Mon	3-Sep	Labor Day, No Lecture	
7	Weds	5-Sep	Chromatin I	4, p. 187-200, 207-209
8	Fri	7-Sep	Chromatin II	4, p. 187-200, 207-209
	Mon	10-Sep	Exam 1: Pollock Testing Center (Lectures 1-8), No Lecture	
9	Weds	12-Sep	DNA Synthesis and DNA Replication Machines	5, p. 237-253
10	Fri	14-Sep	DNA Replication	5, p. 254-264
11	Mon	17-Sep	DNA Damage and Repair	5, p. 266-276
12	Weds	19-Sep	DNA Recombination and Mobile Genetic Elements	5, p. 277-292
13	Fri	21-Sep	Transcription Basics	6, p. 299-309
14	Mon	24-Sep	Eukaryotic Transcription and RNA Processing II	6, p. 309-321, 325
	Weds	26-Sep	Exam 2: Pollock Testing Center (Lectures 9-14), No Lecture	
15	Fri	28-Sep	Eukaryotic Transcription and RNA Processing II	6, p. 309-321, 325
16	Mon	1-Oct	Export, rRNA processing, Translation Basics	6, p. 326-340
17	Weds	3-Oct	The Ribosome, Translation Regulation I	6, p. 340-351,
18	Fri	5-Oct	Translation Regulation II, Protein Folding and Destruction	6, p.353-360, 159
19	Mon	8-Oct	DNA-Binding Proteins and Prokaryotic Genetic Switches	7, p. 369-379, 380-383
20	Weds	10-Oct	Gene Regulatory Mechanisms I: Eukaryotic	7, 384-396
21	Fri	12-Oct	Gene Regulatory Mechanisms II: Epigenetics and Post-Transcriptional Control	7, p. 401, 404-406,413-430

22	Mon	15-Oct	Biochemical Methods I	8, p. 442-463
23	Weds	17-Oct	Biochemical Methods II	8, p. 442-463
	Fri	19-Oct	Exam 3: Pollock Testing Center (Lectures 15-23), No Lecture	
24	Mon	22-Oct	Molecular Biology Methods I	8, p. 463-485
25	Weds	24-Oct	Molecular Biology Methods II, Genetic & Genomic Methods	8, p. 494-508
26	Fri	26-Oct	Visualizing Cells I	9, p. 529-547, 554-562
27	Mon	29-Oct	Visualizing Cells II	9, p. 529-547, 554-562
28	Weds	31-Oct	Membrane Structure and the Lipid Bilayer	10, p. 565-576
29	Fri	2-Nov	Membrane Proteins	10, p. 576-594
30	Mon	5-Nov	Carrier Proteins, Channel Proteins and Membrane Potential (end of exam 4)	11, p. 597-611
31	Weds	7-Nov	Action Potential and Nervous Transmission	11, p. 611-629, 632-633
	Fri	9-Nov	Exam 4: Pollock Testing Center (Lectures 24-31), No Lecture	
32	Mon	12-Nov	Intracellular Compartments and Organelle Import	12, p. 641-658
33	Weds	14-Nov	Organelle Transport, Peroxisomes and the Endoplasmic Reticulum	12, p. 658-683
34	Fri	16-Nov	Protein Modification and Lipid Synthesis in the ER	12, p. 683-691
			Thanksgiving Break, No Lectures This Week	
35	Mon	26-Nov	Vesicle Formation and Targeting	13, p. 695-707
36	Weds	28-Nov	Vesicle Targeting (cont) and the Lysosome	13, p. 710-729
37	Fri	30-Nov	Endocytosis and Exocytosis	13, p. 730-750
38	Mon	3-Dec	Mitochondria	14, p. 753-782,
39	Weds	5-Dec	Chloroplasts and photosynthesis and organelle genomes	782-809
40	Fri	7-Dec	Catch up, extra time	
			Exam 5: Location TBD (Lectures 32-40)	

### Texts, Readings, Materials:

Textbook: Alberts, *et al.*, Molecular Biology of the Cell, 6th edition (blue cover). You should complete the reading assignment before class so that you are familiar with the lecture material. This will help you follow the lecture and respond to the clicker questions.

I-clickers: We will be using the student response system (I-clickers) in class, I-clicker is an electronic system that allows you to respond to questions in class. The I-clicker will be used in all class periods, and you are responsible for bringing your remote daily and assure it is in good working order (working batteries). In order to receive credit for clicker questions, you will need to register your I-clicker remote online within the FIRST WEEK of class. You can complete this registration through the link provided on Canvas.

Lecture Notes/Study Guides/Videos: Lecture notes will be posted as Powerpoint files before class.

*You are strongly encouraged to bring these to class.* Study guides will be posted for specific textbook chapters, but should not be viewed as comprehensive. Helpful videos will be posted to Canvas of especially challenging concepts either from the textbook publisher (Garland) or other trustworthy sources.

### **Grading and Exams:**

Exams (400 pts): Each exam (5 exams, 80 points each) will consist of 40 multiple choice questions. Scores for the exams will be posted on Canvas. It is your responsibility to learn to use your account and to check your scores. Exams will be held at the Pollock Testing Center (PTC). The PTC will send you an email about 7-10 days before to schedule your exam. I have set up the exam so that you can take them anytime that the PTC is open.

Clicker-Based Participation (40 pts): Students are responsible for registering their clickers on Canvas within the first week of class. You can earn up to a total of 40 clicker points throughout the semester. More points will be awarded for correct answers so take them seriously and come to class prepared. You will receive 0.5 pts for a correct answer and 0.25 points for an incorrect answer. There will be opportunities to earn more than 40 pts, but once you earn 40, you have earned your maximum for the semester. The opportunity to earn more than 40 pts builds in some forgiveness for missed responses and incorrect answers. You will not be awarded clicker points on days that you are absent from lecture for any reason. Clicker grades will be updated on Canvas shortly after each exam.

Clicker misconduct: ***The use of the response system is subject to University Academic integrity policies.*** Bringing another student's clicker to class and entering a response or other misuse is considered misconduct. Random checks of clicker responses versus physical attendance in class may be conducted.

Final Grades: Final grades will be determined by the exam scores and points given for clicker responses (see above). The following table provides **approximate final** letter grade assignments based upon previous years' final grade distributions. This scale is based on an overall class mean of 75% or higher. If the class mean is lower, the grading scale will be adjusted downward. If the class performs better than expected, it will not be adjusted upward.

<u>GRADE:</u>	<u>PERCENTAGE:</u>
A	>93.0%
A-	>90.0%
B+	>85.0%
B	>80.0%
B-	>75.0%
C+	>70.0%
C	>60.0%
D	>50.0%
F	<50.0%

Missed Exams: Make up exams can be either all essay questions or a mixture of essay and short answer questions at my discretion. Make ups must be taken within two weeks or you will receive a zero. Whenever possible, notify me prior to the exam. Exams should only be missed for a family emergency, accident, or serious illness.

No extra credit work will be accepted. No exams will be dropped.

## **Relevant Policies of the Pennsylvania State University:**

### Academic Success:

The Eberly College of Science (ECOS) is committed to the academic success of students enrolled in the College's courses and undergraduate/graduate programs. When in need of help, students can utilize various College and University-wide resources for learning assistance. These are found at:

<http://science.psu.edu/current-students/support-network/advising>

### Code of Mutual Respect and Cooperation:

ECOS's Code of Mutual Respect and Cooperation embodies the values that we hope our faculty, staff, and students possess, and will endorse, to make the Eberly College of Science a place where every individual feels respected and valued, as well as challenged and rewarded. This document is found at:

<http://science.psu.edu/climate/support-and-resources/code-of-mutual-respect-and-cooperation/Code-of-Mutual-Respect%20final.pdf>

**The most important way to demonstrate respect for your classmates is to engage in proper classroom behavior.** Talking and other disruptive actions negatively impact the ability of people to learn and follow the lecture.

### Resources for Students with Disabilities:

If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at +1.814.863.1807 (V/TTY). For further information regarding ODS, please visit their website at <http://equity.psu.edu/ods/>. In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at the ODS website). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

### Academic Integrity:

All Penn State policies regarding ethics and honorable behavior apply to this course (see links below for policy statements). Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. All exam answers must be your own, and you must not provide any assistance to other students during exams. The students and instructors are bound by the rules and procedures on academic integrity set by the Eberly College of Science Academic Integrity Committee. A complete listing of these policies can be found at the following web site: <http://www.science.psu.edu/academic/Integrity/index.html>. It is the student's responsibility to know and abide by these policies. Failure to do so may result in sanctions or expulsion.

### Changes to this Course Syllabus:

Please note that this course syllabus is subject to change as needed to provide an effective instructional environment and to achieve the goals and objectives described above. Should the syllabus change, all changes will be provided in writing via Canvas with reasonable notice given of the changes.