

## **BIOL 151 Introduction to Biological Sciences I**

### **Welcome to BIOL 151: Introduction to Biological Sciences I**

Before we begin the learning process its a good idea to become familiar with how this particular course is structured and what the expectations of the course are. This module was created help guide you through this process.

### **Meet Your Instructor: Dianne Jennings, Ph.D.**

Hello everyone, I am Dr. Jennings (you can call me Dr. J) and I will be your guide this semester as you begin your exploration of the nature of biological sciences. I know it may seem minor to you but I would prefer that you refer to me as Dr. or Professor Jennings, not Ms. and definitely not Mrs. Jennings (that would be my mom). I have been in the Biological Sciences for a while, I received my B.S. in Wildlife Biology from Kansas State University (yes Kansas does have a University) and a M.S. in Parasitology from Kansas State as well. My PhD however was from North Carolina State University in Plant Physiology. As it may seem I am a bit of a jack of all trades (except Human Anatomy) and have spent some time dabbling in many of the biological disciplines. I hope that my broad background will allow me to help you take the knowledge you learn in this course and apply it to something that interests you (yes, even if it is human anatomy). Please feel free to contact me when you have questions ([dbjennings@vcu.edu](mailto:dbjennings@vcu.edu)) or post your questions to our course discussion board. I look forward to getting to know you this semester.

### **What this course is about:**

This semester we will be exploring the fascinating world of biology. During the course of semester we will discuss many biological principles including cell biology, energy, molecular biology and genetics. From atoms to cells to genetics we will be building a framework of some of the core biological principles and connecting them to the world around you

### **Prerequisites:**

The prerequisites for BIOL 151 are placement into MATH 151 and CHEM 101. This does not mean you have to be enrolled in either of those courses, simply that you meet the requirements needed to take them (placement tests in the MATH and CHEMISTRY departments, see their web pages for more information). If you have questions please contact the professor.

### **Reading Materials/Textbook:**

There is no physical textbook for this course. We will be using a open educational resource that has been tailored by the Introductory Biology professors at VCU. Links to the reading assignments will be provided in the course units on Blackboard.

## Other Required Materials:

We will be using an online program called TopHat this semester. TopHat is where all the powerpoints from the lectures will be available and where the majority of the reading assignments will be so an account is a necessity. Top Hat is also integrated into each lecture and your responses to in class questions on this platform are a part of your grade. In order to participate through TopHat you will need to bring a laptop, tablet or smart phone (something that can text or access the internet or support the TopHat App) to class everyday. If you cannot do this or have some issue related to this please contact me immediately so we can work something out.

## Course Objectives:

By the end of the course you should be able to .....

- Correlate the structure of organic molecules with their basic functions and their roles in cells
- Describe how energy enters living systems and how it used by different organisms and organelles to keep life going.
- Compare and contrast the formation of new cells with the formation of gametic cells
- Outline the relationships between genes, inheritable traits and gene expression patterns
- Relate key biological themes to examples found in the natural world
- Explain how scientists learn more about the world around them, and the changing nature of scientific information.
- Apply key concepts in biology to information/scenarios outside of the course

## Course Expectations

**Due to the nature of the course and its format there will be no make ups given for missed assignments.** Should you experience any difficulty in completing an assignment due to a legitimate reason (severe illness, death in family, accident) you must provide documentation of the reason (Dr.'s note, obituary, police report) **within 24hrs** of the missed deadline to be considered for an exemption from the assignment. Loss of internet access is not a legitimate reason for not completing assignments and no exemptions will be given for this.

Participation is also a key element to this course. You will be asked to actively participate both in class and online during the course. ***It is vital that you complete all assignments within the given time frames***, that your interactions with classmates, TAs and the professor are courteous. Do not copy and paste any materials. **All work that you submit for assignments should be original and written in your own words.**

If at any time you find yourself struggling with course materials or with outside issues it is important that you contact me immediately. I cannot help if I do not know you are struggling. Please be aware however that I cannot make exceptions to course policies in fairness to all the students in the course. Within those boundaries I will work to do what we can to keep you on track.

## **Attendance Policy**

As mentioned previously your participation in this course is part of the key to your success. Your attendance is determined by your presence in class, the record of your access of the course blackboard page and your completion of assignments. The attendance policy for this class is as follows:

1. You are expected to be present and participation during each class period. We will be using TopHat during class and attendance will be gauged by your answering questions and completing in class assignments.
  - Should you miss class you are welcome to participate on TopHat at home, however in class assignments like group worksheets cannot be made up
2. Because we are using online course materials you are expected to be active on Blackboard and TopHat outside of class regularly.
  - Should you fail to access the course Bb page for 3 consecutive days you may be dropped from the course without notice.
  - Should you fail to complete any unit, miss more than 3 consecutive assignments you may be dropped from the course or assigned an F for the course
3. Inability to access the internet during the course is not an excuse for completing assignments on time or for violating policy 2
4. If you know that you might be in danger of violating policies 1 or 2 you must notify me immediately and I will decide whether to allow you to continue in the course
5. Appropriate documentation must be provided before exemptions or extended deadlines will be considered. Alternative testing formats may be requested

If you have any questions or concerns about these policies please contact me.

## **Guidelines for Success**

It is a common misconception that introductory courses are easier than other upper level courses. This is not accurate for the sciences. In this semester we will be covering materials that are essential building blocks for your success in future biology courses. To help achieve this we will be incorporating more self-learning and assessment than you may be accustomed to in an effort to help you master the concepts.

Just to be upfront, you can expect to spend at least 15-20 hours a week on this course over the semester; reading assigned materials, watching videos, participating in discussions, completing practice questions, self-assessments and other assignments.

## **To maximize your potential for success;**

- you will need to have access to reliable internet service (this does not mean wireless on your phone)
- you will need to keep track of assignments and due dates and ensure that things are completed on time

- you will need to take advantage of any review materials that are provided, including attending SI or preceptor review sessions (and not just right before the tests)
- should you experience any difficulties related to the materials (this does not mean internet issues) you should contact me immediately so that I can help you resolve them before moving forward
- the more effort you put into this course the more you will get out of it (knowledge and skills, not necessarily just grades), however if what you are doing is not working make sure to get help early.

The units that we will be doing will overlap in both content and time frames. It is important that you complete each unit fully and each assignment before the due dates. The units build upon each other, so you will need to understand the material in each in order to be successful in the next unit. We are building the foundation for all the other courses you will take in Biology so it is essential that you gain a solid understanding of everything that we will cover.

### Grading

During this semester your grades will be based on the following:

Assignment Type	% of Course grade	Additional Information
<b>In Class:</b> Group discussion questions, quizzes, TopHat Qs, take home assignments.	25%	Each item is equally weighted regardless of the number of pts
<b>Online:</b> TopHat readings, Blackboard Question sets, surveys, modules.	25%	Each item is equally weighted regardless of the number of pts
<b>Tests:</b> 4 total, each consists an Online portion (60% test score) and an In Class portion (40% test score)**	50%	Each test is equally weighted

\*\* For the fourth test only, the online portion will count as 50% of the test score and the in class will count as 50% of the test score.

THERE IS NO FINAL FOR THIS COURSE BUT ALL EXAMS ARE COMPREHENSIVE IN NATURE, this means that each test will build upon the material in preceding test. Our last test is schedule for the finals period but the length of the testing period has been altered. Please see Important Dates for testing dates.

## Grading Scale:

A 90-100%

B 80-89.9%

C 70-79.9%

D 60-69.9%

F <60%

To be clear, there is no curving or rounding in the grading. NO EXCEPTIONS will be made and NO EXTRA CREDIT will be given.

## Course Topics and Reading Schedule

**(Readings and topics may be altered due to unforeseen circumstances, any changes will be announced in class, through Blackboard course announcements and noted here)**

Unit	Dates	Topics	Reading Assignments (on TopHat)
1	[Removed]	Commonalities of Living Organisms	<ul style="list-style-type: none"><li>• The Science of Biology</li><li>• Themes &amp; Concepts of Biology</li></ul>
		Reviewing Atoms, Bond & Water	<ul style="list-style-type: none"><li>• Atoms and Chemical Bonds</li><li>• Water</li></ul>
		Carbon & Organic Molecules	<ul style="list-style-type: none"><li>• Carbon and Organic Molecules</li><li>• Synthesis of Biological Macromolecules</li></ul>
		Molecules & Membranes	<ul style="list-style-type: none"><li>• Structure and Function of Plasma Membranes</li><li>• Proteins</li></ul>
		Membrane Properties: Permeability	<ul style="list-style-type: none"><li>• Membrane properties and Permeability</li></ul>
		Comparing Components of Cells  -prokaryotic vs. eukaryotic  -endomembrane system  -other organelles  -cytoskeletal elements	<ul style="list-style-type: none"><li>• Comparing Cells</li><li>• The Endomembrane System</li><li>• Cellular Connections</li></ul>
2		Energy for Life: Chemical Reactions and Enzymes	<ul style="list-style-type: none"><li>• Energy &amp; Metabolism</li></ul>

	[Removed]		<ul style="list-style-type: none"> <li>• Potential, Kinetic, Free &amp; Activation Energy</li> <li>• The Laws of Thermodynamics</li> <li>• ATP: Adenosine TriPhosphate</li> <li>• Enzyme Function and Regulation</li> </ul>
		Pulling Energy from the Sun: basics of photosynthesis	<ul style="list-style-type: none"> <li>• Introduction to Photosynthesis</li> <li>• Capturing Light Energy</li> <li>• Making Organic Molecules</li> <li>• Photosynthetic Efficiency</li> </ul>
		Getting Energy from Food: basics of cellular respiration	<ul style="list-style-type: none"> <li>• Energy in Living Systems</li> <li>• Glycolysis</li> <li>• The Krebs' Cycle</li> <li>• Oxidative Phosphorylation</li> <li>• Metabolism without Oxygen</li> <li>• Regulation of Cellular Respiration</li> </ul>
3	[Removed]	From one cell to two: fundamentals of the cell cycle	<ul style="list-style-type: none"> <li>• Prokaryotic Cell Division</li> <li>• Cell Division in Eukaryotes</li> <li>• Control of the Cell Cycle</li> <li>• Cancer &amp; The Cell Cycle (tentative)</li> </ul>
		Copying DNA: DNA structure and replication	<ul style="list-style-type: none"> <li>• DNA Structure</li> <li>• DNA Replication</li> <li>• DNA replication in Prokaryotes</li> <li>• DNA Replication in Eukaryotes</li> <li>• DNA Repair</li> </ul>
		Meiosis and Sexual Reproduction	<ul style="list-style-type: none"> <li>• Meiosis</li> <li>• Sexual Life Cycles</li> </ul>
4	[Removed]	Introductions to Mendelian Genetics	<ul style="list-style-type: none"> <li>• Introduction to Genetics</li> <li>• Characteristics and Traits</li> <li>• Laws of Inheritance</li> </ul>
		From Gene to Protein	<ul style="list-style-type: none"> <li>• Transcription</li> <li>• mRNA processing</li> <li>• Ribosomes and Protein Synthesis</li> </ul>
		Controlling Gene Expression	<ul style="list-style-type: none"> <li>• Regulation of Gene Expression</li> <li>• Prokaryotic Gene Regulation</li> <li>• Eukaryotic Epigenetic Gene Regulation</li> <li>• Eukaryotic Transcriptional Gene Regulation</li> <li>• Eukaryotic Post-transcriptional Gene regulation</li> </ul>

			<ul style="list-style-type: none"><li>• Eukaryotic Translational &amp; Post-translational Gene regulation</li><li>• Cancer and Gene Regulation (tentative)</li></ul>
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## Unit Test Dates:

Unit I: Organization and Structure

Online: [Removed]

Short Answer In Class: [Removed] (25 minutes)

Unit II: Energy for Life

Online: [Removed]

Short Answer In Class: [Removed] (25 minutes)

Unit III: DNA and Cell Division

Online: [Removed]

Short Answer In Class: [Removed] (25 minutes)

Unit IV: Inheritance and Gene Expression

Online: [Removed]

Short Answer In Class: [Removed]

**There is no final exam in this course. The last test is scheduled for the final period. Each test is comprehensive and will include material from previous tests.**

## VCU Policies

The required syllabus statements originally included here are maintained by the Office of the Provost and are regularly updated. To prevent the dissemination of information which may no longer be accurate or complete, the full text of the required syllabus statements have been removed from this document.

Students should visit <http://go.vcu.edu/syllabus> and review all syllabus statement information. The full university syllabus statement includes information on safety, registration, the VCU Honor Code, student conduct, withdrawal and more.