# BIOD 322 Neuroscience **3 credits**

**Prerequisites:** General Biology and General Chemistry

**Instructors:** Renee Correll, DPT, Department Co-Chair

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

**Additional Information:** www.portagelearning.com*

**Course meeting times:** BIOD 322 is offered continuously

**Course Description**: This course is designed to cover the basic principles and concepts related to the structure and function of the nervous system. The course will begin with a discussion of the structure of the nervous system and neurons, including how neurons communicate with one another. Specific methodologies related to neuroscience research will also be covered. Further modules in the course will cover sensory systems, motor movement, motivation, homeostasis, emotion, stress, learning, and memory. Finally, diseases and pathology related to the nervous system will be discussed.

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

- Describe the anatomy and organization of the nervous system.
- Explain how neurons communicate with one another.
- Discuss the neural pathways and circuits responsible for sensation, perception, movement, motivation, homeostasis, emotion, and stress.
- Explain the neurobiological regions and processes underlying learning and memory functions.
- Identify the underlying pathology and treatments associated with specific neurodegenerative diseases and psychological disorders.

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

*Each of these BIOD 322 student learning outcomes is measured:

* 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.com platform.

Directly by: (1) Module application problems (with instructor feedback)
(2) Module exams
(3) 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 60 - 70 hours of reviewed module assignments with instructor feedback, and 10 contact hours of secure online module 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 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.

*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: **Anatomy of the Nervous System**

This module will cover an introduction to the field of neuroscience and will describe basic anatomy of the nervous system and the organization of its divisions.

Module 2: **Neural Function and Transmission**

This module will discuss the principles of neural transmission, including neuronal membrane structure, action potentials, synaptic transmission, and neurotransmitters.

Module 3: **Neuroscience Research Methods**

This module will introduce the basics of the scientific method and will discuss methodologies in neuroscience used to study the function of brain regions, visualize neural cells, image the brain, measure brain activity, and induce genetic changes.

Module 4: **Sensory Systems**

This module will cover the anatomy, function, and pathways associated with the sensory systems of the body, including the body senses and the olfactory, gustatory, visual, and auditory systems.

Module 5: **Movement**

This module will explore the pathways, brain regions, and neurotransmitters involved in motor movement.

Module 6: **Motivated Behaviors, Homeostasis, & Emotion**

This module will discuss the neurobiological basis of motivated behaviors and homeostatic mechanisms. The underlying brain structures responsible for processing emotion and responding to stress will also be introduced.

Module 7: **Learning & Memory**

This module will focus on the neural processes, brain regions, and synaptic changes that occur during learning and memory.

Module 8: **Diseases of the Nervous System**

This module will cover the symptoms, pathology, and possible treatments for several specific neurodegenerative diseases and psychological disorders.

**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 1-14 (2 weeks) | Module 1, Exam 1 | Anatomy of the Nervous System |
| Days 15-28 (2 weeks) | Module 2, Exam 2 | Neural Function and Transmission |
| Days 29-43 (2 weeks) | Module 3, Exam 3 | Neuroscience Research Methods |
| Days 44-58 (2 weeks) | Module 4, Exam 4 | Sensory Systems |
| Days 59-73 (2 weeks) | Module 5, Exam 5 | Movement |
| Days 74-88 (2 weeks) | Module 6, Exam 6 | Motivated Behaviors, Homeostasis, & Emotion |
| Days 89-103 (2 weeks) | Module 7, Exam 7 | Learning & Memory |
| Days 103-117 (2 weeks) | Module 8, Exam 8 | Diseases of the Nervous System |
| Days 118-125 (1 week) | Final Exam | Based on module material |

**Grading Rubric:**

| | |
|---|---|
| Check for Understanding = | 1 pt. |
| 10 Module Problem Sets = 10 pts. each x 8 = | 80 pts. |
| 8 Module exams = 100 pts. each x 8 = | 800 pts. |
| Final exam = 175 pts. | 175 pts. |
| Total | 1056 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.

- **Open Neuroscience Initiative** by Austin Lim (https://www.austinlim.com/open-neuroscience-initiative)
- **Introduction to Neuroscience** by Valerie Hedges (https://openbooks.lib.msu.edu/intronеuroscience1/)
- **Foundations of Neuroscience** by Casey Henley (https://openbooks.lib.msu.edu/neuroscience/)
- **Principles of Neural Science**, 6th Edition, by Kandel, Koester, Mack, & Siegelbaum

**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.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
- 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.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 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.com.

**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.