

# PSYCHOLOGY 365

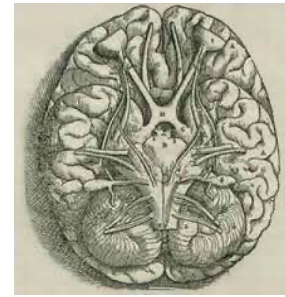
## Cognitive Neuroscience

3 credits

Pre-reqs: One of PSYC 260, PSYC 270, COGS 200, NSCI 201

University of British Columbia, Vancouver

Jan-April, 2022 T-Th 3:30-5:00 BUCH A101 or zoom



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\*bear painting by former 365 Student Nicola Tindle

### Acknowledgment

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the x<sup>w</sup>məθk<sup>w</sup>əyəm (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 in their culture, history, and traditions from one generation to the next on this site.

## I. COURSE DESCRIPTION AND GOALS

The two-fold goal of this course is to introduce you to questions that drive research in cognitive neuroscience and the methods we have to answer them, while engaging you in active and critical discussion of current research and controversies in the field. That is, the goal is to give you a taste of classic studies and late-breaking news in the neuroscience of human cognition, while giving you the skills to make your own decisions about what information means and what to do about it in the world of FAKE NEWS! Topics include the cognitive neuroscience of perception, attention, learning, memory, and decision-making. After successful

completion of this course, you will have a better understanding of what we know and don't know about the mysterious workings of the human mind and brain — and a glimpse of what the future may hold.

### Summary of Assessments

Quiz (Jan 25)	10%	
Midterm Exam 1 (Feb 17)	20% or 30%	
Midterm Exam 2 (Mar 22)	20% or 30%	
Final Exam (Apr 12-27)	35%	
Participation (By final exam)	5%	
<b>Total</b>		<b>100%</b>
Human Subject Pool participation	3%	

NOTE: Because the world is volatile, from COVID variants threatening the immunocompromised to washed out highways and other restrictions, **there is a remote option for every component of this course. Exams will be held online. Participation in live sessions is wholly optional** and may be remote or in person. **ALL lecture materials required for exams are pre-recorded and will be available to download from Canvas!**

## II. COURSE MATERIALS

### Classes

**Recorded Lectures.** Pre-recorded lectures will be posted on Canvas by the scheduled class time and will remain available for the duration of the course.

**In-person class sessions.** The scheduled class times will be used for optional live Q & A and discussion. We will use this time to go over selected lecture slides from the videos slowly, with questions, as well as other questions and discussion points that come up. These sessions will be conducted via Zoom until Jan 24. After that, depending on the progression of the pandemic they will be either conducted via zoom or in-person (these sessions will be livestreamed and monitored for questions). If and when it's possible, you can access the livestream and for the live sessions use this link:

<https://ubc.ca.panopto.com/Panopto/Pages/Sessions/List.aspx?folderID=95e1f265-e625-4d18-85ac-adf801870cf2>. Note that all material that will appear on exams is in the pre-recorded lectures.

### Readings

**Required Textbook.** Richard Passingham (2016). *Cognitive Neuroscience: A Very Short Introduction*. Oxford University Press. Available at the Bookstore. Also available as an ebook. ISBN: 9780198786221 and online at the UBC library for free! The inexpensive and very readable book will provide a general overview and some background for the experimental studies we will read and discuss in class.

**Other readings.** These include peer-reviewed experimental papers which will be posted on Canvas. Papers are also available through the UBC library. There will also be videos, media articles, and blog posts occasionally assigned.

Readings are meant to provide background (textbook) as well as details (papers) of scientific studies to be covered in each class, and will be due before class. The lectures will not simply recapitulate the readings, but will build on, expand and clarify material in the readings as well as *provide additional information*. Therefore, it's important to make sure you do the readings before the relevant lecture so that you have the necessary background for the lecture material. The lectures will highlight the information from the papers that you will need for the exams, so that you can study what's important. Most weeks you will be required to read ONE empirical paper a week. Papers listed in parentheses are optional, and are sources of material that will be in the lecture. FOR OPTIONAL PAPERS YOU WILL ONLY BE EXAMINED ON MATERIAL THAT IS IN THE LECTURE.

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### III. COURSE WEBPAGE

<https://canvas.ubc.ca/> (location for important announcements, readings, lecture notes, discussion, and grades)

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### IV. COURSE REQUIREMENTS

The assignments in this course are designed to foster an understanding of cutting-edge research in cognitive neuroscience that is informed by background knowledge of how thinking has developed in each research area. Readings, lectures, and exams will be geared towards this goal.

#### Academic concessions

For course policies regarding in-term academic concessions, please refer to the relevant UBC calendar entry: <http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0>.

#### Exams

Exams will cover all lecture and reading material indicated in the syllabus. Note that lectures add to and elaborate on reading materials, and will contain information that is not in the readings. As we go along there will be more to synthesize and you will have had more practice doing it. **Exams will be online. Course policy is that we do not give make-up exams. If you are excused from one of the midterms we will distribute that proportion of your grade across the other exams.**

#### Basic Neuroscience and Neuroanatomy Quiz (10%)

**2 Midterms (30% for the exam you do better on and 20% for the exam you do worse on).**

These will draw on both lectures and the readings. For superior performance; you must have a clear understanding of both. There are two midterms so that you can digest the material in smaller chunks, which should allow you to master it better. Having two midterms also gives you more practice for the final exam, and the chance to keep bringing up your game, as well as giving you some insurance if one of the exam days is just a bad day.

**Final Examination (35% of total course grade).** While there will be more emphasis on material not covered in the mid-terms, the final will be cumulative in that you will be expected to synthesize more recent material with material learned earlier in the course. **Please note: the date of the final will not be announced until**

mid-February and so I strongly advise you **NOT** to plan travel until you learn the dates of your final exams. You cannot take the final on a different date/time unless you have a documented medical illness.

**Participation (5% of total course grade).** Participation grades will be based on successfully completing **canvas quizzes (4%)** and submitting **two discussion questions** over the course of the term (**1%**). You must complete the quizzes for each module to get credit for them. Your score on the quiz will count toward your total participation grade. As they are meant to encourage you to pay attention and remember key concepts as we go along, you can take them as many times as necessary to get 100%. You have until the end of term to complete them for the participation grade, but the questions on them are designed to cover material that can show up in exams, and they will only help you with the midterms if you complete them beforehand.

### **Piazza for Discussions**

We will be using Piazza for class discussion. The system is designed to provide fast and efficient help from classmates, the TAs, the peer tutors and myself. **Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza.** If you have any problems or feedback for the developers, email [team@piazza.com](mailto:team@piazza.com). You will be able to sign up on the class Q&A forum by clicking the Piazza link in Canvas. You will need to create a new password. After that you can view Piazza by clicking the Canvas link.

**Research participation (extra credit).** You also have the opportunity to earn up to **three (3)** extra percentage points on your overall final grade by participating in studies regularly conducted by the Psychology Department and coordinated through the Human Subject Pool (HSP). For each hour of experimental participation you can earn one credit towards your final grade. You can sign up for studies by visiting <https://ubc-psych.sona-systems.com/>. If you prefer, you can earn these same extra credits by completing a library-writing project, in which you read and summarize a peer-reviewed research article. You can find out more about how you can earn extra credits at <https://psych.ubc.ca/hsp>. There you will find a detailed guide about how to participate in the HSP, how-to videos, and a list of frequently asked questions.

One percentage point is assigned to your final grade for each hour of participation and **partial credits will be rounded down** (i.e., 1.5 hours = 1% extra credit). Credits can be recorded and tracked via the subject credit website. These credits are added to your grade at the end of the course. If you do not correctly assign your credits to this course, you will NOT receive credit so please make sure you have done this correctly.

**Library Assignment.** As an alternative to participating in studies, you may choose to complete library writing projects, in which you read and summarize a research article; each article summary counts as one hour of research participation. Library assignments are due on the last day of classes. A full description of the library assignment is available on page 5 of the "Info for Participants" document that can be found on the HSP website. This term, the class ID is 33005051, class name is "HSP 2021-2022 (Spring)" and password is "Research".

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## V. COURSE GRADING

Your final grade consists of the items described in Section IV. Performance for each of the items above will be put into a calculator that outputs your final course percentage earned. As mentioned in Section IV, any extra credit earned will be added to this final score.

You are earning a degree at a highly reputable post-secondary institution. Therefore, criteria for success are high. The Faculty of Arts offers the following guidelines that broadly characterize the kind of work that is generally associated with the main grade ranges.

**A RANGE: *Exceptional Performance.*** Strong evidence of original thinking; good organization in written work; capacity to analyze (i.e., break ideas down) and to synthesize (i.e., bring different ideas together in a coherent way); superior grasp of subject matter with sound critical evaluations; evidence of extensive knowledge base.

**B RANGE: *Competent Performance.*** Evidence of grasp of subject matter; some evidence of critical capacity and analytic ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.

**D-C RANGE: *Adequate Performance.*** Understanding of the subject matter; ability to develop solutions to simple problems in the material; acceptable but uninspired work; not seriously faulty but lacking style and vigor.

**F RANGE: *Inadequate Performance.*** Little or no evidence of understanding of the subject matter; weakness in critical and analytical skills; limited or irrelevant use of the literature.

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## VI. UNIVERSITY POLICIES

### ACADEMIC INTEGRITY

Academic honesty is essential to the continued functioning of the University of British Columbia as an institution of higher learning and research. All UBC students are expected to behave as honest and responsible members of an academic community. Breach of those expectations or failure to follow the appropriate policies, principles, rules, and guidelines of the University with respect to academic honesty may result in disciplinary action.

We will adhere to the UBC Respectful Environment policy <https://hr.ubc.ca/sites/default/files/wp-content/blogs.dir/14/files/UBC-Statement-on-Respectful-Environment-2014.pdf>.

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access, including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on [the UBC Senate website](#).

## VII. COURSE POLICIES

Class will be on **Zoom** (link below) until at least the end of the **second week**. We will be following UBC policy and monitoring the situation as needed. If we return to in-person class, there will be remote options for students in different situations. When in-person, you are required to wear a non-medical mask in class as per provincial mandate unless exempt. **Do not come to class if you are feeling ill, and please complete a COVID self assessment <https://bc.thrive.health/covid19/en> and test if applicable. Free vaccines are available for everyone currently in BC.**

**Zoom Link:** <https://ubc.zoom.us/j/63975032910?pwd=a3JPbmczNENvWnpDVUpiN1BBcjdxUT>

### Readings

The readings will be current experimental papers featuring cutting edge studies in cognitive neuroscience, supplemented by short chapters from the Passingham textbook. Note these papers are demanding! I will walk you through how to read these papers and point you to what material is important to know for exams and quizzes and what methodological details are unnecessary for our understanding of the papers.

### E-mail policy

Please direct any questions where the answers will be of interest to other class members to Piazza! For other matters, in most cases, e-mails will be answered within 48 hours of receipt (not including weekends). If you send the instructor or teaching assistants an email, the email subject should include the course and nature of the inquiry. Please send questions about grading/assessment to the TAs and about the course content to Prof. Todd. Please note that last-minute emails about test questions may very well not be answered the day before an exam so please plan accordingly.

You are strongly encouraged to use Piazza and to join live discussions during the scheduled course time.

### Syllabus changes

There may be minor changes to the syllabus during the term. You will be notified of these changes ASAP and no changes will be instituted that dramatically affect your ability to properly prepare for an examination.

### Office hours

You can use one on one office hours as well as attending group discussion sessions during Tuesday's class time if you have questions or concerns about any of the material that you wish to discuss live/"in-person." You may also make office hour appointments to ask about graduate school, research or other related questions. If we cannot answer your question(s) about topics beyond the course, we'll direct you to someone who can.

You will need to contact TAs for sessions provided to review your exams if you so choose. If you have any outstanding questions you can fill out a request form and talk to Dr. Todd. Any grading disputes other than calculation errors for the midterms must be handled with Dr. Todd within three weeks of when the scores were released.

### "Classroom" conduct

Our virtual classroom is a place where you should always feel safe and respected. It is also a place that is conducive to learning and intellectual curiosity. Any behaviors compromising this environment will not be tolerated and the student(s) and/or individual(s) will be asked to leave.

### Access and Diversity

UBC is committed to equal opportunity in education for all students including those with documented physical or learning disabilities. If you believe you fall in this category, please visit this website (<http://www.students.ubc.ca/access/disability-services/support-students/exam-accommodations/>) to take the necessary steps to ensure that you have every opportunity that you deserve to excel here at UBC.

### Grade bumps

When computing final grades, the instructor carefully analyzes every single student to determine whether a grade bump is deserved. Bumps *may* be awarded for consistent performance at a major grade boundary or for marked improvement from the midterm to the final (i.e., 10%+). Bumps are not guaranteed and are *\*not\** awarded for non-academic reasons (i.e., student is graduating and/or involved in sports or other extracurricular activities). **DO NOT send the instructor an email asking for a grade bump.**

### Academic Misconduct

Cheating, plagiarism, and other forms of academic misconduct are very serious concerns of the University, and the Department of Psychology has taken steps to alleviate them. Relevant to this course, the Department has implemented software that can reliably detect cheating on multiple-choice exams by analyzing the patterns of students' responses. This will be used for every assessment we take in this course. For what how to avoid plagiarism on writing assignments see UBC guidelines for plagiarism:

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959>

In all cases of suspected academic misconduct, the parties involved will be pursued to the fullest extent dictated by the guidelines of the University. Strong evidence of cheating may result in a zero credit for the work in question. According to the University Act (section 61), 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.

Do note that during exams, the instructor and invigilators reserve the right to move students in their seating arrangement with no explanation provided.

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## VIII. LEARNING ANALYTICS

Learning analytics includes the collection and analysis of data about learners to improve teaching and learning. This course will be using the following learning technologies: Canvas & Piazza. Many of these tools capture data about your activity and provide information that can be used to improve the quality of teaching and learning. In this course, I plan to use analytics data to:

- View overall class progress
  - Review statistics on course content being accessed to support improvements in the course
  - Track participation in discussion forums
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## IX. COPYRIGHT

All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the Course Instructor or licensed for use by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline.

Students are permitted to record lectures.

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## X. USEFUL LINKS

### Helpful student information

UBC Academic Calendar

<http://www.calendar.ubc.ca/vancouver/academicyear.cfm>

UBC Access and Diversity

<http://www.students.ubc.ca/access/index.cfm>

Tips to help overcome test anxiety

[http://www.swccd.edu/~asc/lrnlinks/test\\_anxiety.html](http://www.swccd.edu/~asc/lrnlinks/test_anxiety.html)

### WELLNESS RESOURCES

Below you will find links to a wide range of resources you may want to use if you are struggling in any way to manage your responsibilities while in school or the stresses of life in general.

**Crisis Services:** If you or someone you know are in an emergency, please contact 911, Crisis Centre BC 1 800 784 2433, or Crisis Services Canada 1 833 456 4566. More information here:

<https://students.ubc.ca/health/accessing-crisis-support-services>.

**Campus Lightbox:** One website with links to ALL the mental health resources and more: <https://campuslightbox.com/> Start here!

**For 24/7 mental health support** as covered by UBC:

<https://students.ubc.ca/health/ubc-student-assistance-program-sap>

<https://here2talk.ca/main>

**For other UBC Health & Mental Health resources:**

<https://students.ubc.ca/health>

<https://students.ubc.ca/health/counselling-services>

**For the Centre for Accessibility:**

<https://students.ubc.ca/about-student-services/centre-for-accessibility>

**For a neutral third party (Ombudsperson):** <https://ombudsoffice.ubc.ca/>



## Psychology 365 2022: CLASS SCHEDULE

May be subject to minor revisions with advance notice from the instructor.

<u>Lecture</u>	<u>Date</u>	<u>Day</u>	<u>Topic</u>	<u>Assignment</u> (readings in parentheses are optional)
1	11-Jan	T	Introduction/Syllabus Module	Syllabus
2	13-Jan	Th	Cognitive Neuroscience: The Good, the Bad, and the Ugly	Passingham Chap 1; How to Read a Scientific Paper for Non-Scientists
3	18-Jan	T	Neuroanatomy Part 1	Neuroanatomy module Part 1
4	20-Jan	Th	Neuroanatomy Part 2	Neuroanatomy module Part 2
5	25-Jan	T	<b>Quiz</b> Cognitive Neuroscience methods	Poldrack & Farah, 2015
6	27-Jan	Th	fMRI: Workhorse of Cog Neuro	
7	1-Feb	T	Recognizing objects Part 1	Passingham Chap 2; Brain facts: How AI helps us understand human vision
8	3-Feb	Th	Recognizing Objects Part 2	Neural networks made easy
9	8-Feb	T	Classifying Objects	How to Read a Scientific Paper (Connolly et al., 2012);
10	10-Feb	T	Predicting perception	Egner, Monti & Summerfield, 2009
11	15-Feb	T	Review	
12	17-Feb	T	<b>Midterm 1 (Classes 5-10)</b>	
	21-25 Feb		<b>NO CLASS – Reading Week</b>	
13	1-Mar	Th	What is special about faces?	Harada et al., 2020; Cracking face code
14	3-Mar	Th	Selecting Attention	Passingham Chapter 3
15	8-Mar	T	Sustaining attention	Rosenberg et al., 2016
16	10-Mar	Th	Emotion, motivation and attention	
17	15-Mar	T	Reward and attention (& learning)	Anderson et al., 2016; 2 Dopamine blogs
18	17-Mar	Th	Reward & attention continued	
19	22-Mar	T	<b>Midterm 2 (Classes 13 -18)</b>	
20	24-Mar	Th	The Hippocampus: From space travel to time travel	Passingham Chapter 4
21	29-Mar	Th	Episodic memory	How to See a Memory; Gilmore et al., 2021
22	31-Mar	T	Rehearsing and retrieving memories	Bird et al., 2015
23	5-Apr	Th	Rehearsing and retrieving memories continued	
24	7-Apr	T	Pulling it all together	Wager 2021