BIOD 101 Essential Biology I w/ Lab

4 credits

Prerequisites: High-school biology and chemistry (recommended, but not required)

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Contact Information: Faculty may be contacted through the Portage messaging system

Additional Information: www.portagelearning.com*

Course Meeting Times: BIOD 101 is offered continuously

Course Description: This course will provide students with an introduction to the fundamental laws, theories, and concepts of biology. Topics include chemical principles and the biological chemistry associated with cellular structure and function; taxonomy and the organization of life; the structure and function of macromolecules; the basic structure of cells; energy and cellular respiration; the genetic basis of cellular division, regulation, and the means of inheritance; the mechanistic approaches to cellular signaling; microbiology and the mechanisms employed by both foreign and host defenses. The laboratory component of this course is delivered using virtual labs and interactive simulations with detailed instruction and demonstrations from an experienced instructor.

* Portage Learning college courses are offered by Geneva College, which is regionally accredited by the Middle States Commission on Higher Education. Portage Learning is included in the College's Department of Professional and Online Graduate Studies; courses are delivered through the PortageLearning.com platform.

Course Outcomes: As a result of this course experience a student should be able to:

- Explain principles of biological chemistry as it relates to cellular functions
- Describe fluid and solute movements in a cell
- Describe the key differences between eukaryotic and prokaryotic cells
- Outline general guidelines for the classification of organisms
- Identify eukaryotic cell organelles and structures and explain the functions of each
- Describe the roles of major biological molecules
- Explain the metabolic processes of aerobic and anerobic respiration of eukaryotic cells
- Compare various types of enzymatic reactions
- Define the cellular machinery that governs the cell cycle, mitosis, and meiosis
- Outline the basic structure of DNA
- Explain the principles of Mendelian genetics
- Calculate the patterns of gene inheritance
- Describe the molecular concepts of cell signaling and controlled cell death
- Explain microbiology principles associated with bacterial and viral infections
- Describe innate immunological responses

*Please see the *Module & Lab Topics* section below for expanded course outcomes.

Lab Outcomes: As a result of this laboratory experience, students should be able to:

- To define laboratory safety, experimental techniques, and best practices
- To identify and explain the various components of a light microscope
- To explain the concept of variables with a laboratory experiment and the essential components of scientific writing
- Explain the principles of fluid and ion movements relative to osmosis, diffusion and tonicity
- To evaluate how varying conditions can alter cellular respiration
- To describe and then evaluate changes in enzymatic activity
- Explain the principle of DNA gel electrophoresis

Each of these BIOD 101 student learning outcomes is measured:

Directly by: (1) Module application problems (with instructor feedback)
(2) Module exams
(3) Lab exams
(4) Cumulative final exam

Indirectly by an end of course student-completed evaluation survey

Course Delivery: This course is asynchronously delivered online and is composed of 45 - 55 hours of reviewed module assignments with instructor feedback, 6 contact hours of secure online module exams, 12 – 16 hours of observation of demonstration labs and 7 hours of lab exams.

Course Progression: It is the policy for all Portage Learning courses that only one module (lecture) exam is to be completed within a 48-hour period. Research on the best practices in learning indicates that time is needed to process material for optimal learning. This means that once an exam has been completed, the next exam may not be opened or taken until 48 hours after the submission of the previous module exam. This allows for instructor feedback/class expectations as the student moves through the material. Instructors, like the College, are not available during the weekend; grading, therefore, is M-F and may take up to 72 hours during these days. Also, it is the policy of Portage Learning to support a minimum of 21 days to complete a course; this is not a negotiable time period. Please plan your time accordingly.

Note: Professors reserve the right to reset any exam taken in violation of these guidelines.

Required readings, lectures and assignments: Portage courses do not use paper textbooks. Students are required to read the online lesson modules written by the course author which contain the standard information covered in a typical course. Please note the *exam questions are based upon the readings*. Video lectures which support each lesson module subject should be viewed as many times as is necessary to fully understand the material.

Module Review Questions: The practice problems within the modules are a part of your final grade, and the module work will be reviewed for completeness (not correctness) by the instructor. **Be sure to answer all the problems, being careful to answer the questions in your own words at all times since this is an important part of adequate preparation for the exams.**

After you answer the practice problems, compare your answers to the solutions provided at the end of the module. If your answers do not match those at the end, attempt to figure out why there is a difference. If you have any questions, please contact the instructor via the Canvas messaging system (see Inbox icon).

Academic Integrity is a serious matter. In the educational context, any dishonesty violates freedom and trust, which are essential for effective learning. Dishonesty limits a student's ability to reach his or her potential. Portage places a high value on honest independent work. In a distance learning situation, we depend on the student's desire to succeed in the program he or she is entering. It is in a student's own best interests not to cheat on an exam, as this would compromise the student's preparation for future work.

It is required of each student to take exams without consulting course materials or study aids including another person, the lesson pages, printed materials, or the Internet. **Students may not reference or use outside**

materials from any source, including their own notes or drafts in a word processing document, unless explicitly instructed to do so. Additionally, as we are required to evaluate the mastery of the material presented in this course, the use of content/processes/methods from a previous course will be considered as the use of an outside resource. It will be necessary to show all your work on exams.

A violation of the academic integrity policy will result in a *10 point deduction per question* for the first offense, a *"0" on the entire exam* for the second offense, and *possible expulsion from the course* following review by the instructor in consultation with an administrative-instructional committee for the third offense.

If students have questions about this policy, they should contact their instructor. Failure to understand this policy regarding violations of academic integrity will not excuse any student from its consequences. In the enforcement of the policy, **no notification is required between occurrences**. If three occurrences are found in your course prior to your instructor grading your work, each occurrence will be treated as an individual case, and the enforcement will apply as shown above.

For example: If you take two exams before your instructor has time to review your work and there are violations on both exams, you will receive a 10 point deduction per question involved in the first exam, and a zero for the second exam. If you have any question about the work you submitted, we recommend that you wait until your instructor has had time to grade your exam prior to taking another one.

Review the Student Handbook for more specifics. If you have any questions regarding the academic integrity policy, please consult your instructor **prior** to taking module exam one.

Required Computer Accessories: It is recommended that students use a desktop or laptop computer, PC or Mac, when taking the course. Some tablet computers are potentially compatible with the course, but not all features are available for all tablet computers. The latest full version of Google Chrome, Firefox, Edge, or Safari browser is required for the optimal operation of the Canvas Learning Management System. In addition, this course will use the Respondus Lockdown Browser for exams. **Please NOTE: Chromebooks and tablets (other than iPad) are not compatible on exams using the Lockdown Browser.** Instructions on downloading and installing this browser will be given at the start of the course. It is recommended to also have the latest version of Flash installed as a browser plugin as some sections of the course may require it. We highly recommend using a high-speed Internet connection to view the video lectures and labs. You may experience significant difficulties viewing the videos using a dial-up connection.

For more information on basic system and browser requirements, please reference the following:

- System requirements: https://community.canvaslms.com/docs/DOC-10721-67952720328
- Browser requirements: https://community.canvaslms.com/docs/DOC-10720
- Respondus requirements: https://web.respondus.com/he/lockdownbrowser/resources/

Module & Lab Topics

Module 1: In this module, students will be introduced to the chemical principles and the biological chemistry associated with cellular structure and function. Students will learn how to identify cellular organelles, understand the major functions of each, and how they work together within a cell. The role of macromolecules within a cell will be examined. Students will then be introduced to the structural and functional aspects of the cell membrane as well as the different types of osmotic gradients and modes of transport utilized within the cellular environment.

Module 2: In this module, the major characteristics and levels of structure will be explained for the 3 major domains. In addition, classifications and cell features (organelles and organization) will be discussed, compared, and contrasted for the different kingdoms. This module will also introduce a variety of model systems commonly used to study biological processes.

Module 3: In this module, students will begin with an introduction to basic catabolic and anabolic biological reactions. Students will then receive a comprehensive overview of the key metabolic processes of aerobic (glycolysis, TCA and ETC) and anerobic (fermentation) respiration and how energy (ATP) is harvested and used by the cell. Enzymatic reactions, including an overview of competitive and non-competitive inhibition will be discussed.

Module 4: This module contains an in-depth discussion on the cell cycle (mitosis and meiosis) and the cellular machinery that governs the processes. In addition, common disease states that arise as a consequence of cell cycle dysregulation will be examined. Mendelian genetics and the concepts of inheritance and genetic crosses will be discussed. Examples of genetic disorders and conditions will be discussed.

Module 5: In this module, students will be introduced to cellular signaling. Content includes a comprehensive biological overview of the molecular signaling mechanisms that governs cell communication. Receptors and the modes of signal transduction, secondary messengers, and downstream response cascades will be discussed. Signal termination, feedback pathways, and apoptotic signaling will be included as well.

Module 6: In this module, students will be introduced to microbiology and immune responses. Methods for identifying and visualizing prokaryotic and eukaryotic cells based upon structural characteristics, shape, and movement are emphasized. Strategies of the innate and adaptive immune system defenses and the mechanisms employed when activated are examined. Common pathogens and the disease states associated from evading host defenses are also included.

Lab 1: In this lab, students will be introduced to the principles of lab safety and personal protective equipment (PPE), the scientific method, and the components of a laboratory notebook.

Lab 2: In this lab, students will be introduced to the metric system as it pertains to recording length, mass, and volumetric measurements and the conversions often required between SI and metric units within health-related fields.

Lab 3: In this lab, students will cover the basic components and functions of a light microscope. The principles of magnification, resolution, and contrast are covered and then expanded into the different types of microscopy including fluorescence, SEM, and TEM.

Lab 4: In this lab, students will cover the principles of osmosis, tonicity, and concentrations. Lab experiments are designed to demonstrate how gradients can affect cell viability and cellular composition.

Lab 5: In this lab, students will examine cellular respiration and the associated regulatory and feedback mechanisms used to maintain equilibrium.

Lab 6: In this lab, students will assess enzymatic activity under varying conditions of temperature and pH. Students will be tasked with analyzing and then determining the optimal ranges for maximum enzymatic activity.

Lab 7: In this lab, students will be introduced to the technique of gel electrophoresis. The associated processes of restriction enzyme digests and polymerase chain reactions (PCR) will be discussed, along with various applications.

Required labs and assignments:

For the laboratory portion of the course, students will observe an experienced lab instructor. It is the responsibility of the student to view each lab video in its entirety and only mark the lab as “done” when it is completed. **Please note that the use of outside material (i.e. the internet, textbooks, articles, etc.) is not permitted while taking the lab exams.** A recommended lab schedule can be found on the home page of each lab; the student should follow this schedule to meet course objectives.

Grading Rubric:

Check for Understanding =	1 pt.
6 Module exams = 100 pts. each x 6 =	600 pts.
6 Sets of Review Questions = 5 pts each x 6 =	30 pts.
7 Lab exams = 30 pts. Each x 7 =	210 pts.
Final exam = 120 pts.	120 pts.
Total	961 pts.

The current course grade and progress is continuously displayed on the student desktop.

Grading Scale:

89.5% - 100% (861 - 961 pts)	= A
79.5% - 89.4% (764 - 860 pts)	= B
69.5% - 79.4% (668 - 763 pts)	= C
59.5% - 69.4% (572 - 667 pts)	= D
<59.4% (< 571 pts)	= F

External References: If the student desires to consult a reference for additional information, the following textbook is recommended as providing complete treatment of the course subject matter.

- Lisa Urry, et al., **Campbell Biology AP Edition**, 11th edition, Pearson

Learning Support Services:

Each student should be sure to take advantage of and use the following learning support services provided to increase student academic performance:

Video lectures: Supports diverse learning styles in conjunction with the text material of each module

Messaging system: Provides individual instructor/student interaction

Tech support: Available by submitting a help ticket through the student dashboard

Accommodations for Students with Learning Disabilities:

Students with documented learning disabilities may receive accommodations in the form of an extended time limit on exams, when applicable. To receive the accommodations, the student should furnish documentation of the learning disability at the time of registration, if possible. Scan and e-mail the documentation to studentservices@portagelearning.com. Upon receipt of the learning disability documentation, Portage staff will provide the student with instructions for a variation of the course containing exams with extended time limits. This accommodation does not alter the content of any assignments/exams, change what the exam is intended

to measure or otherwise impact the outcomes of objectives of the course.

One-on-one Instruction:
Each student is assigned to his/her own instructor. Personalized questions are addressed via the student dashboard messaging system.

Online learning presents an opportunity for flexibility; however, a discipline to maintain connection to the course is required; therefore, communication is essential to successful learning. **Check your messages daily.** Instructors are checking messages daily Monday-Friday to be sure to answer any questions that may arise from you. It is important that you do the same, so you do not miss any pertinent information from us.

Holidays:
During the following holidays, all administrative and instructional functions are suspended, including the grading of exams and issuance of transcripts.

New Year's Day	Easter
Memorial Day	Independence Day
Labor Day	Thanksgiving weekend
Christmas Break	

The schedule of holidays for the current calendar year may be found under the Student Services menu at www.portagelearning.com

Code of Conduct: Students are expected to conduct themselves in a way that supports learning and teaching and promotes an atmosphere of civility and respect in their interactions with others. Verbal and written aggression, abuse, or misconduct is prohibited and may be grounds for immediate dismissal from the program.

This is a classroom; therefore, instructors have the academic freedom to set forth policy for their respective class. Instructors send a welcome e-mail detailing the policy of their class, which students are required to read prior to beginning the course.

Grievances: If for any reason a student has a complaint about the course work or the instructor, the student is advised to first consult the instructor, who will be willing to listen and consider your concern. However, if you don't feel you have received a satisfactory reply, contact the Academic Dean of Portage Learning for further consideration. The formal grievances process must be initiated via written communication. If desired, please file a written grievance to academics@portagelearning.com to initiate the process.

Remediation: At Portage Learning we allow a "one-time" only opportunity to re-take an alternate version of **one** module exam on which a student has earned a grade lower than 70%. This option must be exercised before the final exam is started. If an exam is retaken, the original exam grade will be erased, and the new exam grade will become a permanent part of the course grade. However, before scheduling and attempting this retest, the student must resolve the questions they have regarding the material by reviewing both the old exam and the lesson module material. Once ready to attempt the retest of the exam they must contact their instructor to request that the exam be reset for the retest. Remember, any module retest must be requested and completed **before** the final exam is opened.

Note: Exams on which a student has been penalized for a violation of the academic integrity policy may not be re-taken.