BIOL 351 Pharmacology — 3 credits

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Prerequisites: General biology and chemistry

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Contact Information: Faculty may be contacted through the Canvas messaging system.

Additional Information: www.portagelearning.edu[1*]

Course meeting times: BIOL 351 is offered continuously.

Course Description: This course provides a comprehensive overview to pharmacology. This course will begin by covering basic pharmacology principles and move quickly into therapeutics. The goal is to introduce common pathophysiology associated with each body system as well as the associated mechanisms of drug therapies used to target specific disease states.

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

- **Explain** the concepts within pharmacokinetics and pharmacodynamics and **associate** their concepts and vocabulary to the drugs and/or drug classes discussed in the course
- **Solve** drug dosage problems, including for pediatric populations, and interpret prescription abbreviations (sig codes).
- **Describe** the pathophysiology/physiology associated with common diseases and **recall** how pharmacotherapies target these mechanisms; **Identify** the drug class(es), generics, trade names and drug(s) used for treating specific diseases including infectious diseases.
- **Summarize** the mechanisms of action, therapeutic effects, indications, and adverse effects of the major drug classes
- **Analyze** patient's condition and **select and justify** the proper drug treatment, and **relate** the adverse effects or special considerations to the patient.
- **Recall** the regulatory aspects associated with therapeutics and **interpret** information from drug fact labels and therapeutic inserts.

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

[1*] Portage Learning college courses are offered by Geneva College, which is accredited by the Middle States Commission on Higher Education and Bushnell University, which is accredited by Northwest Commission on Colleges and Universities. The Faculty Senate of both institutions have vetted and approved the courses as part of their curriculum.

Each of these BIOL 351 student-learning outcomes is measured:

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

Indirectly by an end of course student-completed evaluation survey

Course Delivery: This course is asynchronously delivered online. Contact hours include 50 - 60 hours of reviewed module assignments with instructor feedback and video lectures. There are 10 additional contact hours composed of secure online exams.

Course Progression: It is the policy for all Portage Learning courses that only one (module/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 Topics:

Module 1: An Introduction to Pharmacology Concepts. This module will provide an overview of basic terminology related to pharmacology. Topics such as nomenclature, classification and routes of administration will be covered. This module will also introduce pharmacologic principles such as pharmacokinetics and pharmacodynamics. The concepts of absorption, distribution, metabolism and excretion will be explored as well as how they can change in different populations. Lastly, basic mathematic principles related to drug dosing will be introduced and students will become proficient in completing common calculations.

Module 2: Nonprescription Medications. This module will provide students with an understanding of over-the-counter (OTC) medications and the difference in federal legislation governing the promotion and sale of them compared to prescription medications. Students will become familiar with common OTC and herbal medications that patients use to self-treat. Emphasis will be placed on understanding the limited number of active ingredients that make up the many OTC medications available to consumers.

Module 3: Cardiology/Nephrology. In this module students will be introduced to select disease states impacting the cardiovascular system including: hypertension, angina, CHF, and hyperlipidemia. The focus will be on understanding the pathophysiology of these conditions and how specific drug classes are used to treat these disease states. This module will also cover the physiology of the kidney and its role in water excretion. This concept will be reinforced through an understanding of the different types of diuretic medications available and how they are used clinically to treat different disease states such as hypertension, CHF, and fluid retention.

Module 4: Endocrinology. In this module students will cover the basic physiology of the endocrine system and what results when it is not functioning properly. Conditions of the thyroid, pituitary, and adrenal glands will be presented briefly. The majority of the therapeutic focus will be on the most prevalent endocrine related disease, diabetes. By the end of the course students will be able to explain the pathophysiology related to diabetes and the different drug therapy options available for treatment.

Module 5: Pulmonology. This module will primarily cover the pathophysiology of both asthma and COPD. Drug therapies available for treatment will be discussed. Emphasis will be on understanding where treatment options may overlap between the two disease states and where they are

different. Content will include an introduction to the different types of inhalers available and a description of proper inhaler use.

Module 6: Pharmacology of Infectious Disease. This module will provide students with overview of the different classes of antibiotics available. Content will include basic guideline to selecting an appropriate antibiotic. The class will also cover some common or serious class wide adverse events or toxicities that students should become familiar with.

Module 7: Gastroenterology. This module will introduce students to common conditions impacting patients' gastrointestinal system including GERD, PUD, constipation, nausea, vomiting, and diarrhea, and IBS. Basic pathophysiology will be discussed as well as drug therapy options available for treatment.

Module 8: Neurology/Psychiatry. This module will have two main focuses: pain and psychotropic medications. The different types of pain that patient's experience as well as the different types of analgesic medications available will be examined. A basic understanding of the mechanism of action of the different classes will be covered. Content will also include an examination of psychotropic medications including: anxiolytics, antidepressants, and antipsychotics. A basic understanding of the pathophysiology of common mental health conditions will be covered including how drug therapies work to correct these imbalances.

Module 9: Specialty Medications. This module will cover the new and growing classification of medications known as specialty drugs. Students will be introduced to the most common specialty medications including monoclonal antibodies and other immunomodulating agents used in the treatment of disease states such as: rheumatoid arthritis, multiple sclerosis, Crohn's disease, hepatitis C, oncology, and more. Students will learn what constitutes a specialty medication and how the delivery of the medication to the patient differs from traditional prescription medications.

Module 10: Dosing Calculations. This module will cover the basic mathematics involved in most medication dosage calculations. Students will learn common prescription abbreviations, unit and metric conversions, and basic formulas on how to calculate the correct medication to administer. Some examples include dimensional analysis and IV flow rate formulas. Students will also learn terminology related to parenteral dosing, calculating an IV drip rate, and weight-based dosing. Emphasis is placed on medication safety.

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.”

Time Period	Assignments	Subject Matter
Days 1-9	Module 1, Exam 1	Introduction to pharmacology
Days 10-19	Module 2, Exam 2	Nonprescription medications
Days 20-29	Module 3, Exam 3	Cardiology and nephrology
Days 30-39	Module 4, Exam 4	Endocrinology
Days 40-49	Module 5, Exam 5	Pulmonology
Days 50-59	Module 6, Exam 6	Pharmacology of infectious disease
Days 60-69	Module 7, Exam 7	Gastroenterology
Days 70-79	Module 8, Exam 8	Neurology/Psychiatry
Days 80-89	Module 9, Exam 9	Specialty Medication
Days 90-99	Module 10, Exam 10	Dosing Calculations
Days 100-108	Final Exam	Based on module material

Grading Rubric:

Check for Understanding =	1 pt.
10 Module Problem Sets = 5 pts. each x 10 =	50 pts.
10 Module Exams = 100 pts. each x 10 =	1000 pts.
Final Exam = 200 pts.	200 pts.
Total	1251 pts.

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

Suggested External References:

If the student desires to consult a reference for additional information, the following textbooks are recommended as providing complete treatment of the course subject matter:

- Hitner, Henry and Barbara Nagle. **Pharmacology: An Introduction**, 7th edition, McGraw-Hill, 2016.
- A. Lilley, L., et al. **Pharmacology and the Nursing Process**, 8th ed. St. Louis, MO: Mosby, 2017

NOTE: We do not support the use of outside resources to study, except the ones 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
- Easter
- Juneteenth
- Labor Day
- Christmas Break
- MLK Day
- Memorial Day
- Independence Day
- Thanksgiving weekend

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 by requesting an appeal form from 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.