

November, 2023

Prerequisites: BIOD 101 – Essential Biology I w/Lab or equivalent**Faculty:** Brittany Martinez, Ph.D., Department Co-Chair
Rebekah Stepp, MS, CRNP, Department Co-Chair
Tammie Kephart, MS, RDN, LDN, Department Co-Chair

Janine Bartholomew, Ph.D.	Alycia Dalbey, MPAS, PA-C
Christine Bowman, DMD	Jessica R. Kassner, MSN, RN
Heidi Burt, DPT	Stefanie DiSilvio, BSN, MSN, DNP
Natalie M. Cekovich, DNP, MSN, RN, CRNP-BC	Courtney Kronenwetter MS, RD, LDN, CNSC
Allison Keck, DPT	Hannah McGuire, MAT
Melinda Kozminski, PharmD, BCACP	Eric Oberg, MOT, OTR/L
Renee Correll, DPT	Kelly Straley, MS, CRNP
Jerrold A. Poe, Ph.D.	Brandon Zangus, MOT, OTR/L
Crista Bush, MOT, OTR/L	Lindsay Landis, MSN, NP-C
Elizabeth Marrie, MS, RDN, LDN	Linda Lombard-Ash, MSN, FNP-BC
Nathaniel Kephart, DPT	Kayla M. Peters, MS, RD, LDN
Nancy Milligan, M.S.	Loretta Vece, DNP, MSN, RN
Jodi Weigand, MS PT	

Contact Information: Faculty may be contacted through the Canvas messaging system**Additional Information:** www.portagelearning.edu^{1*}**Course Meeting Times:** BIOD 102 is offered continuously

Course Description: A continued examination of the fundamental laws, theories, and concepts of biology. Topics include genetics, the molecular basis of replication, transcription, translation, and gene regulation; the effects of mutations on gene expression; endocrine signaling and the associated disease states; neuron action potentials and signaling cascades; muscle contraction and reflexes; principles of homeostasis and the associated feedback mechanisms relative to blood osmolarity, blood pressure and thermal regulation; an introduction to pharmacology, pharmacokinetics, and the process of clinical trials; epidemiology, and the global impact, surveillance, and investigation of infectious diseases. The laboratory component of this course is

^{1*} Portage Learning college courses are offered by Geneva College, which is 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.edu platform.

delivered using virtual labs and interactive simulations with detailed instruction and demonstrations from an experienced instructor.

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

- Explain the molecular mechanisms of DNA replication
- Describe the processes of transcription, translation, and gene regulation
- Explain the feedback mechanisms within the endocrine and nervous systems
- Contrast the classes of receptors and varying types of ligands
- Describe and contrast the disease states caused by endocrine dysregulation
- Outline the physiology and anatomy of a neuron and the associated signaling cascades
- Describe muscle contraction, reflexes and signaling pathways
- Define homeostasis and the varying regulatory feedback mechanisms associated
- Outline the drug development process, classifications, schedules and safety measures
- Outline and contrast the phases of a clinical trial
- Define absorption, distribution, metabolism and excretion relative to drug kinetics
- Explain the goals of public health relative to epidemiology and etiology
- Identify host and environmental factors relative to the modes of transmission
- Outline surveillance strategies when conducting case studies

**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 explain the principle of and interpret the results of a microarray
- To identify and explain the effects of hyperinsulinism
- To define and evaluate bodily reflexes based on techniques used in a medical setting
- Identify and explain various homeostatic techniques modeled within the laboratory
- To define, assess and then evaluate the processes of absorption and excretion
- To critically evaluate a public health investigation

Each of these BIOD 102 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 6 hours of lab exams.

Course Progression: It is the policy for all Portage Learning courses that only one (module lecture/final) 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 28 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.

We do not support the use of outside resources to study, except for the ones listed in the syllabus under “Suggested External References”. If you have questions about the material or would like further explanation of the concepts, please contact your instructor.

Module Problem Sets: 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 of 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).

NOTE: Module problem sets are not an option or a choice; they are required. This means that you must complete all the review questions within the modules. Not only are problem sets class participation, they are the best way to prepare for the exams.

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. 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 or put their work into question, as this would compromise the student's preparation for future work. It is the student's responsibility to review the **Student Handbook** and all policies related to academic integrity. If clarification is necessary, the student should reach out to their instructor for further explanation **before** initiating module 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; a strong internet connection is needed. You are also **required to use LockDown Browser with a webcam**, which will record you during an online, nonproctored exam. (The webcam feature is sometimes referred to as "Respondus Monitor.") **Your computer must have a functioning webcam and microphone. Additionally, students will need a photo ID that includes your picture and full name is required. 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. 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:

Canvas browser and system

requirements: <https://community.canvaslms.com/t5/Canvas-Basics-Guide/What-are-the-browser-and-computer-requirements-for-Canvas/ta-p/66>

Respondus Requirements: <https://web.respondus.com/he/lockdownbrowser/resources/>

Respondus Monitor Requirements: <https://web.respondus.com/he/monitor/resources/>

Module & Lab Topics

- Module 1: In this module, students will be provided with a comprehensive overview of the biochemical principles and molecular mechanisms that govern DNA replication and protein synthesis. Also included are the processes that regulate gene and protein expression, modifications and repair mechanisms.
- Module 2: In this module, the physiological functions of the endocrine system and the glands, organs, and tissues that are responsible for the regulation and coordination of all other body systems will be discussed. Also included is a discussion on disease states relative to endocrine dysregulation.

- Module 3: In this module, students will begin with an overview of physiological processes at the cellular level and then quickly expand into how these processes interact on the system level. The regulatory processes that control skeletal and cardiac muscle contractions, and the involvement of neurons, action potentials and reflex arcs will be covered in detail.
- Module 4: This module contains an in-depth discussion on homeostasis and the signaling pathways that work together to keep our body in equilibrium. Areas of mechanistic focus will include the balance and maintenance of calcium levels, blood glucose, osmoregulation and blood pressure, and thermoregulation. Examples of disorders as a direct result of failing to maintain homeostasis will be discussed.
- Module 5: In this module, students will be introduced to the principles of pharmacology and pharmacokinetics. Content includes an overview of the mechanisms governing drug-receptor binding, drug metabolism, and disease therapies. Further discussions will include how therapeutics are brought to market and the processes of drug classification, regulation, and clinical trials.
- Module 6: In this module, students will be introduced to the basic epidemiological concepts of public health. Strategies for examining both historical and current events, identifying risk factors and infectious agents, and formulating recommendations to minimize disease spread will be discussed. Students will also examine surveillance practices and measurable outcomes relative to both descriptive and analytical epidemiological studies.
- Lab 1: In this lab, students will be introduced to microarray technology. The principles, configuration and concepts of the microarray will be covered in detail. The microarray will be used to analyze similarities and difference in gene expression between cancerous and non-cancerous tissue samples.
- Lab 2: In this lab, the endocrine system will be examined in the context of hormone regulation through the reversible induction of hyperinsulinemia in a goldfish. Behavioral characteristics will be closely monitored over a set period of dosages and time.
- Lab 3: In this lab, the physiology of reflex arcs will be assessed. The patellar, corneal, and plantar somatic reflexes, as well as the corneal autonomic reflex will be demonstrated.
- Lab 4: In this lab, the experiments are designed to demonstrate how varying amounts of exercise-induced stress can affect blood pressure and cardiac output. The homeostatic mechanisms involved under each condition tested will be discussed.

Lab 5: In this lab, students will examine the pharmacokinetics of potassium iodide and acetylsalicylic acid metabolism through two independent experiments. The ADME profiles of each experiment will be discussed relative to the timepoint data collected and the metabolite levels analyzed.

Lab 6: In this lab, students will be assigned an epidemiological case study. Students will be tasked with assessing, analyzing, and interpreting the data provided and make appropriate recommendations towards public health.

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.

Suggested Timed Course Schedule (to complete the course within a typical college semester)

All Portage courses are offered asynchronously with no required schedule to better fit the normal routine of adult students, but the schedule below is suggested to allow a student to complete the course within a typical college semester. Students may feel free to complete the course on a schedule determined by them within the parameters outlined under “Course Progression.”

<u>Time Period</u>	<u>Assignments</u>	<u>Subject Matter</u>
Days 1-14 (2 weeks)	Module 1, Exam 1 Lab 1 and Lab Exam 1	DNA Replication and Protein Synthesis
Days 15-28 (2 weeks)	Module 2, Exam 2 Lab 2 and Lab Exam 2	Endocrine Function
Days 29-43 (2 weeks)	Module 3, Exam 3 Lab 3 and Lab Exam 3	Physiology
Days 44-58 (2 weeks)	Module 4, Exam 4 Labs 4 and Lab Exam 4	Homeostatic Mechanisms
Days 59-73 (2 weeks)	Module 5, Exam 5 Lab 5 and Lab Exam 5	Pharmacology and Pharmacokinetics
Days 74-88 (2 weeks)	Module 6, Exam 6 Lab 6 and Lab Exam 6	Epidemiology
Days 89-95	Final Exam	Based upon module material

Grading Rubric:

Check for Understanding =	1 pt.
6 Sets of Problem Sets = 5 pts. each x 6 =	30 pts.
6 Module Exams = 100 pts. each x 6 =	600 pts.
6 Lab exams = 30 pts. Each x 6 =	180 pts.
<u>Final exam = 120 pts.</u>	<u>120 pts.</u>
Total	931 pts.

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

Grading Scale:

96.5% - 100% = A+
92.5% - 96.4% = A
89.5% - 92.4% = A-
86.5% - 89.4% = B+
82.5% - 86.4% = B
79.5% - 82.4% = B-
76.5% - 79.4% = C+
72.5% - 76.4% = C
69.5% - 72.4% = C-
66.5% - 69.4% = D+
62.5% - 66.4% = D
59.5% - 62.4% = D-
0% - 59.4% = 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

NOTE: We do not support the use of outside resources to study, except the one listed above.

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.edu. 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	MLK Day
Easter	Memorial Day
Juneteenth	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.edu

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 a student has a complaint about the coursework or the instructor, the student is advised to first consult the instructor, who will be willing to listen and consider your concern. To file a formal grievance for consideration by the Academic Review Committee, the process must be initiated via written communication to academics@portagelearning.edu.

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.

Syllabi are subject to change as part of ongoing educational review practices. Students are responsible for accessing and using the most recent version of the course syllabus.