

## **BIO 517 – Cellular & Molecular Biology I Syllabus**

**Classes:** Online. This course will make considerable use of the Canvas site.

**Instructor:** Dr. Shaad M. Ahmad

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**Office Hours:** By appointment. Please email Dr. Ahmad if you have any questions. If you need further assistance, we will schedule a Zoom session.

### **Required Textbook:**

- *Karp's Cell and Molecular Biology*, 9<sup>th</sup> edition  
by Janet Iwasa and Wallace Marshall

It is absolutely essential for you to have access to the textbook. Students are expected to read the textbook and understand important key concepts. As an online course, the textbook is going to be our primary learning tool.

**Course prerequisites:** At least one semester of undergraduate Organic Chemistry.

### **Course objectives:**

By the completion of the course, the student will be able to:

- Understand advanced concepts in cell biology from a molecular perspective.
- Follow and remain abreast of primary literature in the field.
- Discuss and communicate cell biology concepts to laypeople.

### **Course content:**

- Properties of cells
- Different classes of cells
- Chemical basis of life (covalent and noncovalent bonds, nature and types of biological molecules)
- Bioenergetics and enzymes as biological catalysts
- Structure and function of the plasma membrane
- Structure and function of cytoplasmic membrane systems and membrane trafficking
- Mitochondria and chloroplasts
- Cell-cell and cell-environment interactions
- Cytoskeleton and cell motility

**Course description:** This course provides a fundamental review of the molecular basis of the structure and function of the cell and its constituent organelles. It provides a description of emerging cell biology technologies and techniques, basic experimental and analytical approaches, and tools and applications within the domains of medicine and

biology. Since this is an asynchronous online course, students are expected to access all materials electronically.

**Examinations and Term paper:** Two hour-long examinations (Exams 1 and 2) will be given during the semester (see *Course schedule* for details). The exams will be comprised of true/false questions, multiple-choice questions, and questions requiring short essay answers and will be worth 100 points each. You will also be expected to submit a term paper by May 2<sup>nd</sup> worth 50 points.

**Assignments:** You will be provided with Case Study assignments that describe actual applications of cell and molecular biology in our regular life, as well as in disease and medicine, and expected to answer questions based on your understanding of the material. These assignments will be worth a total of 35 points.

**Quizzes:** Lectures will be interspersed with some surprise quizzes. These will count up to a total of 5 or 10 bonus points.

**PowerPoint presentations:**

Several *compulsory* recorded PowerPoint presentations are expected of you. First, each of you will be expected to present one of the two sections, *Aerobic Respiration and the Mitochondrion* or *Photosynthesis and the Chloroplast*, as a 70-minute video lecture tailored for undergraduate students based on your reading and understanding of the text (Dr. Ahmad will assist you with your preparation). Later in the course, each of you will also be expected to provide a recorded presentation of a peer-reviewed journal article on a topic related to the material covered in class, after consultation with Dr. Ahmad. The length of this presentation will be 15-20 minutes. Collectively, these presentations will count towards a maximum of 15 required points.

**Evaluation and grading:** Graduate students will be scored out of a maximum of 300 points (100 for Exam 1 + 100 for Exam 2 + 50 for Term Paper + 15 for Presentations + 35 for Assignments). Fractional scores will be rounded up. Bonus points from quizzes, as described above, will be added to this total score from the exams and term paper.

**Grading scale:**

- 95% ≤ A+
- 90% ≤ A < 95%
- 86% ≤ A- < 90%
- 82% ≤ B+ < 86%
- 78% ≤ B < 82%
- 74% ≤ B- < 78%
- 70% ≤ C+ < 74%
- 66% ≤ C < 70%
- 62% ≤ C- < 66%
- F < 62%

**Course schedule:**

<b>Week*</b>	<b>Topic</b>	<b>Chapter</b>
<b>1</b>	Instructor Introduction, Discussion of Syllabus, Expectations of the Course	
	Introduction to the Study of Cell and Molecular Biology – Part 1	1
<b>2</b>	Introduction to the Study of Cell and Molecular Biology – Part 2	1
	The Chemical Basis of Life – Part 1	2
<b>3</b>	The Chemical Basis of Life – Part 2	2
	The Chemical Basis of Life – Part 3 / Bioenergetics and Enzymes – Part 1	2, 3
<b>4</b>	Bioenergetics and Enzymes – Part 2	3
	Review for Exam 1	
<b>5</b>	Exam 1	
	The Structure and Function of the Plasma Membrane – Part 1	4
<b>6</b>	The Structure and Function of the Plasma Membrane – Part 2	4
	The Structure and Function of the Plasma Membrane – Part 3	4
<b>7</b>	The Structure and Function of the Plasma Membrane – Part 4	4
	Aerobic Respiration and the Mitochondrion (Student Presentations)	5
<b>8</b>	Photosynthesis and the Chloroplast (Student Presentations)	6
	Interactions Between Cells and Their Environment – Part 1	7
<b>9</b>	Interactions Between Cells and Their Environment – Part 2	7
	Cytoplasmic Membrane Systems – Part 1	8
<b>10</b>	Cytoplasmic Membrane Systems – Part 2	8
	Cytoplasmic Membrane Systems – Part 3	8
<b>11</b>	Review for Exam 2	
	Exam 2	
<b>12</b>	The Cytoskeleton and Cell Motility – Part 1	9
	The Cytoskeleton and Cell Motility – Part 2	9
<b>13</b>	The Cytoskeleton and Cell Motility – Part 3	9
	The Cytoskeleton and Cell Motility – Part 4	9
<b>14</b>	Discussion about Presentations and Term Paper	
	Student Presentations	
<b>15</b>	Student Presentations	
<b>16</b>	Term Paper Due	

\**Week* indicates the week during the semester by which the students are expected to have read the relevant chapters and followed the appropriate video lectures on the topics, as well as when recorded presentations from the students are expected and online examinations scheduled.

- The course schedule may be changed during the semester. Any change will be announced at the lecture and through Canvas.
- 01/18 Last day to add/register for classes.

***Academic Freedom:*** “Teachers are entitled to freedom in the classroom in discussing their subject, but they should be careful not to introduce into their teaching controversial matter which has no relation to their subject.”

The preceding comes from the American Association of University Professors statement on academic freedom. Though the entire statement speaks to many issues, it is this portion on the conduct of the course that is most relevant. This means that faculty have the right to conduct their class in a fashion they deem appropriate as long as the material presented meets the learning objectives laid out by the entire faculty. <http://www.aaup.org/AAUP/pubsres/policydocs/contents/1940statement.htm>

***Americans with Disabilities Act Policy:*** Indiana State University seeks to provide effective services and accommodation for qualified individuals with documented disabilities. If you need an accommodation because of a documented disability, you are required to register with Disabled Student Services within the Center for Student Success - <https://www.indstate.edu/services/student-success/cfss/student-support-services/disability-student-services>. You can contact the Center at 237-2700, 1<sup>st</sup> floor Normal Hall

***Sycamores Care:*** At Indiana State, we care for your overall well-being. We want to help you get the care, referrals, and answers you need to ensure your success. Sycamores Care <https://www.indstate.edu/student-affairs/sycamores-care>

***COVID-19-related policies:***

Students are expected to adhere to course attendance policies, as stated in the course syllabus. Students must complete the Sycamore Symptom Assessment by email before arriving on campus each day unless they have documented their COVID immunization and have been exempted from the program. Documented COVID-related absences will be treated like any other serious medical issue. Following University policy, students with a documented, serious medical issue must contact the Office of the Dean of Students for assistance. The Office of the Dean of Students will supply documentation for faculty. Students with a documented serious medical issue should not be penalized and will be given a reasonable chance to complete exams or assignments. Once notification is made, faculty will make reasonable efforts to accommodate the student’s absence and will communicate that accommodation directly to the student. Please note that faculty are not required to accommodate a serious medical issue with virtual content options, like streaming or recorded lectures. Students who have been notified by contact tracers of a close contact who has tested positive for COVID must abide by their instructions, which will include a mandatory period of quarantine, especially if the student is unvaccinated, and/or mandatory testing. To avoid the potential of missing significant class time, students are strongly encouraged to receive the COVID vaccination that has been made available on campus. For more information about the vaccines or to find a vaccination

site, go to: [ourshot.in.gov](http://ourshot.in.gov). The [ISU Health Center](#) also administers COVID-19 vaccines by appointment.

Students should contact the [Office of the Dean of Students](#) with questions by calling **812-237-3829**.

The information provided in this section of the syllabus is subject to modification based on guidance by public health authorities. Please follow [this link](#) for updated information on ISU's Fall 2021 requirements.

***Statement on Discrimination, Sexual Harassment, and Sexual Misconduct:***

Indiana State University [Policy 923](#) strictly prohibits discrimination on the basis of: age, disability, genetic information, national origin, pregnancy, race/color, religion, sex, gender identity or expression, sexual orientation, veteran status, or any other class protected by federal and state statutes in ISU programs and activities or that interferes with the educational or workplace environment.

Title IX of the Educational Amendments of 1972 prohibits discrimination based on sex, including sexual harassment. Sexual harassment includes quid pro quo harassment, unwelcome verbal or physical conduct, sexual assault, dating violence, domestic violence, and stalking.

If you witness or experience any forms of the above discrimination, you may report to:

Office: Equal Opportunity & Title IX; (812) 237-8954; Rankin Hall, Room 426  
Email: [ISU-equalopportunity-titleix@mail.indstate.edu](mailto:ISU-equalopportunity-titleix@mail.indstate.edu)  
Online: [https://cm.maxient.com/reportingform.php?IndianaStateUniv&layout\\_id=10](https://cm.maxient.com/reportingform.php?IndianaStateUniv&layout_id=10)

Disclosures made to the following confidential campus resources will not be reported to the Office of Equal Opportunity and Title IX:

ISU Student Counseling Center: (812) 237-3939; Gillum Hall, 2<sup>nd</sup> Floor  
Victim Advocate: (812) 237-3829; HMSU 7<sup>th</sup> Floor  
UAP Clinic/ISU Health Center: (812) 237-3883; 567 N. 5<sup>th</sup> Street