



Temple University
Department of Biology
College of Science & Technology

Biology 2212

Fall, 2017

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| Lecture time: | M W F, 11:00-11:50 AM |
| Lecture location: | 133 Biology Life Science |
| Instructor: | Rhonda H. Nicholson, Ph.D., Assistant Professor for Biology |
| Office address: | 402B Biology-Life Sciences |
| Office phone: | 215-204-9547 |
| Email address: | rnichol@temple.edu |
| Office hours: | Monday and Wednesday, 2:30 – 4:00 PM (or by appointment) |
| Textbook: | <i>Biology, 11th edition, (2017) Urry, Cain, Wasserman, Minorsky, and Reece</i> |

COURSE INFORMATION

Biology 2212 examines living systems at the most fundamental levels. Topics include chemical bonds, the unique properties of water, carbon chemistry, the structures and functions of macromolecules, as well as the thermodynamic and kinetic properties of enzymes. At the cellular level, we will study the components of cell-to-cell communication, cellular signaling, the regulation of the cell cycle, and cell motility. An examination of the processes of gene expression and DNA replication lead into studies on chromosome behavior during meiosis and the field of genetics. This course finishes by surveying two compelling biological processes: aging and cancer.

Course and Learning Objectives

- Develop a strong foundation in biological chemistry, cell biology, and genetics
- Apply knowledge of fundamental principles gained in this course to more advanced studies in biochemistry, cell biology and genetics

Communication:

E-mail is the preferred form of communication outside of lecture and office hours. It is very important that you include your name, Temple I.D. number, and subject in your e-mail. Because I check my e-mail regularly, you should receive a response within 24 hours of your first message. Please direct all questions about the lab to your lab instructor or the laboratory coordinator, Dr. Dan Spaeth (spaceman@temple.edu).

It is imperative that you obtain AccessNet and a Temple University e-mail account. This allows access to the Blackboard site through TU portal. Lecture power points, study guides, grades, as well as important course announcements are posted on Blackboard. (Obtain an e-mail account by going to <http://www.temple.edu/cs>. Alternatively, visit the Computer Services Help Desk, Room 106, TECH Center, 12th St. & Montgomery Ave. Call 204-8000 for more information.)

Prerequisites:

The prerequisites of this course are Chemistry 1031 and Chemistry 1032, or the equivalent, with a grade of C or better. Math 1021 (college algebra) and Math 1022 (pre-calculus) are also necessary; you must be able to use logarithms, exponents, and perform simple algebra.

Co-requisite:

You must be enrolled in Chemistry 2251 (Organic Chemistry), or have completed organic chemistry with a grade of C- or better.

Laboratory:

Your laboratory grade is determined by lab quizzes, the quality and promptness of lab reports, as well as laboratory performance. **Laboratory attendance is mandatory.** If you are absent from your scheduled laboratory, you must attend another section **that week**. See laboratory guidelines.

Course Materials:

The textbook is **Biology, 11th edition, 2017, by Urry, Cain, Wasserman, Minorsky, and Reece**; it is available at Temple bookstore or online. The laboratory manual and laboratory information are posted on Blackboard. The laboratory safety manual (also known as "CST Student Guidelines") is available at the Ritter Hall Copy Center. Mandatory safety goggles are available in the Bookstore.

A copy of the instructor's power point presentation (or selected segments) will be posted on Blackboard. A copy of "Principles of Biochemistry" (Lehninger), 7th edition, will be available for reference at the Ginsburg Library on the Health Sciences Campus. A copy of "Principles of Biochemistry" (Lehninger), 5th edition, also will be available for reference at Paley Library.

2212 Student Obligations:

You are expected to attend every lecture and take careful notes. Lectures will begin precisely at the appointed time. Topics described in the text will be expanded upon significantly in the lecture, with additional materials posted on blackboard or provided by the instructor. You are strongly encouraged to re-copy your lecture notes in order to incorporate important points from the required reading assignments. This exercise will help you to solidify your understanding of what was covered in lecture, solve problems in the quantitative segments of the course, and help you identify areas of uncertainty. Approximately 2 hours of study for every hour of lecture is the suggested minimum. Because your lecture/reading notes are crucial to your success, I strongly advise students to find at least one study partner. Your partner can provide notes in the event of an absence.

In order to help you focus and learn the lecture and reading material, study guides will be posted on blackboard. You must attend the lecture in order to complete the study guides in a satisfactory manner. I emphasize that the lectures will expand significantly on subjects in the text. The examinations will be based on the contents of the lectures and study guides. You are responsible for obtaining study guides and other posted lecture material from the Blackboard site, as well as monitoring Blackboard for class announcements and information. Quantitative segments of the course include, molarity, thermodynamics, pH and buffers, enzyme kinetics, and probability related to genetics. Study guides will contain sample problems and their solutions. You will find modified versions of these problems on the examinations. I strongly advise you to read ahead and stay current with lecture notes and study guides. In this course, a foundation is built by layering the current lecture topic upon previous lectures. The amount and depth of material covered is far too great for you to learn effectively, should you fall behind in the readings or fail to attend lecture.

Examinations:

For examinations, you will need ~2-3 sharpened #2 pencils. **Absolutely no study materials, graphing calculators, or programmable calculators will be permitted during examinations.** If necessary, students using certain pre-approved translators must sit in the front row during an examination. Direct all questions that arise during an examination to the instructor or your TA. Exchanging information during an examination is a violation of the Temple University Student Code and will result, at a minimum, in a failing grade.

The format of Biology 2212 examinations is multiple choice as well as computation. **Examinations will not be returned to you.** Examination scores will be posted on Blackboard. You will be allowed to review your examinations and ask questions during your scheduled laboratory. You are also welcome to review your test in my office by appointment.

Tests must be taken during their scheduled time. If you are absent from an examination due to a medical emergency, a letter explaining the circumstances, signed and dated by a physician (unrelated to the student), must be submitted to me as soon as it is reasonably possible. If you miss an examination

and I am not notified within 36 hours, you will receive a zero for that examination. If you miss the final due to serious medical and/or legal circumstances, you must provide proper documentation as described above within 36 hours of the scheduled final examination. In this event you must take a make-up examination by 1:00 p.m., Friday, December 22nd, 2017. If you cannot take the final by 1:00 on December 22nd, you will have to take an incomplete. For information on the Incomplete Policy, refer to Temple University Policy #02.10.13 on the "Policies and Procedures" link on the Temple homepage.

Incomplete:

You must be passing the course and only miss the final examination in order to apply for an "Incomplete". If circumstances force you to miss the final and apply for an incomplete, two steps must be taken. First, the professor and the student must sign an "Incomplete Contract" that is held in the Biology Office. Second, for Biology 2212, it is requested that the final examination must be made up by the end of the second week of the following semester (Friday, January 26th, 2018). If you fail to make up an Incomplete within the designated time limit, your grade for the course will be calculated without a final examination score.

Grading:

The final grade will be determined from the examinations and the laboratory as follows:

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| Examination I= 11% | Examination II=16% | Examination III=16% |
| Examination IV=16% | Final examination=16% | Laboratory grade=25% |

Course withdrawal:

The last day to drop a course is Monday, September 11th. The final date for course withdrawal (no tuition refund) is Tuesday, October 24th. The following statement regarding course withdrawal is from the Temple University student bulletin, policy # 02.10.14:

During the first two weeks of the fall or spring semester or summer sessions, students may withdraw from a course with no record of the class appearing on the transcript. In weeks three through nine of the fall or spring semester, or during weeks three and four of summer sessions, the student may withdraw with the advisor's permission. The course will be recorded on the transcript with the instructor's notation of "W," indicating that the student withdrew. After week nine of the fall or spring semester, or week four of summer sessions, students may not withdraw from courses.

- *No student may withdraw from more than five courses during the duration of his/her studies to earn a bachelor's degree.*
- *A student may not withdraw from the same course more than once.*
- *Procedure: Withdrawal from a course is accomplished with a Schedule Revision (Drop/Add) form, processed through Temple registration.*

Disability disclosure:

Any student who has a need for accommodation based on the impact of a documented disability should contact me privately to discuss the specific situation by the second week of classes. To learn about resources available to you, please contact Disability Resources and Services at 215- 204-1280 in 100 Ritter Annex. I will work with DRS to coordinate reasonable accommodations for all students with documented disabilities.

Student and Faculty Academic Rights and Responsibilities Policy:

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has a policy on Student and Faculty Academic Rights and Responsibilities (Policy #03.70.02). The policy can be accessed through the following link: http://policies.temple.edu/getdoc.asp?policy_no=03.70.02.

Cell Phones:

Cell phones and Bluetooth devices must be off during class! A student who engages in text messaging, answers or places a cell phone call during lecture will be penalized for misconduct in accordance with university regulations.

BIOLOGY 2212 LECTURE SCHEDULE (Note: schedule may be subject to change)

| LECTURE | DATE | TOPIC | TEXTBOOK CHAPTER |
|---------|---------------------|--|------------------|
| 1 | Mon. (8/28) | Introduction Chemical Bonds | Chapter 2 |
| 2 | Wed. (8/30) | Water I (Emergent properties) | Chapter 3 |
| 3 | Fri. (9/01) | Water II (pH) | Chapter 3 |
| 4 | Wed. (9/06) | Functional Groups | Chapter 4 |
| 5 | Fri. (9/08) | pH and Buffers | * |
| 6 | Mon. (9/11) | Macromolecules I (Carbohydrates and Lipids) | Chapter 5 |
| 7 | Wed. (9/13) | Macromolecules II (Proteins) | Chapter 5 |
| 8 | Fri. (9/15) | Macromolecules III (Nucleic Acids) | Chapter 5* |
| 9 | Mon. (9/18) | Thermodynamics I (Laws of Thermodynamics) | Chapter 8* |
| 10 | Wed. (9/20) | Thermodynamics II (Energy and Enzymes) | Chapter 8* |
| 11 | Fri. (9/22) | Enzyme Kinetics I | * |
| --- | Mon. (9/25) | TEST 1 (Lectures 1-8) | |
| 12 | Wed. (9/27) | Enzyme Kinetics II | * |
| 13 | Fri. (9/29) | Cells I (Endomembrane System) | Chapter 6 |
| 14 | Mon. (10/02) | Cells II (Cytoskeleton and Extracellular Matrix) | Chapter 6 |
| 15 | Wed. (10/04) | Membranes (Mechanisms of Transport) | Chapter 7 |
| 16 | Fri. (10/06) | Cellular Respiration I (Glycolysis and the Citric Acid Cycle) | Chapter 9 |
| --- | Mon. (10/09) | Test II (Lectures 9-14) | |
| 17 | Wed. (10/11) | Cellular Respiration II (Oxidative phosphorylation) | Chapter 9 |

| LECTURE # | DATE | TOPIC | TEXTBOOK CHAPTER |
|------------------|---------------------|--|-------------------------|
| 18 | Fri. (10/13) | Cell Communication I (Receptors) | Chapter 11 |
| 19 | Mon. (10/16) | Cell Communication II (Transduction and Response) | Chapter 11 |
| 20 | Wed. (10/18) | Cell Cycle and Mitosis (Regulation of Phases) | Chapter 12 |
| 21 | Fri. (10/20) | DNA Replication | Chapter 16 |
| --- | Mon. (10/23) | Test III (Lectures 15-21) | |
| 22 | Wed. (10/25) | Prokaryotic Gene Regulation (Operon induction and repression) | Chapter 18 |
| 23 | Fri. (10/27) | Eukaryotic Gene Regulation I (Promoters, Enhancers, Histone code) | Chapter 18 |
| 24 | Mon. (10/30) | Eukaryotic Gene Regulation II (RNA processing) | Chapter 18 |
| 25 | Wed. (11/01) | Transcription | Chapter 17 |
| 26 | Fri. (11/03) | Translation (Ribosomes and peptide bonds) | Chapter 17 |
| 27 | Mon. (11/06) | Meiosis (Genetics of Gamete formation) | Chapter 13 |
| 28 | Wed. (11/08) | Genetics I (Mendel's Laws) | Chapter 14 |
| 29 | Fri. (11/10) | Genetics II (Complex patterns of inheritance) | Chapter 14 |
| -- | Mon. (11/13) | Test IV (Lectures 22-28) | |
| 30 | Wed. (11/15) | Genetics III (Linkage) | Chapter 15 |
| 31 | Fri. (11/17) | Genetics IV (Imprinting, mutation and genetic variation) | Chapter 15 |
| 32 | Mon. (11/27) | Viruses I (Categories and lifecycles) | Chapter 19 |
| 33 | Wed. (11/29) | Viruses II (Influenza, Yellow Fever) | Chapter 19 |
| 34 | Fri. (12/01) | Cancer I (Genetic mutation) | Chapter 19 |
| 35 | Mon. (12/04) | Cancer II (Biochemical principles of treatment) | Chapter 18* |

| LECTURE # | DATE | TOPIC | TEXTBOOK CHAPTER |
|--|---------------------|---|-------------------------|
| 36 | Wed. (12/06) | Mechanisms of Aging | * |
| 37 | Fri. (12/08) | Biotechnology II (Recombinant proteins, array analysis, forensic genetics) | Chapter 20 |
| 38 | Mon. (12/11) | Biotechnology I (Recombinant DNA and cloning) | Chapter 20 |
| -- | Mon. (12/18) | FINAL EXAMINATION | 10:30-12:30 |
| (The final examination features new material from lectures 29-38 and is cumulative from lectures 1-28.) | | | |

* Instructor will provide study material