University of Victoria
Neuroscience Graduate Program
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COURSE OUTLINE

Fundamentals of Cognitive Neuroscience
NRSC 500B/A01/22293
MEDS 487/A01/22182
Term Offered: Spring, 2022

Instructor: Dr. Olave E. Krigolson
Class Location: Zoom / In person
Class Day(s) and Time(s): Mondays and Thursdays 8:30 to 9:50 am

Email: krigolson@uvic.ca
Office: MCK 187
Office Hours: By arrangement

Course Description
Provides a foundational basis in neuroscience. Comprehensive instruction in behavioral and cognitive neuroscience.

Course Goals and Learning Outcomes
Students will meet twice a week to learn key concepts in cognitive neuroscience.

1. Students will be able to answer daily quiz assignments.
2. Students will understand and be able to explain the identified key concepts.

Textbook or Materials
Kandel, E., Schwartz, J., Jessel, T., Siegelbaum, S., & Hudspeth, A. J. (Eds.). (2012). *Principles of Neural Science, Fifth Edition*. New York: McGraw Hill.
Additional readings will be posted on the course website (www.krigolsonteaching.com).

Course Schedule

Week	Topic Title	Topic Description
Jan 10th	Introduction	Review course outline and assessment procedures
Jan 13th	Perception I	Primary Visual Cortex
Jan 17th	Perception II	The Dorsal Stream
Jan 20th	Perception III	Intermediate Visual Processing
Jan 24th	Perception IV	The Ventral Stream and Top Down Processing
Jan 27th	Attention I	Enhanced Processing
Jan 31st	Attention II	Blindsight
Feb 3rd	Attention III	Consciousness
Feb 7th	Memory I	The Hippocampus
Feb 10th	Memory II	Regional Representation
Feb 14th	Memory III	LTP and LTD
Feb 17th	Memory IV	Synaptic Plasticity
Feb 21st	Reading Break	
Feb 24th	Reading Break	
Feb 28th	Learning I	Hebbian Learning
Mar 3rd	Learning II	Reinforcement Learning
Mar 7th	Learning III	Dopamine and Reinforcement Learning

Mar 10th	Learning IV	Human Models and Evidence for Reinforcement Learning
Mar 14th	Decision Making I	Expected Value
Mar 17th	Decision Making II	The Explore vs Exploit Dilemna
Mar 21st	Decision Making III	System I versus System II Decision Making
Mar 24th	Decision Making IV	Moral Choice
Mar 28th	Computational I	Classic Neural Network Models
Mar 31st	Computational II	Reinforcement Learning Models
Apr 4th	Computational III	Drift Diffusion Models of Decision Making
Apr 7th	Computational IV	Advanced Neural Networks

Assessment

Overall Grade
A. Quizzes 40%
B. Other Assessments 60%

A. Quizzes (40 points)

You will start each class with a five-minute quiz (24 in total). The purpose of the quiz is to ensure you have read the assigned reading BEFORE coming to class. We cannot have a seminar style class if you do not do the assigned readings BEFORE coming to class. Each quiz will be graded out of 2 points, with grades assigned as follows:
0 = Poor comprehension (no answer / no idea)
1 = Reasonable comprehension (you got the gist of it)
2 = Good comprehension (nailed it!)
I will count all quizzes towards your grade, but only to a maximum of 40 points. In other words, you can miss up to four quizzes without losing points in the course.

B. Other Assessment Activities (60 points)
You will select from a range of assessment activities to earn points for the rest of your grade. Assessment items will only be counted towards your grade if you earn a minimum of a B- standing (70%). Note, you can complete as many of these activities as you like.

You have the opportunity to complete a range of other assessment activities to earn points towards your final grade. Note the maximum number of points in this category is 60, regardless of how many activities you complete.

i. Teach a Class (10 points: maximum 20 points or 2 classes)
You can teach up to two classes to earn points in this course. Your role will be to give a brief (10 minute) summary presentation on the core concept of the day and facilitate the discussion of the assigned paper. A key requirement if you must meet with Dr. Krigolson to ensure you understand the core concept and have your slides approved before you teach.

ii. Midterm Exams (20 points: maximum 60 points or 3 midterms)
You may choose to write a midterm exam on one or more of the three key topic groupings:
Midterm One: Perception and Attention
Midterm Two: Memory and Learning
Midterm Three: Decision-Making and Computational Neuroscience
For the midterm exam you will write three short essay exam answers on questions related to the core topic for each class session. The exam will take place out of class. You will be emailed the questions when you are ready and you will have two hours to answer them to the best of your ability.

iii. Article Summary and Critique (2 points: maximum 20 points or 10 critiques)
You can choose to write article summaries and critiques. For each of the assigned articles, you will find an article that cites that paper and write an article summary of that article and a critique of it. The summary should be a half a page in length and the critique should also be a half a page in length. Your article summary and critique must be unique, once a paper is selected another student may not use it.

iv. Short Review Paper (15 points: maximum 30 points or 2 short review papers)
You can choose to write up to two short review papers. The review paper is to be on a selected topic and should be 1500 to 2000 words in length (this does not include a title page and references). Within the review paper you must summarize the work on no less than 15 original source articles. The review paper must follow APA guidelines.

v. Long Review Paper (30 points: maximum 30 points or 1 long review paper)
You can choose to write a long review paper. The review paper is to be on a selected topic and should be 3500 to 4000 words in length (this does not include a title page and references). Within the review paper you must summarize the work on no less than 30 original source articles. The review paper must follow APA guidelines.

vi. Media Discovery and/or Creation (20 points: as negotiated dependent on scope)
You can choose to discovery and/or develop media content to support future iterations of the course. This content can be in the form of web content, animations, a video or another agreed upon format. The purpose is to provide future students with supplemental material to better understand the course material. Discovery activities (i.e., finding a useful video, etc) will only be assigned a minimal point value and can only be done one at a time. In other words, a media discovery must be approved before you search for another one. The course instructor reserves the right to reject your content based on suitability or replication of existing content. Development activities must be negotiated with the course instructor prior to their commencement.

Grading Scale

All students will be assigned a grade from 0 to 100 in line with university grading policies.

Course Experience Survey

I value your feedback on this course. Towards the end of term you will have the opportunity to complete a confidential course experience survey (CES) regarding your learning experience. The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future. When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receive an email invitation, you can go directly to your CES dashboard. You will need to use your UVic NetLink ID to access the survey, which can be done on your laptop, tablet or mobile device. I will remind you nearer the time but please be thinking about this important activity during the course.

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

Student Information and Support

Policy on Academic Integrity
https://www.uvic.ca/calendar/grad/index.php#/policy/BJujesM_E?bc=true&bcCurrent=02%20-%20Policy%20on%20Academic%20Integrity&bcItemType=policies

Equity, Diversity, and Inclusion
The Neuroscience Graduate Program embraces an inclusive learning community and is committed to promoting, providing, and protecting a positive, supportive, and safe learning and working environment for all its members. Acts that incite hatred, espouse or encourage bigotry, either implied or explicit, will not be tolerated. Please refer to information available on the Equity & Human Rights (EQHR) website https://www.uvic.ca/equity/index.php, the General University Policies and the additional resources below.

- **Graduate student support resources**
  https://www.uvic.ca/graduatestudies/resourcesfor/students/informationfor/index.php
- **Support for Indigenous Students**
  https://www.uvic.ca/graduatestudies/resourcesfor/home/informationfor/indigenous/index.php
- **Resources for students with a disability**
  https://www.uvic.ca/graduatestudies/resourcesfor/home/informationfor/disability/index.php
  https://www.uvic.ca/services/cal/.
- **Support for International Graduate Students**
  https://www.uvic.ca/graduatestudies/home/home/informationfor/international/index.php
- **Accommodation of Religious Observance**
  https://www.uvic.ca/calendar/grad/index.php#/policy/SkmigiMOV?bc=true&bcCurrent=17%20-%20Accommodation%20of%20Religious%20Observance&bcItemType=policies
- **Office of the Ombudsperson**
  The Office of the Ombudsperson is an independent and impartial resource to assist with the fair resolution of student issues. A confidential consultation can help you understand your rights and responsibilities. The Ombudsperson can also clarify information, help navigate procedures, assist with problem-solving, facilitate communication, provide feedback on an appeal, investigate and make recommendations. Phone: 250-721-8357; Email: ombuddy@uvic.ca