BIO 110: Fundamentals of Biology - Summer 2025

University of Rhode Island

Instructor

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Email

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(Email is the preferred way of communication. I will respond within one business day)

ZOOM ROOM

https://uri-edu.zoom.us/my/dlpaim

COURSE OVERVIEW:

BIO 110 is URI's one semester course introducing you to the fundamentals of biology.
In this online asynchronously course, we will discuss fundamental concepts of the cellular and chemical basis of life, genetics, and animal form and function, mainly from the perspective of evolution. My primary goal is to help you improve your ability to gather basic biological concepts, apply them to answer scientific questions and broaden your perception of living organisms in all their forms.

STUDENT'S "OFFICE" HOURS

Access my Starfish calendar and feel free to choose a time that works for you to meet with me. I've made several times available throughout the week, but if none of those work for you, send me an email, and I will gladly accommodate you. Please know that I am readily available to help, so don't hesitate to reach out. The sooner you contact me, the more effectively I can assist you throughout the semester.

WHAT IS THIS COURSE ABOUT?

This course is all about the study of life in all its complexities. It begins with the basic chemical building blocks of living things, moves on to the structure and function of cells, and ends with how cells and tissues work together in animals and the evolutionary processes that shape biological systems. To better understand the nature of existence, we'll integrate knowledge from different disciplines, like physics, chemistry, and sociology.

The goal is not just to cover topics but to help you think critically, connect ideas across fields, and grow as an informed citizen and budding scientist, shaped by your unique background, strengths, and areas for growth.
With these thoughts in mind, here is the course broad learning objectives:

- To describe how atomic structure relates to the structure of macromolecules, biochemical reactions, and energy transformation in glycolysis, the citric acid cycle, and oxidative phosphorylation.
- To explain how cells divide, how genetic information is passed on, and how inherited traits are transmitted through generations and contribute to evolution.
- To understand the differences between evolutionary processes (mutation, gene flow, genetic drift, and natural selection) and how they drive the evolution of populations.
- To describe how the structure and function of organ systems in animals are related.
- To apply your biology knowledge to understand real-world situations.
- To use reflection and self-assessment to improve your learning.

WHERE TO FIND IN THE SYLLABUS:

CLASS FORMAT: This online course is asynchronous and is **not** self-paced. Instead, it is designed with a consistent structure of due dates for assignments, discussions, and exams. At the beginning of each unit, it is recommended that you devote some time to determine what is involved and how much of your time will be required to complete the necessary readings, activities and meet deadlines.
Each content module covers one unit of the course and is divided into topics according to the course alignment provided below. Within each module, you will find a list of learning objectives, chapters assigned for reading, pre-recorded lectures, slides and/or guided notes, supplementary videos, and accompanying assignments. Start by completing the interactive readings assigned for each module. Watch the pre-recorded lectures and use guided notes to help you identify the most critical information covered. Watch the supplemental videos and work on the class work and homework assignments. At any moment during this process, contact me if you need extra clarification or have any questions/concerns. Students' "office" hours will be essential for us to connect, supplement your asynchronous work, clarify questions, and to further practice any necessary skills. By fostering critical thinking skills and applying your knowledge of biology to real problems, this course aims to help you develop long-term material retention and achieve a strong grade. Be sure to check out the "Start here" module, which includes all the information you need to get started, including needed technology, course policies, my contact information, and a suggested schedule to complete the work.

COURSE REQUIREMENTS:

(1) **Earned credit or concurrent enrollment in BIO 103 (the lab section for this course)**: If you need assistance finding an open section, please contact the Lab Manager for Biological Sciences, Linda Forrester (lindaforrester@uri.edu). ATTENTION: BIO103 is an in-person course.
(2) **Access to Brightspace:** course material, activities, and communication will be delivered through Brightspace.
(3) **Textbook:** You are required to have access to **Mastering Biology** with Pearson eText: *Biological Sciences, 8th Edition* (Freeman et al.). The **cost** for an 18-week access code, which includes access to the platform and the eText, is **$84.99** and can be purchased at the bookstore or directly through Pearson. A module in Brightspace contains all the information you need to register and link your account to Mastering Biology. We will use Mastering Biology for readings, homework, practice exams, and actual exams. When registering for Mastering Biology, you have a 14-day free trial before payment is required.
(4) **Proctoring system for exams:** This course requires the use of LockDown Browser and a webcam (**Respondus Monitor)** for online exams. The webcam can be built into your computer or can be the type that plugs in with a USB cable. The license to use Respondus Monitor **costs $10** and can be purchased directly when you take your first monitored assignment. A student Quick Start Guide (PDF) is available in Brightspace under the "Mastering Bio" module.
(5) **Computer with reliable, high-speed Internet access and appropriate system and software to support the Brightspace, Mastering Bio and Respondus platforms:** check Brightspace under "Start here" module for specific technology requirements and LMS help (Learning Management System – Brightspace).

COURSE GRADING:

Throughout this course, you'll have numerous chances to accumulate points. Exams, homework, and assignments serve as valuable tools for both of us to measure your progress and learning. Here's a breakdown of each category for your better understanding:

Assessment	Explanation	Percentage
Exams	There will be four exams, one after each unit. The lowest exam grade will be dropped. You can only access each exam after completing at least one attempt of the corresponding practice exam. Check the missed exam policy for more details. Each exam will count for 20% of your final grade. Exams will be administered through Mastering Bio using Respondus monitor.	60
Interactive Readings	Interactive readings consist of text chapters spaced with practice problems or videos to help you learn key concepts before you apply that knowledge in other assignments. When completing these assignments, you have unlimited attempts to answer correctly for full credit. Late submissions are accepted for half-credit. They will be completed in Mastering Bio.	8
Class work	These assignments will involve application of the material that you prepared from readings, lectures, and supplemental videos. They will include case studies, problems set, discussion boards, etc. For the most part, any reasonable answer gets full credit. So, answer honestly. For the discussion boards, you will usually complete one initial post and respond meaningfully to at least two colleagues. Simple responses like: "I agree", "I think so too", "Good job", "I like your answer" do not count as a response. These assignments will be available and submitted in Brightspace.	7
Homework	There will be one homework assignment for each unit. These assignments provide your first opportunity to apply new knowledge after completing the readings and lecture videos. They are auto graded, and you have two attempts per question to earn full credit. Homework will be completed in Mastering Biology.	10
Practice exams	There will be four practice exams, offering an opportunity to assess your ability to meet learning objectives that are highly likely to appear on the actual exams. You can take each practice exam up to five times for a grade and revisit it for additional practice. The practice exams will mirror the format and timing of the actual exam. The lowest practice exam grade will be dropped. These exams will be completed in Mastering Biology using Respondus Monitor, exactly as with the actual exam.	15
	TOTAL	100

Grading scale for the course:

A = 93, A- = 90, B+ = 87, B = 83, B-= 80, C+ = 77, C = 73, C- = 70, D+ = 67, D = 60, F < 60

Final grades will be rounded to the nearest whole number using two decimal places. For instance, if you have a 92.52%, that rounds to 93%, and you will receive an A for the course. If, however, you have a 92.44%, that does not round up to 93%, and your grade will remain in the A- range.

COURSE POLICIES

EXAMS: The exams will be timed (60 minutes), and the format will closely resemble the practice exams. Questions will be based on the lecture material and will be completed one at a time, with no option to return to previous questions. Exams will be available only on designated exam days within a specific timeframe (check Brightspace for the exact schedule), so please plan accordingly. The Learning Objectives (listed below) serve as study guides for the exams. Exams must be completed individually. They will be administered through Mastering Biology using Respondus Monitor, an automated proctoring system that utilizes a webcam and video analytics to maintain exam integrity. To ensure your first exam with Respondus Monitor runs smoothly, you must complete an ungraded Respondus training that requires the LockDown Browser and a webcam before taking the graded exam. If you require accommodations for time extensions or other needs, please provide the appropriate documentation at least three days before the exam date.

MISSED EXAM: Because exams are online and available for a long time, each student must complete every exam except in the event of a documented emergency or significant illness. You **must** provide a university-approved excuse and **documentation** if you miss an exam. It is your responsibility to inform me as soon as possible, preferably before the exam. Failure to provide proper documentation will result in a make-up exam with **25% penalty for the missed exam**. However, taking the exam with a penalty is still better than receiving a zero. If you miss only one exam, you have also the option to not take it and count as your dropped exam grade.

→ If you miss an exam without a university-approved excuse, you must contact me **within 24 hours** to schedule a make-up exam. After that, your missed exam will be your dropped exam grade. There are no exceptions to this policy.

As outlined by university policy, the only valid reasons for missed deadlines include documented medical illnesses, personal tragedy (please have a note from the Dean of your College), emergencies, observance of religious holidays, or participation in university-sanctioned athletics or events. It's crucial for students to promptly provide the required documentation to substantiate these situations. Responsibility for any missed work lies with the student.

PARTICIPATION: Completing all activities and participation is crucial and required to succeed in this course because it helps us both (you and me) to identify what you do or don't understand. In an online learning environment, we measure participation by regular online presence and engagement in course activities such as posting to a discussion board and completing class assignments, homework, and other course-related assessments.

Netiquette guidelines for this online course:

➔ **Respect:** it's essential to show respect to your peers and professor, when communicating online. Remember that your words may be interpreted differently than you intended without facial cues and body language. This includes the use of humor and sarcasm. Before sending a message, ask yourself if you would say the same thing in person.

- ➔ Share your knowledge: one of the great benefits of online learning is the diverse experience of your peers, allowing you to learn from each other. Feel free to share your knowledge with the group in the discussion boards, including resources and reference materials.
- ➔ Practice kindness: avoid bullying or provoking arguments when expressing your opinion or presenting controversial topics. Disagreeing with others while remaining respectful and preventing personal attacks is possible. Remember to treat others the way you would like to be treated.
- ➔ Be mindful of other people's time and attention: ensure your messages are clear and brief, and avoid sending large files or images, unless requested. Please note that responses may not be immediate, so refer to the syllabus for further information.

USE OF COURSE MATERIALS – INTELECTUAL PROPERTY: all materials available in this course are intended for the personal use of students enrolled in BIO110 Summer 2025 ONLY. It includes (but is not limited to) slides, in-class activities, quizzes, projects, practice exams, exams, exams questions, study guides, and any other material available in Brightspace or distributed by email. Students are prohibited to record or disseminate course content in any way or posting course materials on third-party sites such as Chegg, One Class, Course Hero, etc. without the instructor permission.

USE OF AI TOOLS INCLUDING CHATBOTS, SUCH AS CHATGPT AND SIMILAR: I understand that you may be tempted to use AI tools to complete assignments, especially when working on your own. However, relying on AI for quizzes, homework, and any assignment in general, will hinder your independent thinking, creativity, and critical reasoning—skills we aim to develop in this course. For this reason, the use of AI for completing assignments is discouraged.
That said, AI tools can be valuable for learning and generating ideas. I encourage you to use resources like ChatGPT as a personal tutor to generate practice questions, clarify topics (especially when instructor help isn't available), create study guides, check grammar, and support your intellectual growth.
However, be aware that AI-generated content still tends to include incorrect facts, fake citations, and sometimes offensive material. Don't trust anything it says unless you either know the answer or can verify the information with other sources. You are responsible for any inaccurate, biased, or unethical content you submit, whether it comes from you or an AI tool you used.

Cheating and plagiarism will not be tolerated. URI's regulations regarding cheating will be applied.

Cheating (URI policy) - Academic Integrity: Integrity and Honesty are key community values at URI. Cheating and plagiarism are not acceptable and will be dealt with according to University's guidelines. Any exam or assignment that the instructor has reason to believe is plagiarized *in whole or in part* will receive a zero and the student(s) involved will be reported to the Office of Community Standards. We strongly encourage you to study in groups, but examinations, homework, and quizzes are to be completed individually. A student's name on any work including electronic submissions on Brightspace from your accounts shall be regarded as assurance that the work is the result of the student's own independent thought and study. Most academic work builds on the contributions of others. Students have an obligation to know how to quote, paraphrase, summarize, or reference the work of others with integrity. A source need not be given for common

knowledge within a discipline. Utilizing campus academic resources including the Academic Enhancement Center and the Writing Center are encouraged.

The following are examples of academic dishonesty:

- Using AI and problem solving websites for assignments and exams
- Unauthorized possession or access to exams
- Unauthorized communication during exams
- Unauthorized use of another's work or preparing work for another student
- Taking an exam for another student
- Altering or attempting to alter grades.
- The use of notes or electronic devices to gain an unauthorized advantage during exams
- Facilitating or aiding another's academic dishonesty.
- Using more than one clicker to help a friend cheat (both clicker owners will be disciplined).

RESPECT: Respect is a core foundation of my teaching philosophy and, in this learning community, respect for one another's viewpoints, backgrounds, and contributions is a requirement. Engaging in thoughtful discussions and interactions that are free from derogatory or disrespectful language is expected in all circumstances, including discussion boards. Respect towards the instructor involves engaging thoughtfully completing course modules and adhering to deadlines. Respect towards fellow students necessitates active participation in discussions, acknowledging different viewpoints, and maintaining a courteous tone in interactions. I encourage an environment where diverse perspectives are valued, fostering a productive and inclusive atmosphere for all participants.

DISABILITY, ACCESS, AND INCLUSION SERVICES: Your access in this course is important. Please send me your Disability, Access, and Inclusion (DAI) accommodation letter early in the semester so that we have adequate time to discuss and arrange your approved academic accommodations. If you have not yet established services through DAI, please contact them to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom. DAI can be reached by calling: 401-874-2098, visiting: web.uri.edu/disability, or emailing: dai@etal.uri.edu.

ANTI-BIAS STATEMENT: We respect the rights and dignity of each individual and group. We reject prejudice and intolerance, and we work to understand differences. We believe that equity and inclusion are critical components for campus community members to thrive. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at www.uri.edu/brt. There you will also find people and resources to help.

BIOLOGICAL SCIENCES BEREAVEMENT STATEMENT:

If you are grieving or have experienced the death of a loved one, the Biological Sciences Faculty, Staff, and Teaching Assistants understand and want to support you during this difficult time. Some of the questions you have may be about missing class or your assignments. We encourage you to first reach out to the Dean of Students Office using the Bereavement Notification Request Form (https://cm.maxient.com/reportingform.php?UnivofRhodeIsland&layout_id=32) or you may call your Dean (if you are in University College, contact 874-5903 and ask to speak to the UC Dean about a private matter; if

you are in CELS contact Dean Anderson in the Office of Student Affairs, 874-5026 or kand@uri.edu), so they can notify all your instructors about your circumstances. The University Counseling Center can also offer further support (401-874-2288, https://web.uri.edu/counseling/crisis/).

➔ Please don't hesitate to contact me so we can create a plan to help you succeed in this class, even during these difficult times. Remember, your mental well-being is more valuable than your grade.

FINANCIAL HELP: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the Dean of Students (401-873-2098) for support. Also, if you have difficulties affording course materials, feel free to contact me as soon as possible, and we will explore possible solutions.

NEED HELP WITH BIO 110? This is a challenging course. Success requires that you keep pace with the work, understand core concepts, and study effectively. Remember, you have several resources for help:

- Your professor: meet with me by zoom. I take your learning seriously and am pleased to help. Please don't wait until the day before the exam or the end of the semester.
- Your "virtual classmates": connect to your peers using Brightspace chat, discussion board or even in the lab, and form study groups.
- Academic Enhancement Center: The Academic Enhancement Center (AEC) offers face-to-face and online services (tutoring) to undergraduate students seeking academic support. Services are based out of 4th Floor Roosevelt Hall (Phone: 401-874-2367), and online. Peer tutoring is available for STEM & BUS-related courses through the Drop-In Center and small-group tutoring. Check the Brightspace "Start Here" module for the updated schedule available for this summer or visit https://web.uri.edu/aec/tutoring/ .

Suggested course schedule to complete modules (due dates are indicated below):

DATE	CHAPTER: LECTURE TOPIC
05/19 (M)	1: The study of Life
05/21 (W)	2: Water and Carbon: The Chemical Basis of Life
05/23 (F)	3, 5 and 6.1: Biological Macromolecules (Carbs, Proteins and Lipids)
05/26 (M)*	8: Energy and Enzymes: An Introduction to Metabolism
05/27 (T)	EXAM 1
05/28 (W)	7: Inside the Cell
05/30 (F)	6.2 and 6.3: Structure and Function of Plasma Membranes
06/02 (M)	9: Cellular Respiration and Fermentation
06/04 (W)	4 and 15: Nucleic Acids, DNA synthesis and repair
06/06 (F)	12: The Cell Cycle (EXAM 2)
06/09 (M)	13: Meiosis

06/11 (W)	14: Mendel and the Gene
06/12 (Th)	22 and 23: Basics of Evolution
06/13 (F)	16 and 17: Genes, transcription and translation (EXAM 3)
06/16 (M)	30.1 and 39: What Is an Animal? And Animal Form and Function
06/18 (W)	33 and 48: Viruses; The Immune System in Animals
06/20 (F)	47: Animal Reproduction and Development (FINAL EXAM)

*Memorial Day, plan accordingly.

DUE DATES (check Brightspace for details):

Unit 1: Tuesday 05/27 - all unit 1 course work including exam 1 must be submitted by 11:59pm EST
Unit 2: Friday 06/06 - all unit 2 course work including exam 2 must be submitted by 11:59pm EST
Unit 3: Friday 06/13 - all unit 3 course work including exam 3 must be submitted by 11:59pm EST
Unit 4: Friday 06/20 - all unit 4 course work including exam 4 must be submitted by 11:59pm EST

COURSE ALIGNMENT WITH LEARNING OBJECTIVES:

UNIT	TOPIC	LEARNING OUTCOMES	READINGS	ASSESSMENTS*
1: The Foundation	The study of Life	Define what makes something alive or not alive.	1.1	IR1 and 2 CW1 and 2 DB1 HW1 PE1 Exam1
	The Chemical Foundation of Life	Explain the relationship between atoms and molecules. Explain 1) what electronegativity means, 2) how electronegativity influences the electron positions in a covalent bond, and 3) how electronegativity influences the partial charges on atoms in a covalent bond. Compare hydrogen bonds and covalent bonds in terms of the mechanisms and strength of attraction between the atoms involved Explain the structure of water and its properties Define the terms acid, base, and pH. Sketch the pH scale and note where on the scale you find strong acids, strong bases, and water. Explain the relationship between hydrogen bonding and phenomena such as sweating, moderate coastal climates, and the oceans' response to global warming.	2.1; 2.2; 2.3; 2.5	
	Biological Macromolecules: Proteins	Label the four components of an amino acid and explain the role of each in terms of how the molecule functions in a protein. Describe at least three functions that proteins serve in cells. Describe each of the four levels of protein structure and explain how each influences the protein's final size, shape, and chemical properties Predict whether the R-group on an amino acid that you haven't seen before will 1) interact with water, and 2) act as an acid (proton donor) or base (proton acceptor).	3	
	Biological Macromolecules: Carbohydrates	Describe the different ways monosaccharides can vary in their structure. Explain how the structure of polysaccharides relates to their specific biological functions. Explain how the structure of carbohydrates determines their various functions in cells.	5	
	Biological Macromolecules: Lipids	Describe the structural diversity found among different types of lipids. Explain how lipid structure determines their biological functions in cells.	6.1	
		Explain how energy is transformed in a chemical reaction. Given a graph showing how free energy changes over the course of a chemical reaction, 1) label the sections representing the reactants, activation energy, and	8.1; 8.3; 8.4; 8.5	

	Metabolism (Energy & Enzymes)	products, 2) explain why energy peaks during the transition state, and 3) determine whether the reaction is exergonic or endergonic. Explain the factors that affect enzyme function Explain how enzyme structure affects the rate of a chemical reaction.		
2: The Cell	Cell Structure and Function	Describe the role of cells in organisms. Describe the structure of eukaryotic cells. Compare prokaryotic and eukaryotic cells. Compare animal cells with plant cells. Summarize the functions of the major cell organelles	7.1; 7.2; 7.6	IR 3 and 4 CW3 and 4 DB2 HW2 PE2 Exam 2
	Structure and Function of Plasma Membranes	Compare the processes of diffusion and osmosis and provide biological examples that illustrate each process. Explain how the structure of the plasma membrane determines the movement of water and solutes. Predict what will happen to a cell when it is placed in a hypertonic, hypotonic, or isotonic solution.	6.2 and 6.3	
	Cellular Respiration	Make a chart summarizing the inputs and outputs of glycolysis, pyruvate processing, the citric acid cycle, and oxidative phosphorylation, using NADH, FADH2, Glucose, Acetyl CoA, Pyruvate, O_2, CO_2, H^+ gradients, and ATP. Using the chart, explain how energy is transferred or transformed in each stage. Describe how feedback inhibition would affect the production of an intermediate or product in each cel. respiration stage. Explain how cells use fermentation pathways to obtain energy from glucose in the absence of oxygen.	9	
	Nucleic Acids and DNA Synthesis and Repair	Compare the structure, chemical composition, location, and function of DNA with RNA. Define complementary base pairing and explain its connection to the observation that DNA strands are antiparallel. Use a drawing that you create to explain the statement: "A newly synthesized DNA strand is half old and half new. Describe the function of major components of the replisome: helicase, topoisomerase, DNA polymerase, DNA ligase, and primase.	4.1; 4.2; 4.3; 15.2; 15.3; 15.4; 15.5	

		Using a drawing, explain 1) the problem that arises during lagging strand synthesis at the end of a chromosome, and 2) the role of telomerase in solving the problem. Explain how DNA damage and/or mismatches are detected and repaired.		
	The Cell Cycle and Mitosis	Explain why chromosome replication has to occur before mitosis, in interphase. Explain the differences between somatic cells and germ cells. Describe the outcomes of cell division between these two categories of cells. Given a micrograph or drawing of a cell you've never seen before, label chromosomes, chromatids, sister chromatids, and homologous chromosomes, if present, and determine the haploid number and ploidy of the cell. Diagram the sequence of stages in the eukaryotic cell cycle (M, G1, S, and G2) and label the major event or events that occur in each. Explain why cancer is 1) associated with mutations that regulate the cell cycle, and 2) more common in older than younger people Predict the consequences of altering a given stage (M, G1, S, and G2) in the cell cycle in terms of the cell's structure or fate.	12	
3: Genetics	Meiosis	Explain why the segregation of homologous chromosomes in meiosis I leads to a reduction in ploidy. Explain why no two haploid cells that result from meiosis are alike in terms of genotype and why this is important in terms of offspring fitness. Given a drawing of a cell determine the ploidy of the cell, the number of chromatids, DNA molecules and chromosomes. Differentiate between the genetic information held on two homologous chromosomes, two nonhomologous chromosomes, two sister chromatids, and two non-sister chromatids.	13.1; 13.2; 13.3	IR5 and 6 CW5, 6 and 7 HW3 PE3 Exam 3
	Mendel and the Gene	Label which elements in a Punnett square represent the genotypes of egg, sperm, and offspring. Explain how you can determine the frequency of each egg and sperm genotype and how you can use this information to calculate the frequencies of offspring genotypes and phenotypes. Given any pair of parental genotypes and information on the alleles present, use a Punnett square to complete a genetic cross. Identify the genotypes and phenotypes of offspring and calculate their predicted frequencies.	14	

		Given information on parental and offspring phenotypes, determine whether the alleles involved are 1) dominant, recessive, or codominant, 2) autosomal or X-linked, and 3) linked or unlinked. Identify non-Mendelian inheritance patterns such as incomplete dominance, codominance, multiple alleles, and sex linkage Define polygenic inheritance and explain why it produces traits with a continuous variation. On a pedigree, label 1) males and females, 2) affected and unaffected individuals, and 3) generations.		
	Basics of Evolution	Define adaptation, fitness, evolution, and theory. For each term, explain how its use in science differs from its use in everyday English. Recall examples of evidence regarding: (a) whether species change through time and (b) whether they are related by common ancestry Using specific examples, explain why evolution by natural selection is neither random nor progressive, and why adaptations are not 'perfect'. Distinguish the theory of evolution by natural selection from prior ideas about how species change. Correct common misconceptions about natural selection and evolution. Understand the main evolutionary processes besides natural selection (mutation, gene flow, genetic drift, and non-random mating), and explain how each of these, drive evolution.	22.1; 22.2; 22.3; 22.5 and 23.2 - 23.6	
	How Genes Work	Make a flow chart summarizing the flow of information in cells from gene to protein. Label arrows connecting mRNA, DNA, and proteins, and explain what each arrow represents. Add elements to your central dogma model that represent "exceptions" such as 1) production of rRNA, tRNA, and "other RNAs", 2) DNA replication, and 3) the action of an enzyme called reverse transcriptase, which catalyzes the synthesis of DNA from an RNA template.	16.1; 16.2; 16.3	
	Transcription, RNA Processing, and Translation	Explain how the genetic code relates transcription to translation and why it is considered degenerated, unambiguous, conservative, nearly universal and non-overlapping. Compare and contrast transcription regulation in prokaryotes and eukaryotes.	17	

		Compare prokaryotic and eukaryotic transcription Describe the roles of ribosomes, mRNA, and tRNAs in translation. Use a copy of the genetic code to predict the sequence of the amino acids produced from a given mRNA or double-stranded DNA fragment (template and coding strands). Identify the start and stop codon.		
4: Form & Function	The Animal Body: Basic Form & Function	Analyze the characteristics that distinguish animals from other eukaryotes. Explain how different animal body plans are characterized and compared. Analyze the relationships among the cells, tissues, and/or organs involved in a given animal physiological system, including how their structures correlate with their functions and how they interact in terms of function. Describe why surface area-to-volume ratio sets constraints on the maximum size of cells and multicellular organisms.	30.1; 39.1; 39.2; 39.3	IR7 and 8 CW8 and 9 DB3 HW4 PE4 Exam 4
	Viruses	Explain why viruses are considered obligate intracellular parasites, and why viral diseases are difficult to treat with drugs. Using a diagram, explain how the following events in a virus' life cycle occur: enter a host cell, produce viral proteins, replicate viral genome, assemble new virions, exit host cell, transmission to a new host.	33.1; 33.2	
	Vertebrate Immune Systems	Compare and contrast the functions of the innate response versus acquired response in the human immune system. Explain the functions of cytotoxic T cells, helper T cells, the antibodies produced by activated B cells, and memory cells. Explain the logic of vaccination to a 4th grader.	48	
	Animal Reproduction and Development	Describe advantages and disadvantages of asexual and sexual reproduction Explain how animals develop their offspring during gestation Outline anatomical adaptations that occurred in animals to facilitate reproduction	46.1; 46.2	

*IR = Interactive Reading; CW= Class Work; PE= Practice Exam; DB = Discussion Board

If you have read this syllabus, then you are on the right track to succeed in this class!
Looking forward to an enjoyable semester in BIO 110.

Daniela Lopes Paim Pinto, M.Sc., Ph.D
Associate Teaching Professor
Department of Biological Sciences