COURSE OUTLINE		
TERM: Spring 2024	**COURSE NO:** BIOL 412	
INSTRUCTOR:	**COURSE TITLE:** Neurological Damage, Disease and Degeneration	
OFFICE: **LOCAL:** **E-MAIL:**	**SECTION NO(S):**	**CREDITS:** 3.0
OFFICE HOURS: TBA		
COURSE WEBSITE: TBA		

Capilano University acknowledges with respect the Liḻwat7úl (Lil'wat), xʷməθkʷəy̓əm (Musqueam), shíshálh (Sechelt), Sḵwx̱wú7mesh (Squamish), and Səlílwətaʔ/Selilwitulh (Tsleil-Waututh) people on whose territories our campuses are located.

COURSE FORMAT
Three hours of class time weekly, plus an additional hour delivered through online or other activities for a 15-week semester, which includes two weeks for final exams.

COURSE PREREQUISITES
CHEM 215 (C-) or BIOL 215 (C-); and BIOL 312 (C-)

CALENDAR DESCRIPTION
Neurological disorders arising from damage, disease and degeneration, are a major and growing global health concern. In this seminar course, students will explore principles and patterns of nerve cell, tissue and organ damage associated with stress, disease, drugs, medications, ageing and head injury. Further, students will appraise risk factors, aetiologies, therapies and future trends with respect to neurological disorders, and how to recognize and explain the mechanisms of pathologic changes specific to the central and peripheral nervous systems.

COURSE NOTE
BIOL 412 is an approved Science course.
BIOL 412 is an approved Science and Technology course for Cap Core requirements.

REQUIRED TEXTS AND/OR RESOURCES
Students will be provided with a course package available on the course eLearn page including selected readings and materials drawn from primary and secondary literature, podcasts, videos and other content. The course package will include information on which readings or materials should be completed for each course component.

COURSE STUDENT LEARNING OUTCOMES
On successful completion of this course, students will be able to do the following:

- Describe the structure and function of neurons, as well as the central and peripheral nervous systems
- Explain how neurological diseases integrate with broader organ systems and overall human health.
- Review the major causes and consequences of neurological disorders.
- Evaluate current hypotheses for the underlying pathophysiological mechanisms and potential therapeutic approaches for neurological disorders.
- Critique the potential for preventative health measures to address neurological disorders and identify their mechanisms of action.
- Assess the efficacy of molecular tools and biochemical assays used in the lab to study the pathophysiology of neurological damage, disease or degeneration.
- Collaborate with peers to critique primary literature, identify new avenues for exploration and design research proposals.
- Create review articles that survey existing knowledge, synergize and summarize overall patterns and lead future avenues for research to resolve outstanding questions.
- Direct communication and strategy development with local community organizations and/or government to promote new prevention and treatment therapies for neurological disorders.

Students who complete this Science and Technology course will be able to do the following:

- Apply numerical and computational strategies to solve problems.
- Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information).
- Explain how scientific inquiry is based on investigation of evidence and evolves based on new findings.
- Participate in scientific inquiry and communicate the elements of the process, including making careful and systematic observations, developing and testing a hypothesis, analyzing evidence, and interpreting results.

COURSE CONTENT

Weeks	Topics
1	**Neurons and Synapses** -Review of neuron anatomy and propagation of action potential -Review of electrical signalling -Review of the hypothalamic-pituitary-adrenal axis -Review of chemical signalling
2	**The Stress Responses** -Cortisol's effect on the brain
3	**Pre-metabolic Syndrome & Type 2 Diabetes Mellitus** -Insulin resistance and the brain -Microvascular disease and the brain

Weeks	Topics
4	**Inflammation & the Nervous System** -Pro-inflammatory chemicals -Anti-inflammatory chemicals -Antioxidant defenses
5	**Oxidative Stress & the Nervous System** -Free radicals and reactive oxidative and nitrogen species
6	**Vascular Dementia & Transient Ischemia Injury** -Hypoxia -Stroke
7	**Alzheimer's Disease** -Protein misfolding response -Plaque and amyloid formation -New medication
8	**Mild Traumatic Brain Injury** -Delayed sequelae -Long term implications and application to other neurological disorders
9	**Exogenous Chemicals & The Brain** -Pharmaceuticals -Illicit drugs -Phytochemicals
10	**Physical Exercise & The Brain** -Exercise effects on vasculature -Exercise effects on oxidative stress
11	**Emerging Therapeutic Approaches for Neurological Disorders** -Review and evaluation of traditional and modern therapeutic approaches
12-13	**Review & Presentations**
14-15	**Final Exam Period**

EVALUATION PROFILE

Project presentation	10%
Project submission	15%
Term assignments	45%*
Final exam	30%
Total	**100%**

**no individual assessment will exceed 35%*

GRADING PROFILE

A+ = 90-100	B+ = 77-79	C+ = 67-69	D = 50-59
A = 85-89	B = 73-76	C = 63-66	F = 0-49
A- = 80-84	B- = 70-72	C- = 60-62	

Incomplete Grades

Grades of Incomplete "I" are assigned only in exceptional circumstances when a student requests extra time to complete their coursework. Such agreements are made only at the request of the student, who is responsible to determine from the instructor the outstanding requirements of the course.

Late Assignments

Assignments are due at the beginning of the class on the due date listed. If you anticipate handing in an assignment late, please consult with your instructor beforehand.

Missed Exams/Quizzes/Labs etc.

Make-up exams, quizzes and/or tests are given at the discretion of the instructor. They are generally given only in medical emergencies or severe personal crises. Some missed labs or other activities may not be able to be accommodated. Please consult with your instructor.
*** Accommodations can be made to honour community needs and traditional practices.

Attendance

Students are expected to attend all classes and associated activities.

English Usage

Students are expected to proofread all written work for any grammatical, spelling, and stylistic errors. Instructors may deduct marks for incorrect grammar and spelling in written assignments.

Electronic Devices

Students may use electronic devices during class for note taking, research or as indicated by their instructor only.

On-line Communication

Outside of the classroom, instructors will (if necessary) communicate with students using either their official Capilano University email or eLearn; please check both regularly. Official communication between Capilano University and students is delivered to students' Capilano University email addresses only.

UNIVERSITY OPERATIONAL DETAILS

Tools for Success

Many services are available to support student success for Capilano University students. A central navigation point for all services can be found at: https://www.capilanou.ca/student-services/

Capilano University Security: download the CapU Mobile Safety App

Policy Statement (S2009-06)
Capilano University has policies on Academic Appeals (including appeal of final grade), Student Conduct, Academic Integrity, Academic Probation and other educational issues. These and other policies are available on the University website.

Academic Integrity (S2017-05)
Any instance of academic dishonesty or breach of the standards of academic integrity is serious and students will be held accountable for their actions, whether acting alone or in a group. See policy and procedures S2017-05 Academic Integrity for more information:
https://www.capilanou.ca/about-capu/governance/policies/

Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances, are prohibited and will be handled in accordance with the Student Academic Integrity Procedures.

Academic dishonesty is any act that breaches one or more of the principles of academic integrity. Acts of academic dishonesty may include but are not limited to the following types:

Cheating: Using or providing unauthorized aids, assistance or materials while preparing or completing assessments, or when completing practical work (in clinical, practicum, or lab settings), including but not limited to the following:

- Copying or attempting to copy the work of another during an assessment;
- Communicating work to another student during an examination;
- Using unauthorized aids, notes, or electronic devices or means during an examination;
- Unauthorized possession of an assessment or answer key; and/or,
- Submitting of a substantially similar assessment by two or more students, except in the case where such submission is specifically authorized by the instructor.

Fraud: Creation or use of falsified documents.

Misuse or misrepresentation of sources: Presenting source material in such a way as to distort its original purpose or implication(s); misattributing words, ideas, etc. to someone other than the original source; misrepresenting or manipulating research findings or data; and/or suppressing aspects of findings or data in order to present conclusions in a light other than the research, taken as a whole, would support.

Plagiarism: Presenting or submitting, as one's own work, the research, words, ideas, artistic imagery, arguments, calculations, illustrations, or diagrams of another person or persons without explicit or accurate citation or credit.

Self-Plagiarism: Submitting one's own work for credit in more than one course without the permission of the instructors, or re-submitting work, in whole or in part, for which credit has already been granted without permission of the instructors.

Prohibited Conduct: The following are examples of other conduct specifically prohibited:

- Taking unauthorized possession of the work of another student (for example, intercepting and removing such work from a photocopier or printer, or collecting the graded work of another student from a stack of papers);
- Falsifying one's own and/or other students' attendance in a course;
- Impersonating or allowing the impersonation of an individual;
- Modifying a graded assessment then submitting it for re-grading; or,
- Assisting or attempting to assist another person to commit any breach of academic integrity.

Sexual Violence and Misconduct

All Members of the University Community have the right to work, teach and study in an environment that is free from all forms of sexual violence and misconduct. Policy B401 defines sexual assault as follows:

> Sexual assault is any form of sexual contact that occurs without ongoing and freely given consent, including the threat of sexual contact without consent. Sexual assault can be committed by a stranger, someone known to the survivor or an intimate partner.

Safety and security at the University are a priority and any form of sexual violence and misconduct will not be tolerated or condoned. The University expects all Students and Members of the University Community to abide by all laws and University policies, including B.401 Sexual Violence and Misconduct Policy and B.401.1 Sexual Violence and Misconduct Procedure (found on Policy page https://www.capilanou.ca/about-capu/governance/policies/)

Emergencies: Students are expected to familiarise themselves with the emergency policies where appropriate and the emergency procedures posted on the wall of the classroom.

DEPARTMENT OR PROGRAM OPERATIONAL DETAILS

Professionalism

Students should be able to demonstrate a professional attitude and behaviour: reliability, respect for and cooperation with colleagues, willingness to work calmly and courteously, respect for equipment and systems, and constructive response to criticism. The use of cellphones for non-academic purposes during lecture sessions is prohibited. Students using cell phones inappropriately could be asked to leave the lecture hall by the instructor.

Expectations of students

For success in this course, students are expected to attend all lectures; come prepared to address topics presented; and complete assigned text book readings. For every one hour of lecture material presented, students should expect to spend at least two hours reviewing material and engaging with the study tools provided.