

**PSYC 461 – Neuroplasticity and Behaviour
2026 Winter Term 2**

Lecture: Tuesday + Thursday 15:30 – 17:00 LSK Building. Room 201

Instructor: Ivan Trujillo-Pisanty Ph.D.
Optional Office hours: Thursdays KENN 4226 17:15-18:15 Limited zoom hours by appointment.
Email: (ivan.trujillopisanty@ubc.ca)
I will only schedule meetings through e-mail.

Teaching assistant: Monica Bronowski
The TAs will use a dedicated email to schedule Zoom meetings.

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the Musqueam people. The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

Course description:

This course centers on the nervous system's remarkable ability to reorganize itself—a property known as neuroplasticity. While evolutionary processes drive change across species over generations, neuroplasticity enables transformation within a single individual over the course of a lifetime. This adaptive capacity underlies learning, memory formation, personal development, and the potential for regaining function after neurological damage. The course begins with an overview of the biological foundations of neuroplasticity, supported by targeted research and case examples. From there, emphasis shifts to student-led exploration, in which participants critically examine a scientific paper related to neuroplasticity. Working collaboratively, students will present the study's experimental approach, key outcomes, and broader implications in an in-class journal club. Ongoing assessments are designed to deepen understanding through repeated analysis and creative communication of the research, reinforcing knowledge by applying it in multiple contexts.

Course objectives.

After completing this course, you will be able to:

- Define and describe structural and functional mechanisms of neuroplasticity.
- Analyze the relationship between neuroplasticity and behaviour, and appreciate how this relationship can be positive or negative.
- Critically evaluate various experimental methods used to investigate neuroplasticity.
- Apply knowledge of neuroplasticity to real-world contexts such as brain injury, learning, and psychiatric conditions.

- Effectively communicate scientific findings to a variety of audiences.
- Please arrive to lectures and tutorials on time. Late arrivals are disruptive. Avoid side conversations during lectures. Put away your phone during lectures & tutorials. silence all alarms and ringtones. Listen, think, and actively participate.**

Schedule

Date	Topic	Tentative content
Jan 6 and Jan 8	Overview and Organization of the Course	Syllabus, Canvas
	Foundations of Neural Plasticity	Definitions, levels of plasticity, timescales of plasticity. Methods to study plasticity
Jan 13 and Jan 15	Cellular and molecular Mechanisms	Synaptic transmission and modulation, long-term potentiation, long term depression, Intracellular signalling pathways, structural plasticity
Jan 20 and Jan 22	Developmental plasticity	Critical periods. activity-dependant development, Deprivation and enrichment. Neurodevelopmental disorders and plasticity.
	Plasticity across the lifespan	Adult plasticity vs developmental plasticity, aging and changes in plasticity, adaptive vs maladaptive plasticity

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<p>Jan 27 and Jan 29</p>	<p>Modulation of plasticity by neurotransmitters and drugs</p> <p>Hormonal modulation of plasticity</p> <p>Posters due by the end of the week</p>	<p>The role of dopamine, serotonin, and acetylcholine. Drug addiction, psychedelics.</p> <p>Stress and plasticity, modulation by sexual and parental hormones, the role of glia (if we have time)</p> <p>Submit your poster on Canvas</p>
<p>Feb 3 and Feb 5</p>	<p>Plasticity in injury and disease</p> <p>Exercise. fundamentals of Neurogenesis.</p> <p>Poster feedback due by the end of the week</p>	<p>Plasticity after stroke, recovery and compensation, maladaptive plasticity, plasticity in psychiatric disorders</p> <p>BDNF, oxygen, functional and structural plasticity. Basic aspects of neurogenesis.</p> <p>Submit on Canvas</p>
<p>Feb 10 and Feb 12</p>	<p>Plasticity and therapeutics</p> <p>Midterm</p>	<p>Rehabilitation and plasticity-based therapies. Brain stimulation. Pharmacological interventions</p> <p>DO NOT TRAVEL BEFORE FEB</p>
<p>Feb 16- Feb 20</p>	<p>Midterm break</p>	<p>NO CLASSES</p>
<p>Feb 24 and Feb 26</p>	<p>In-class talk consolidation session.</p> <p>Student presentations session 1</p>	<p>Presentation order draw. All slideshows must be submitted by Feb 25</p>

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<p>March 3 and 5</p>	<p>Student presentations session 2</p> <p>Student presentations session 3</p>	
<p>March 10 and 12</p>	<p>Student presentations session 4</p> <p>Student presentations session 5</p>	
<p>March 17 and 19</p>	<p>Student presentations session 6</p> <p>Student presentations session 7</p>	
<p>March 24 and 26</p>	<p>Student presentations session 8</p> <p>Student presentations session 9</p>	
<p>March 31 and April 2</p>	<p>Student presentations session 10</p> <p>Student presentations session 11</p>	

<p>April 7 and April 9</p>	<p>Student presentations session 12</p> <p>Student presentations session 13 (if needed) Course wrap up.</p> <p>Video podcasts due by end of term</p>	
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Exam date: Feb 12 during class. **Do not make travel arrangements before this date.**

Evaluation

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| ● Midterm exam | 30% |
| ● Poster | 15% |
| ● Presentation | 30% |
| ● Kahoot! | 10% |
| ● Course conclusion video podcast | 15% |

Midterm Exam:

- Material from the lectures and readings will be on the exams. Slides and notes are just best study guides. Related articles will be provided for most topics, they will be partially covered in class and are testable.
- Exams will consist of multiple choice and short-answer questions.
- Short-answer questions emphasize critical thinking, analysis of experimental design, proposing new experiments and the accurate explanation of intracellular pathways
- Students can view their marked exams with their TA or professor. The exams remain the property of the university.
- **Regrade requests must be made in writing to the professor (complete a form). The professor reserves the right to regrade the entire exam (not just a particular question), which means that your grade could go down upon regrading.**

Policy on missed tests and extensions:

- Do not come to an exam if you are sick.
- **If you miss an exam because of illness, you must email Prof. Ivan within 24 hours after the exam.**
- **Make-up exams can be oral exams in front of Prof. Trujillo-Pisanty and a TA.**

- You must submit an Academic Concession form (to both Science Advising and Prof. Trujillo-Pisanty).

Poster

In the second part of the course, you will be presenting a research article (see “Presentation” section below) in class. In preparation for this assignment, you must submit a .pdf copy of the paper you have selected and translate it into a “Scientific poster” format (a form of communication commonly used in scientific conferences). This activity will be done in teams of four students (the total number of teams may not exceed 26 students) This exercise is meant to help you simplify the content of the paper and help you consolidate it in what will eventually become a 10 minute talk. This poster will be submitted during the first part of the course to allow us to give you feedback as you prepare for your final talk. In addition, each team will be randomly assigned with the poster of another team and must provide useful feedback. The feedback you receive from other teams will not affect your grade, but the quality of the feedback you give to others will be part of your poster grade.

Posters will be graded in accordance to the following rubric:

- **Clarity 15%** Well organized, font/figures are visible, easy on eyes.
- **Coherence 20%** Logical flow of information. The goal, experiments, results, and conclusions follow a logical sequence.
- **Synthesis 20%** The main messages from the article are covered, supported by the shown data, and can be understood by just reading the poster
- **Depth of analysis 20%** The information is not oversimplified or covered lightly. challenging topics are tackled rather than avoided. Information is covered using your own words. The selected paper is sufficiently challenging and follows strong scientific rigour.
- **Originality 15%** The poster is a new product based on the paper rather than a simple copy of the paper. For example, you may want to make your own diagrams to effectively explain the introduction, methods, or conclusions of the paper. You may get creative in conveying the information effectively.
- **Review of another team’s poster 10%** Provide detailed and useful feedback that the other team can use towards their talk. Highlights aspects that might not be clear, issues with the information sequence, etc. This part will be graded in a scale of 1-4 where 1 represents feedback that is not useful (0 points) and 4 represents perfect feedback (full points=10%)

Note that you will not be presenting the poster as such in front of of the class. It is meant as preparation towards the slideshow for your talk.

Other considerations: Use critical thinking and academic rigour when selecting a paper, remember that is part of your grade. The best repository for this sort of research is <https://pubmed.ncbi.nlm.nih.gov> The title of the paper and the paper authors must appear at the top of the poster. The names of the team members that prepared the poster should be included in a textbox in the bottom right part of the poster. Useful guidelines on how to make a scientific poster can be found here:

<https://www.sfn.org/meetings/neuroscience-2024/call-for-abstracts/presentation-formats/poster-sessions>

Presentation

In 400 level courses students are introduced to some of the learning formats used in graduate school. In this case, we will be adopting the “seminar format” (journal club) for the second part of the course. Students will work in teams of four to present a research paper (no reviews!) of their own interest in a ten minute talk. A list of potential topics to explore will be provided by Ivan, but students are encouraged to explore the relationship between brain plasticity and any topic they find interesting. The talk should cover just enough background information to understand the research question. It should clearly and efficiently explain the methods they used to answer the question, and cover the key experimental results that support the conclusions. The last slide should contain your own conclusions linking the course content to the research paper and highlighting potential implications of their findings. The talk should be able to trigger a five-minute in-class discussion and/or Q&A session. Presentations will be graded in accordance to the following Rubric:

- **Synthesis 20%** The key elements of the paper are effectively boiled down to 10-15 slides without sacrificing quality.
- **Clarity 20%** All team members spoke clearly, using their own words, avoiding simply reading or memorizing slides.
- **Depth of analysis 20%** Questions were answered effectively. The speakers facilitated the discussion and provided meaningful reflections after the talk.
- **Interesting 20%** The choice of paper AND the way it was explained kept the audience interested and prompted interesting follow-up questions by the audience.
- **Coherence 20%** The talk follow a logical sequence that makes it easy to understand and follow the research.
- Time left penalty: **5% off** for every minute the talk is under 9.5 minutes long.
- Time-up penalty: **8% off** if the talk does not fully conclude by 10.5 minutes

Other considerations: As a rule of thumb, aim for approximately one slide per minute of talk (10-15 slides total) Use more slides to explain the methods and results and fewer slides to present the background and the conclusions. Leave enough time for your own conclusions at the end, these can help you start a good discussion.

Kahoot!

- You will need a smartphone, laptop, or tablet with internet connection to participate.
- Participating in 95% of these grants you full marks.
- Kahoot grants points for correct and speedy answers. Top 3 scorers at the end of the term may earn bonus marks.
- Kahoot activities may happen at any point during the class, and even more than once per lecture. Show-up on time, stay in the room, and pay attention to earn your marks.

Course conclusion video podcast:

At the end of the term, you will submit a 3-5 minute video podcast. This activity can be done in teams of up to four or individually. You must use your own words (no scripts, no bots!) to explain at least one topic related to the course in terms anyone can understand. Personal opinions are welcome, but should not be the core of the video. Think of this as a scientific communication for a lay audience. Try to produce a video that would go viral if you were to post it on a video site or on social media. You may use slides, animations, acting, puppets, etc. The face of the person who is speaking should be visible. It will be graded in accordance to the following rubric:

- **Originality 25%** The resulting video is a new product and not a simple repetition of things that were covered in class.
- **Integration of knowledge 25%** Combines new and previously acquired information to produce something new
- **Clarity, accessibility and coherence 25%** The project is logical, audible, images are clear. It can be understood by someone with minimal background.
- **Depth of analysis and ambitious 25%** Aims to explain something interesting and challenging in a clear way as opposed to settling for what is easier. Avoids providing only superficial explanations.

Course Policies

Grade Scaling

In the Psychology Department, we aim to offer learning experiences that welcome and challenge all students to engage meaningfully in our discipline. We strive for grades that accurately reflect student learning and achievement of course learning objectives, rather than solely reflecting their performance relative to others.

In Psychology at UBC-V, we employ department-wide grading standards to promote equitable alignment, supporting students and course instructors as they learn and teach across many diverse courses and sections. For each Course Section, instructors should aim for a grade average in the following Target Ranges (before any bonus HSP points are added, but including any mandatory HSP points): B- (68-71%) in Introductory 100-level and 200-level courses; B (72-75%) in Intermediate 300-level courses; **B+ (76-79%) for Advanced 400-level courses** and Selective-Entry lower-level courses (e.g., PSYC 277, 278, 312, 370, 371, 349, 359, 365). Ranges are intended to provide some flexibility to instructors and account for differences that can occur between classes. Ranges increase across year levels to account for improvements in student learning, and students' ability to self-select into more specialized courses. During the course, instructors may choose to adjust grades and/or difficulty of the assessments, to align with the Target Range. At the end of the course, if the average falls outside the Target Range (either direction), instructors will typically be expected to use a linear transformation to adjust final grades (i.e., add or subtract the same number of points to all students' marks, while ensuring no student fails the course due to this transformation). If a course mean falls in within one +/-

letter grade band above the Target Range (e.g., in the B+ range for Intermediate courses), and the instructor believes these grades to be justified, the instructor may submit a justification request using the departmental approval final grades submission form, and the grades may stand. This Upper Range is intended to inspire further excellence in learning and teaching, and allow for the possibility that some classes select for higher performing students. Courses with means exceeding the Upper Range will be expected to provide justification as well as use a linear transformation to fall within the Upper Range.

Grades are not official until they appear on students' academic record. Students will receive both a percent and a letter grade for this course. Further information on letter grades is available on the UBC Academic Calendar.

Late submission policy

All online deadlines will be 23:59 PST. Late submissions will receive a 15% deduction for the first 24 hours, a 30% deduction for the next 24 hours, and will not be accepted past two days from the deadline. Plan ahead

Department's position on academic misconduct:

Cheating, plagiarism, and other forms of academic misconduct are very serious concerns, and UBC has taken steps to reduce them. UBC has implemented **software that can reliably detect cheating on multiple-choice exams** by analyzing the patterns of students' responses. In cases of suspected misconduct, the parties involved will be pursued to the fullest extent dictated by UBC guidelines. Strong evidence of cheating or plagiarism may result in a zero for the work in question. The President of UBC has the right to impose harsher penalties including (but not limited to) a failing grade for the course, suspension from the University, cancellation of scholarships, or a notation added to a student's transcript.

Statement on AI tools

Artificial intelligence (AI) tools such as ChatGPT have rapidly become an integral part of society. Submitting work generated by an AI to fulfill course requirements is strictly prohibited. However, utilizing AI as a supplementary tool to your learning is welcome. Examples of fair AI use cases are: generating exam study questions, working through conceptual understanding of course ideas, and expanding on class learning by exploring extensions of lectures.

It is important to note that, by nature of their design, not all information provided by these tools are accurate or informed by empirical evidence. Course materials (readings, slides, lectures) will always be the most relevant sources of information for the scope of this course

Special accommodations:

The University accommodates students via the Centre for Accessibility.

Students who will be absent for varsity athletics, family obligations, or other similar commitments generally cannot be accommodated. In these cases, you must ask your instructor during the first week of class.

Health and Weather Considerations:

- **Do not come to lecture or tutorial if you are sick.** If you're sick, then stay home – no matter what you might be sick with (e.g., cold, flu, COVID-19, etc). Washing your hands and using hand sanitizer will reduce the chances that you will get sick.
- Non-medical masks that cover nose and mouth are a primary tool to limit community infection. **Masks are welcome during our class meetings**, for your own protection and for the safety and comfort of everyone else.
- If you are not fully vaccinated against flu and COVID-19, vaccines are available to you, free and on campus. **Please get fully vaccinated.**
- **If you miss a lecture/tutorial** because of illness:
 - Make a connection early in the term with another student or a group of students in the class. You can help each other by sharing notes. If you don't yet know anyone in the class, post on the discussion forum on Canvas to connect with other students.
 - Consult resources on Canvas. I will post slides for each lecture.
 - Use the discussion forum on Canvas for help.
 - Come to office hours with me, a TA, or a peer tutor (via Zoom).
- If you miss a midterm exam because of illness:
 - You must email me within 24 hours after the exam.
 - If you show up for an exam and you are clearly ill, then I will ask you to go home.
- If you miss the final exam because of illness:
 - Apply for deferred standing (academic concession) within 48 hours after the missed final exam. Students who are granted deferred standing write the final exam at a later date.
- If I am ill, then I will not come to class. The same applies to the TAs. If that happens, here's what you can expect:
 - A recorded version of the lecture
 - One of your TAs will substitute.
 - If I am well enough to teach, but taking precautions to avoid infecting others, we may have an online lecture or two (via Zoom). If this happens, you will receive an email or announcement in Canvas telling you how to join the class. This might be a last-minute email. Our classroom will still be available for you to sit and attend an online session.

- In-person, on-campus activities may need to be cancelled due to issues such as weather conditions (e.g., snow). The UBC Provost determines when in-person, on-campus learning activities are cancelled. The UBC Associate Vice President determines when in-person final exams are cancelled. **Instructors do not have advance information and cannot make these decisions, so do not email them about weather cancellations.**
- **If in-person activities are cancelled due to weather or other environmental conditions, class will be held online.** The Zoom link will be posted on Canvas. For those unable to participate in an online class on short notice, I will provide a lecture recording that is posted to Canvas.
- **If weather impacts a midterm, we will reschedule.** Please see Canvas for rescheduling notifications. It is likely the midterm will take place at the next class session.
- **Do not email the instructor and ask them to cancel class or midterms or final exam because of weather.** These decisions are made only by the Provost and Associate Vice President of UBC.

Final suggestions:

Information about academic regulations, course withdrawal dates and credits can be found in the Academic Calendar.

If you need information about studying, note taking, or time management, then free workshops and advice are available from UBC. **Or talk to Prof. Trujillo-Pisanty and TAs!**