PSYC 460 – BEHAVIOURAL NEUROENDOCRINOLOGY SYLLABUS
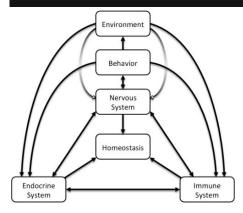
THE UNIVERSITY OF BRITISH COLUMBIA
Department of Psychology
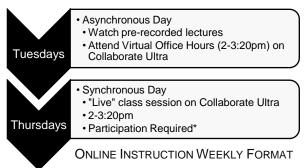
GENERAL INFORMATION

Welcome to PSYC 460! This course focuses on the inter-relationships between the brain, the endocrine systems, and behaviour (see figure to the left). We will study the effects of many different hormones to gain an understanding of how hormonal signaling in the body and brain coordinates the incredible behavioural complexity observed in nature, specifically in humans and animal models. We will discuss the reciprocal nature of hormone and behaviour interactions across development, including topics on puberty, sexuality, stress, and mental health. In addition to assigned review articles, we will use discussions of the primary literature to emphasize the current knowledge and limitations in the field.

This class will be conducted online: all class materials and information will be posted on the **Canvas** learning management system (canvas.ubc.ca). Lecture content will be posted as pre-recorded online videos that may be viewed asynchronously. On Tuesdays, students can attend optional virtual office hours to review concepts and/or ask any questions. Thursday sessions will by synchronous and will consist of discussion group and group learning activities. * *Vancouver time (PDT/PST) for all events/deadlines*

Tuesdays
- Asynchronous Day
  - Watch pre-recorded lectures
  - Attend Virtual Office Hours (2-3:20pm) on Collaborate Ultra

Thursdays
- Synchronous Day
  - "Live" class session on Collaborate Ultra
  - 2-3:20pm
  - Participation Required*

ONLINE INSTRUCTION WEEKLY FORMAT

INSTRUCTOR & TA INFORMATION

Instructor	E-mail	Office Location & Hours
Parker Holman, MSEd, PhD (he/him) Postdoctoral Fellow	parker.holman@ubc.ca	Tuesdays, 2-3:30pm (Zoom/Collaborate Ultra via Canvas)

If you have a question specific to your needs, please use your UBC email account (please write "PSYC 460" in Subject Line), or the "Inbox" on Canvas to reach me.

Teaching Assistant	E-mail	Office Location & Hours
Wansu Qiu	wansuq805@gmail.com	Piazza; By Appointment

Correspondence: This term we will be using **Piazza** for Q&A about course content, assignments, etc. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Please post your questions about course content on Piazza. If you have any problems or feedback, email team@piazza.com. Find our class page at: https://piazza.com/ubc.ca/winterterm12020/psyc460/home

PREREQUISITES

- 4th-year standing
- PSYC 304 – "Brain & Behaviour" OR PSYC 360/370/371 – "Biopsychology / Beh. Neuroscience I & II"

TEACHING PHILOSOPHY

My primary goal as an educator is *student engagement* and I strive to get you invested in the content by providing clear expectations, well-defined learning objectives, and consistent feedback. During lectures, I will refer to the learning objectives explicitly and build in formative assessments to check your understanding and keep you engaged with the lesson.

The most critical factor determining your success in any course is participation. Watch pre-recorded lectures, take good notes, and then review and outline the material presented. Use Piazza to post questions and help answer your classmates' questions; attend virtual office hours to request clarification about a lecture concept and participate in guided practice; interact with me and each other during synchronous discussion group sessions via chat and/or webcam and audio. Participation with course content on Canvas will be logged and will be reflected in your final mark; you will do poorly in this course if you do not view pre-recorded lectures and participate in synchronous discussion group sessions. Finally, come to me or your TA if you need help, ideally as early as possible. *Successful students are those who ask for help*. You will enjoy the material much more if you understand it. Don't wait until it's too late to rectify the problem!

This course will include learning experiences using both asynchronous, pre-recorded **lectures** and synchronous **discussion groups**. I really value your contributions and expect you to come to each synchronous session prepared. Usually we will spend about one week per each major topic (see the Course Schedule later in this syllabus).

LEARNING GOALS

Student Learning Objective	Assessment(s)
1. Demonstrate an understanding of the major hormonal mechanisms that underlie behaviour in animals.	Informal lecture quizzes; midterm & final exams
2. Become a critical consumer of behavioural neuroendocrinological research by understanding a variety of methodological issues.	Journal article critique; discussion group participation; midterm & final exams
3. Be able to read, understand, and integrate research in behavioural neuroendocrinology.	Journal article critique; midterm & final exams
4. Be able to apply varying research methods to study behavioural neuroendocrinology across development.	Research proposal
5. Understand the ethical considerations involved when conducting research.	Discussion group participation; journal article critique
6. Learn about the research process by conducting a literature review, formulating a developmental research question and hypothesis, designing methodology to test hypothesis, and writing a research proposal.	Research proposal

CLASS EXPECTATIONS

Student Expectations		Instructor Expectations	
a.	PLEASE BE ACTIVE AND PARTICIPATE IN CLASS	a.	BE ACTIVE AND ENTHUSIASTIC TO FACILITATE STUDENT LEARNING
b.	Listen and respect others	b.	Listen and respect students' views
c.	Be comfortable taking risks	c.	Accommodate differences in students' learning
d.	Complete all assignments (on time)	d.	Mark objectively, consistently, and in a timely manner
e.	Limit cell phone / computer use to course-specific activities	e.	Limit cell phone / computer use to course-specific activities
f.	Be punctual for all synchronous sessions	f.	Be available to address students concerns outside of class
g.	Discuss class concerns either after class or during designated office hours	g.	Respond swiftly and effectively to student concerns
h.	Be prepared for class by completing assigned readings prior to lesson	h.	Be prepared for class

COURSE MATERIALS

REQUIRED TEXTS

Review Papers & **Discussion Papers** as listed in the syllabus; readings are free via library.ubc.ca (check out EZProxy and/or VPN to help you easily download readings/research articles).

REQUIRED MATERIALS

Access to a computer with reasonable internet connection will be important. A webcam/microphone are ideal, but not essential. As Canvas will be the main "home" for our course, please check your *Account* >> *Notifications* settings to ensure you receive announcements and other notices (more info here).

TECHNOLOGY

We will use Canvas, Zoom and/or Collaborate Ultra. We may use Google Docs/Slides, however, you will not need a Google account (and should log in from a "Private" or "Incognito" browser tab to protect your privacy.

Visit https://keeplearning.ubc.ca/faq/ to learn more about software and applications – including information about privacy/security – in use at UBC. You may also refer to the course statement on Learning Analytics.

OPTIONAL TEXT

An Introduction to Behavioral Endocrinology, Fifth Edition, Nelson & Kriegsfeld (4th Edition is acceptable)

OPTIONAL MATERIALS

Course outlines, lecture notes, and other materials relevant to the course will be available on Canvas (http://canvas.ubc.ca). Please be aware that lecture notes may change such that some slides may be posted after classes. More resources are available for you at http://guides.library.ubc.ca/psyc460, a website created to help you find research on your topic for your journal article critique as well as your grant assignment. Textbook companion website: http://sites.sinauer.com/be5e/index.html

COURSE ASSIGNMENTS/ASSESSMENTS

Component	% of Final Mark	Due Date	
Lecture & Reading Quizzes / Discussion Participation	15%	Cumulative	
Journal Article Critique / Discussion Facilitator	15%	TBD (theme randomly assigned)	
Midterm Exam I		Tuesday, Oct. 6, 2020 (Exam will be held online)	
Midterm Exam II	30%***	Tuesday, Nov. 3, 2020 (Exam will be held online)	****Lowest exam mark dropped; calculated from 2 highest marks*
Final Exam		TBD	
Research Grant Proposal	40%	Topic selection – Friday, Sept. 25 Annotated Bibliography – Friday, Nov. 6 Abstract w/ Specific Aims – Friday Nov. 13 Peer Review – Thursday, Nov. 19 Final Grant – Friday, Dec. 4, 2020	

LECTURE QUIZZES / SYNCHRONOUS DISCUSSION GROUP PARTICIPATION – (15%)

LECTURE PARTICIPATION QUIZZES

For pre-recorded lectures (asynchronous), there will online quizzes embedded within each video lecture. You will earn full credit for each lecture session if you answer **at least one question** correctly. Deadlines for watching asynchronous lectures and completing associated participation quizzes are provided to help you keep up with the content; completing these tasks by these deadlines is strongly encouraged, though there is no penalty for late completion.

DISCUSSION GROUP PARTICIPATION & READING QUIZZES

Prior to the midterm, we will have three classes where we'll discuss primary research articles, and you will be marked based on your participation and overall contributions to small-group discussions. If you are unable to attend a synchronous discussion group session, please contact me for instructions on how to earn credit through an alternative assignment. You cannot participate effectively if you have not read the research articles; accordingly, there will be short online reading quizzes before each discussion group to check your understanding of the assigned research article. Quizzes will be administered online through Canvas, with each quiz closing on the discussion group day at 2pm PDT. For reading quizzes, you will be marked for providing a correct/incorrect answer.

Alternative assignments for those unable to attend synchronous sessions will be possible, but please make attendance for synchronous sessions a priority. "Breakout" room discussions (e.g., small group discussions in Zoom/Collaborate Ultra) will not be available for asynchronous viewing due to technical limitations.

JOURNAL ARTICLE CRITIQUE / DISCUSSION GROUP FACILITATOR – (15%)

JOURNAL ARTICLE CRITIQUE

The process of critiquing the scientific literature is one of the most important aspects of professional science. Indeed, each article you read was submitted to a journal and underwent extensive peer review by fellow experts in the field. Even if you don't intend to pursue a career in professional science, developing critical evaluation skills will serve you well across a broad range of disciplines; moreover, it will help inoculate you against the

rising tide of so-called "fake news." The word *critique* often carries with it a negative connotation – but critiques can be very positive. They help identify what was done well, clarify gaps in our knowledge that may still exist, and guide future research to help narrow down fact from speculation.

There will be 3 discussion groups during the term, with ~20 students responsible for writing a critique for that class's assigned research article. The overarching goal of the research article critique assignment is to help you become critical consumers of the scientific literature (and information in general), while introducing you to important theories, techniques, and lines of research in the field of behavioural neuroendocrinology. More pragmatically, writing a research article critique will provide valuable practice for constructing your research proposal. Please adhere to the following guidelines and consult the assignment instructions and marking rubric on Canvas to help you identify the key components of a well-written journal article critique.

A digital copy of this assignment is due on day of your assigned discussion group by 2pm. Specifically, you must upload your paper to TurnItIn.com to generate an Originality Report (Class ID: 26337765; Enrolment Key: PSYC460001). Please note you can utilize this feature at any point during the term to help make sure that you're using your own words; I will only utilize the *final* Originality Report as part of your assessment.

FORMAT FOR JOURNAL ARTICLE CRITIQUE

2 pages <u>maximum</u>, single spaced. All text should be in 11 pt Arial/Times New Roman font, and margins must be set at 1". Your name and student ID must appear outside the set margins of the page. In general, when write your critique, avoid copying anything directly from the paper – the best critiques are written in relatively simple language *in your own words.* It is often obvious when you have merely re-written some of the material from the paper. You may find using bullet points helpful for organizing your thoughts. Please organize your critique as follows:

1. **Journal Article Information**
    a. Full citation (authors, year, title, journal, volume, page numbers)

2. **Background & Purpose** (~150 words)
    a. What problem was the experimenter trying to solve?
        i. Explain the problem the paper is attacking, and why it is interesting and important
    b. How does your paper relate to the week's theme?
        i. What *course concepts/ideas* are relevant and help us to understand this article?

    Here you need to give a bigger picture reason for why people are studying this particular area and why it is important. Do not give results or try to find the right sentence from the paper that fits this point; instead, read the paper and to somehow distill what you believe the experimental problem is.

3. **Overarching Hypothesis** (~100 words)
    a. What was the *hypothesis*?
        i. Describe what the researchers expected to find and WHY

    Hypotheses are rarely explicitly stated within the paper, they are often implied or based on knowledge of the experimental problem.

4. **Methodology** (~150-200 words)
    a. What were some key methodologies/technique(s)?
        i. BRIEFLY describe experimental design (control groups, statistical methods, etc.)
        ii. Define controls and determine their role
    b. Why will this method produce data that will answer the research question? What makes this method feasible/appropriate?
        i. Examine the relationships between the *independent* and *dependent* variables

c. Are there any limitations to this method? If so, how did the authors overcome these limitations?

How are the hypotheses tested? Here focus on *logic* and a sequence of experiments. Not every experiment needs to be outlined. Details like which species the antibodies are raised in and salt concentrations are entirely inappropriate.

5. **Results** (~150-200 words)
   a. What are the key findings?
      i. Determine the significance of each figure and pick *2-3 figures* that really drive home the thesis of the research article
   b. What do the data show?
      i. Analyze the data: relate data presented to results derived

Concentrate again on the big picture and logical flow. Many of the papers are extremely complicated with many different arguments and results. You need to distill out the key results, which address the hypotheses that you have derived from the paper.

6. **Evaluation of the Research****** (~500 words)
   a. Do the experiments fully address the hypotheses? Any missing controls/experiments?
      i. Conclude your analysis by briefly summing up the strengths and weaknesses of the study and by assessing its contribution to the advancement of knowledge, theory, or practice
   b. Are the results conclusive or are there other alternative interpretations?
      i. Discuss the strengths and weaknesses of the paper as you see them. Were the techniques adequate? Are there other experiments or controls that could or should have been done?

Please don't just say that the researchers should have had a larger sample size – in some cases this may not be true and would actually be wasteful/unethical! Instead, think of this section like a debate about the significance of the data. Don't just list criticisms but defend your ideas and intelligently evaluate the authors' interpretations.

7. **Future Research Directions** (~100 words)
   a. Based on the results, what experiment would you do next?
      i. Consider suggesting research directions and methodological considerations for future researchers

You can get creative with this, and I really want to hear your opinion, not the experiment regarding an antibody and different species or a small point that the authors are outlining in their discussion. *(PRO TIP: This could be a great jumping-off point for your NSERC-style research proposal…)*

DISCUSSION FACILITATOR

Each discussion group, facilitators will help us respond to a series of discussion questions. Discussion group facilitators will be expected to act as "experts" for their assigned research article and clarify any student misconceptions, record student ideas, and help lead a summative class discussion. Additionally, facilitators will provide responses to the discussion group questions that capture the major in-class discussion points.

RESEARCH PROPOSAL – (40%)

The final assignment is a paper describing an original research proposal that is of interest to you and related to any topic covered in the course. Some of you may find it helpful to expand your future directions component of your journal article critique. You will propose a coherent set of experiments that build on what is already known,

but that will contribute new and useful information to the field. More information about specific components to include are listed below. Of course, **_use your own words_** (we will utilize *TurnItIn.com*, a service designed to detect and deter plagiarism; more information on academic misconduct can be found at the end of the syllabus).

A digital copy of this assignment is due on the last day of classes (Friday, Dec 4) before midnight. Specifically, you must upload your paper to TurnItIn.com to generate an Originality Report (Class ID: 26337812; Enrolment Key: PSYC460001). Please note you can utilize this feature at any point during the term to help make sure you're using your own words; I will only utilize the *final* Originality Report as part of your assessment.

RESEARCH PROPOSAL DEADLINES

The research proposal is meant to be a creative way for you learn about the research process and also allow you to dive deep into a topic of interest in the field of behavioural neuroendocrinology. I really want to support you along the way so that you can get the most out of this assignment. It has been my experience with larger writing assignments (i.e. research proposals) that students perform much better and learn more when the process is broken down into more manageable "chunks."

I've split the assignment into 4 "chunks" – topic selection, annotated bibliography, 1-page abstract with specific aims, and peer review – with due dates for each component spread out over the course of the term. Not only does this encourage you to get started early, but it allows for early intervention if there are any problems and helps you stay on top of the assignment. *To incentivize your participation, a portion (25%) of your final research proposal mark will be determined by your timely submission of each component to Canvas*. Don't panic if your topic changes over time – that's completely normal and will happen as you read and learn more about your topic!

- **Topic Selection – Due Friday, Sept. 25th by midnight (PDT)**
    - Identify a broad topic area in the field of behavioural neuroendocrinology
    - Find a knowledge gap that can be addresses – what research is needed to move the field forward?
    - Develop a research question – what problem are you trying to solve gap (related to knowledge gap)?
    - Identify the impact - what is interesting about his question and how will your research improve scientific knowledge, technical capability, and/or clinical practice?

- **Annotated Bibliography – Due Friday Nov. 6th by midnight (PST)**
    - Find 6 primary research articles about your topic
    - For each article, produce ½-1-page document (use journal article critique template as a guideline):
        - Do NOT simply copy the abstract – think of this as a mini journal article critique
        - List the relevant findings
        - Describe how the findings relate to your other articles
        - Describe how the findings relate to your research proposal objectives
        - Include any important figures/graphs/tables along with annotations
    - If your research article critique and proposal topic overlap, feel free to use it as one of your articles!

- **1-page Abstract w/ Specific Aims – Due Friday, Nov. 13th by 2pm (PST)**
    - BRIEF summary of the proposed research. <u>It should be a self-contained description of the project and should contain the specific aims, hypotheses, and expected results</u>.
        - Focus on the aims! We'll work on this at our second Writing Workshop on Oct. 8th

- **Peer Reviews – Due Thursday, Nov. 19th by 2pm (PST)**
    - You will evaluate the Abstracts of two of your peers using Canvas (https://guides.instructure.com/m/4212/l/54363-how-do-i-submit-a-peer-review-to-an-assignment); we will discuss the rubric at our third Writing Workshop Nov. 5th

STRUCTURE OF RESEARCH PROPOSAL

5 pages maximum, single spaced, including figures (if any). 2 additional pages for references (APA format). All text should be in 11 pt Arial/Times New Roman font, and margins must be set at a *minimum* of ¾" (1.87 cm).

Your name and student ID must appear outside the set margins of the page, at the top right corner of every page (submit a redacted version to *TurnItIn.com* to be FIPPA compliant). Follow the NSERC Discovery Grant guidelines (http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/DGIGP-PSIGP_eng.asp). Specifically, your proposal should include the following sections/information (though structure/order can differ):

1. **Abstract / Lay Summary with Specific Aims (1 page MAX)**
    a. This section must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained description of the project and should contain the specific aims, hypotheses, and expected results. It should be informative to other persons working in the same or related fields and insofar as possible understandable to a scientifically or technically literate lay reader.

2. **Background / Literature review (~1.5 pages)**
    a. Discuss the literature pertinent to the proposal, placing the proposed research in the context of the state-of-the-art.
    b. Space will not permit a comprehensive literature survey, and you will be unable to include many references. That makes it all the more important to select judiciously, thereby demonstrating that you have solid knowledge of the field, and the ability and good taste to make the very best use of limited space.
    c. Make sure your literature review is up-to-date, including recent publications in the area.

3. **Objectives / Specific Aims (~1.5 pages)**
    a. Define 2-4 major objectives of your research program – these are the steps to answer your central question(s).
        i. For each objective/aim, genuine, testable, null hypotheses are important and each of these aims should have a concluding statement describing how you will know when you have the answer, and what it will mean to the program.
    b. Discuss potential problems, limitations, alternative strategies, and benchmarks for success anticipated to achieve the aims.

4. **Methodology (~1 page)**
    a. Describe the methods and proposed approach, providing sufficient details to allow the reviewers to assess the feasibility of the research activities.
    b. Avoid going into the minutiae of the methodologies, but provide enough details to demonstrate how technique/methodology allows you to test your hypotheses.

5. **Impact (~½ page)**
    a. Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
    b. Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.
    c. Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

TIPS FOR A SUCCESSFUL RESEARCH PAPER

- START EARLY – This cannot be emphasized enough. Writing a research proposals is difficult; to put together even an adequate proposal requires a minimum of 3-4 drafts, and you need time to step away and reflect between each draft phase. If you get started too late in the game, it will be highly unlikely you'll be able to invest the necessary time/effort to craft a successful research proposal.

- TAKE ADVANTAGE OF RESOURCES – I have tried to provide enough detail about the format of the assignment to eliminate any superficial barriers to your success – please adhere to these requirements. Additionally, I have included a rubric for how you'll be evaluated and have offered access to TurnItIn

for the entire term. Please utilize to these resources, as they can help you self-assess the quality of your work. I will be posting supplemental materials on Canvas to help you write a successful research proposal, in addition to resources available at http://guides.library.ubc.ca/psyc460

- GET FEEDBACK – I really want this research proposal assignment to be a learning experience and not simply a summative assessment. Accordingly, I encourage you to submit sub-assignments on time so that I can provide you with written/verbal feedback. Likewise, you are always welcome to schedule short meetings with me or your TA if you need help drafting, organizing, or revising your proposal.

- KEEP IT CLEAR, CONSISTENT, COMPLETE, & COMPELLING – Start with your major research question and then decide on the "take-home" message of the proposal. Don't be afraid to repeat yourself, especially as you try to tie all of your specific aims and methodologies back to your central research question. Likewise, don't make me hunt for important content: highlight/bold key hypotheses, techniques, or research questions. Finally, avoid unhelpful use of jargon, buzzwords, acronyms, clichés, or distracting prose which does not aid clear, precise communication of your ideas.

MIDTERM & FINAL EXAMS (30%)

We will be using Canvas to administer all exams in this course. The **midterm exams** (**Tuesday, Oct. 6, 2020 & Tuesday, Nov. 3, 2020**) and final exam (date TBD) will cover all material immediately prior to the date of the exam (e.g., second midterm and final are not comprehensive). You can begin the exam at any time from 2-5pm (3-hour window to start the exam; must complete exam by 5pm). Once you access the exam, you will have 60 minutes* to answer all questions. You are expected to know material from class lectures as well as assigned research reviews and discussion group articles. Some examination questions will come exclusively from pre-recorded lectures, some will come exclusively from your reading, and some will come from material that has been covered in multiple formats (e.g., class and reading). Examination questions will come extensively from lecture learning objectives, quizzes, and *Study Questions* at the end of each lecture. The format of the examinations will be multiple choice and short answer/essays administered online via Canvas. The final examination will have the same format. The final exam (date TBD) will have questions from course material covered after the second midterm exam (i.e. final exam is NOT comprehensive).

Exams will be "open book" (i.e., you may use your notes/readings). HOWEVER, I believe trying to look up each question as you go will have a negative impact on your ability to complete the exam in the allotted time. Go through and answer as many questions as you can without your notes/textbook. You can mark questions you'd like to review by clicking the tab to the left of the question. *We will not be utilizing Lockdown Browser or Proctorio, so there is no need to download any software in order to take the midterm/final exams. **I expect each of you to help maintain the integrity of examinations and I will be using Canvas's monitoring/logging software to ensure fairness and accountability.***

Please contact me IMMEDIATELY via e-mail (parker.holman@ubc.ca) if you have technical difficulties during an exam. The exam timer will NOT pause if you lose internet access, so I will need to know about your issue ASAP to make sure you receive the full allotted time for the exam. In a worst-case scenario, I will arrange for an alternative option to support any students who are unable to complete the exam via Canvas during the exam administration window (e.g., in-person testing at the Life Science Centre on an alternate date).

You should let me know **as soon as** you realize you might miss an exam. You will be able to take a missed examination only if you have a compelling reason for your absence during the exam – please refer to the *Departmental Policy on Missed Tests and Extensions* (below) for more information. *Make-up exams will consist of an oral exam to be conducted by me in the presence of the teaching assistant.*

* If you are registered with the Centre for Accessibility for exam accommodations (e.g., extended time), this will be automatically programmed.

COURSE SCHEDULE AT A GLANCE

WEEK	ASYNCHRONOUS LEARNING (PRE-RECORDED MINI-LECTURES)	VIRTUAL OFFICE HOURS & STUDENT Q&A	SYNCHRONOUS LEARNING MEETINGS	• ASSESSMENTS ○ DUE DATE
1	Intro to Behavioural Neuroendocrinology 1. Brief History of Behavioural Neuroendocrinology 2. Intro to Hormones & Behaviour Reading: Becker JB & Breedlove SM. (2002). Introduction to behavioral endocrinology. Becker, J. B., Breedlove, S. M., Crews, D., & McCarthy, M. M. (Eds.). Behavioral endocrinology (2nd ed.). Cambridge, MA, US: MIT Press.	**T Sept. 8** No Office Hours – UBC Imagine Day	**Th Sept. 10** Course Welcome & Overview	• Syllabus Module ○ Sept. 10, 2pm • Lecture quizzes
2	Endocrine Systems 1. Hormone Classes, Receptors, & Actions 2. Signal Transmission 3. Neuroendocrine Axes & Feedback Mechanisms Reading: Becker JB & Breedlove SM. (2002). Introduction to behavioral endocrinology. Becker, J. B., Breedlove, S. M., Crews, D., & McCarthy, M. M. (Eds.). Behavioral endocrinology (2nd ed.). Cambridge, MA, US: MIT Press.	**T Sept. 15** Questions to Ponder: • Compare/contrast oxytocin, LH, and estrogen? ○ Chemical structure, release mechanism, receptor location, etc. • What are the differences between negative and positive feedback? • How do peptide hormones differ from steroid hormones? How are they similar?	**Th Sept. 17** Writing Workshop I: Research Proposal Overview	• Lecture quizzes
3	Stress I 1. Stress Overview 2. Hypothalamic-Pituitary-Adrenal (HPA) Axis vs. Sympatho-adreno-medullary (SAM) System 3. Glucocorticoid Receptors & Limbic-HPA Circuitry Reading: Panagiotakopoulos L, Neigh GN. (2014). Development of the HPA axis: Where and when do sex differences manifest? Frontiers in Neuroendocrinology. 35(3):285–302.	**T Sept. 22** Questions to Ponder: • What is the difference between "stress" and a "stressor"? What is the function of stress? • How do the actions of the SAM system compare with those of the HPA axis? How do these systems interact? • Is stress good or bad? Why or why not?	**Th Sept. 24** Writing Workshop II: Journal Article Critique Discussion Paper: Palumbo MC, Dominguez S, Dong H. (2020). Sex differences in hypothalamic-pituitary-adrenal axis regulation after chronic unpredictable stress. Brain and Behavior. 10(4):e01586.	• Lecture quizzes • Reading quiz ○ Sept. 24, 2pm • Research Proposal Topic Selection ○ Sept. 25, midnight

WEEK	ASYNCHRONOUS LEARNING (PRE-RECORDED MINI-LECTURES)	VIRTUAL OFFICE HOURS & STUDENT Q&A	SYNCHRONOUS LEARNING MEETINGS	• ASSESSMENTS ○ DUE DATE
4	Stress II 1. Acute and Chronic Effects of Stress 2. Stress System Development 3. Sex Differences in Stress Physiology Reading: Panagiotakopoulos L, Neigh GN. (2014). Development of the HPA axis: Where and when do sex differences manifest? Frontiers in Neuroendocrinology. 35(3):285–302.	**T Sept. 29** Questions to Ponder • What are the effects of acute vs. chronic stress on physiology/behaviour? • How does the HPA axis function similarly/differently in males vs. females? Neonates vs. adolescents vs. adults?	**Th Oct. 1** Neuroendo Research Methods Group Activity Review Session	• Lecture quizzes
5	MIDTERM I Test will cover content from weeks 1-4	**T Oct. 6** No Office Hours due to Midterm I	**Th Oct. 8** Writing Workshop III: Constructing Specific Aims	
6	Sex Differences in Development 1. Sex & Gender 2. Sexual Determination & Differentiation 3. Organizational/Activational Hypothesis Reading: McCarthy MM. (2017). Sex and the Developing Brain Second Edition. Colloquium Series on The Developing Brain (Vol. 6). Morgan & Claypool Life Sciences. Chapters 1-6, 8, & 11	**T Oct. 13** Questions to Ponder • Can we study gender effects in rodents? • What are some ways that sex is determined? ○ Is female development the "default"? Why or why not? • How could a researcher determine if a specific behaviour was activated but not organized? Organized but not activated?	**Th Oct. 15** Discussion Group Discussion Paper: Martini M, Irvin JW, Lee CG, Lynch WJ, Rissman EF. (2020). Sex chromosome complement influences vulnerability to cocaine in mice. Hormones and Behavior. 125:104821.	• Lecture quizzes • Reading quiz ○ Oct. 15, 2pm • *Journal Article Critique* ○ Oct. 15, 2pm
7	Adolescent Development 1. Neuroendocrinology of Puberty 2. Menstrual/Estrous Cycles 3. Adolescence as a Sensitive Period Readings: McCarthy MM. (2017). Sex and the Developing Brain Second Edition. Colloquium Series on The Developing Brain (Vol. 6). Morgan & Claypool Life Sciences. • Chapter 7 Schulz KM, Molenda-Figueira HA, Sisk CL. (2009). Back to the future: the organizational–activational hypothesis adapted to puberty and adolescence. Hormones and Behavior. 55(5): 597–604.	**T Oct. 20** Questions to Ponder • How do the hypothalamic-pituitary-gonadal (HPG) axes function in females versus males? • Is adolescence a developmental "sensitive" period? Why or why not? • Do you agree with the statement "Adolescents are simply immature adults"? Why or why not?	**Th Oct. 22** Discussion Group Discussion Paper: Sircar R. (2019). Estrogen modulates ethanol-induced memory deficit in postpubertal adolescent rats. Alcoholism: Clinical and Experimental Research. 43(1): 61–68.	• Lecture quizzes • Reading quiz ○ Oct. 22, 2pm • *Journal Article Critique* ○ Oct. 22, 2pm

WEEK	ASYNCHRONOUS LEARNING (PRE-RECORDED MINI-LECTURES)	VIRTUAL OFFICE HOURS & STUDENT Q&A	SYNCHRONOUS LEARNING MEETINGS	• ASSESSMENTS ○ DUE DATE
8	Sex Differences in Behaviour 1. Biological Foundations of Sex Differences 2. Methods to Study Sex Differences 3. Overview of Sex & Gender Differences in Brain & Behaviour Readings: McCarthy MM. (2017). Sex and the Developing Brain Second Edition. Colloquium Series on The Developing Brain (Vol. 6). Morgan & Claypool Life Sciences. • Chapters 13-17 Shansky RM (2019). Are hormones a "female problem" for animal research? Science 364(6443): 825–826.	**T Oct. 27** Questions to Ponder • What are advantages and disadvantages of animal models for understanding sex/gender differences in behaviour? • What are some behavioural differences between women and men that may arise from neuroendocrinological differences? • If a behaviour more typically observed in men, how can we determine if it arises from sex differences versus from gender differences?	**Th Oct. 29** Discussion Group Discussion Paper: Koss WA, Frick KM. (2019). Activation of androgen receptors protects intact male mice from memory impairments caused by aromatase inhibition. Hormones and Behavior 111: 96–104.	• Lecture quizzes • Reading quiz ○ Oct. 29, 2pm • *Journal Article Critique* ○ Oct. 29, 2pm
9	MIDTERM II Test will cover content from weeks 6-8	**T Nov. 3** No Office Hours due to Midterm II	**Th Nov. 5** Writing Workshop IV: Canvas Peer Review Tutorial	• Annotated Bibliography ○ Nov. 6, midnight
10	Social Behaviour 1. Social Recognition & Play Behaviour 2. Oxytocin & Vasopressin Readings: Johnson ZV, Young LJ. (2017). Oxytocin and vasopressin neural networks: Implications for social behavioral diversity and translational neuroscience. Neuroscience and Biobehavioral Reviews. 76(PA):87–98.	**T Nov. 10** Questions to Ponder • What is the evidence that oxytocin and vasopressin are involved in social behaviour?	**Th Nov. 12** Research Proposal Q&A (*Optional*)	• Lecture quizzes • 1-page Abstract w/ Specific Aims ○ Nov. 13, midnight
11	Parental Behaviour & Attachment 1. Maternal & Paternal Behaviour 2. Parental Hormones & Neurocircuitry 3. Animal Models of Attachment 4. Neuroendocrine Mechanisms of Attachment Readings: Rilling JK, Young LJ. (2014). The biology of mammalian parenting and its effect on offspring social development. Science. 345:771–776.	**T Nov. 17** Questions to Ponder • What are the neuroendocrine factors that contribute to maternal behavior in rats? ○ Are these factors the same for humans? • How might maternal behaviour be passed down across generations non-genomically? • What neurobehavioural influences does a rat mother have on her pups?	**Th Nov. 19** Writing Workshop V: Peer Review Consultations	• Lecture quizzes • Peer Reviews ○ Nov. 19, 2pm

WEEK	ASYNCHRONOUS LEARNING (PRE-RECORDED MINI-LECTURES)	VIRTUAL OFFICE HOURS & STUDENT Q&A	SYNCHRONOUS LEARNING MEETINGS	• ASSESSMENTS ○ DUE DATE
12	Neuroimmune System 1. Stress and Neuroinflammation 2. Cytokines 3. Microbiome Reading: da Cruz-Pereira J, Rea K, Nolan YM, O'Leary OF, Dinan TG, Cryan JF. (2020). Depression's Unholy Trinity: Dysregulated Stress, Immunity, and the Microbiome. Annual Review of Psychology. 71(1): 49–78.	**T Nov. 24** Questions to Ponder • How does the immune system interact with neuroendocrine systems? Evidence? • What is the "neuroimmune system" and how does it impact brain development and function? • What is the microbiome and how is it related to neuroimmune and neuroendocrine function?	**Th Nov. 26** Research Proposal Q&A (*Optional*)	• Lecture quizzes
13	Developmental Origins of Health & Disease (DOHaD) 1. DOHaD History & Barker Hypothesis 2. Fetal Programming of HPA Axis 3. Early Adversity & Mental Health Outcomes Readings: Bale TL. (2015). Epigenetic and transgenerational reprogramming of brain development. Nature Reviews Neuroscience.16(6):332–344.	**T Dec. 1** Questions to Ponder • What potential mechanisms might support fetal programming – how does the early environment "get under the skin" of an individual and increase vulnerability to later-life health problems? • Speculate how resilience operates within the context of DOHaD – how might an individual thrive later in life despite suboptimal prenatal environment?	**Th Dec. 3** Review for Final Exam	• Lecture quizzes • Final Research Proposal ○ Dec. 4, midnight
	FINAL EXAM (Date TBD) **Test will cover content from weeks 10-13**			

A more detailed description of course topics/themes, reading assignments, and key ideas can be found in the *Course Outline* document posted on Canvas.

STRATEGIES FOR OPTIMIZING LEARNING

This section has some general strategies for optimizing learning not only in this class, but for all of your courses at UBC. Originally published in the journal Perspectives on Psychological Science, these tips are backed by research in the cognitive sciences (Putnam et al. 2016). I've made a few modifications and additions based on my past teaching experience, and I encourage you to consider adopting some of these strategies – if you aren't using them already – to help you get the most out of this course and your university experience.

SPACE OUT YOUR LEARNING

- Study for a little bit every day, rather than cramming in one long session.
- Start studying early, and touch on each topic during each study session.
- Reading before class and reviewing lecture notes after class will help consolidate what was covered in class.

LEARN MORE BY TESTING YOURSELF

- Instead of writing a chapter summary as you read, write down what you remember after you read, recalling the details from memory. Then, check to see how well you did (the read-recite-review method).
- Answer the *Study Questions* (found on Course Outline on Canvas) both before and after you read a chapter to help you connect new information with what you already know.
- Use flash cards to learn key vocabulary. Retrieve the idea from memory (before looking at the answer) and use a larger (rather than a smaller) stack of cards. Put answers you missed back in the deck at an early place and the ones you got right at the end. Finally, aim to recall each item correctly multiple times before taking a card out of the deck.
- Be skeptical about what you think you know—testing yourself can provide a better picture about which concepts you know well and which you might need to study further.

GET THE MOST OUT OF YOUR CLASS SESSIONS

- Attend every class session.
- Stay focused during class by closing all programs on your computer other than what you use to take notes and turn off notifications (or, simply leave your laptop at home); you'll avoid distracting yourself and your classmates and will make it easier for you to actively engage with the lesson.
- Ask questions when you don't understand something – chances are someone else in the class has the same question and you'll save everyone time by dealing with the confusion in the moment.
- *Don't write down every single word* – focus on key words, prioritize new information, and summarize main ideas

BE AN ACTIVE READER

- Instead of speeding through your reading, slow down and aim for understanding.
- Ask yourself questions as you read, such as, "What did I learn on this page?" and "What on this page is new to me?"
- Annotate graphs and figures in your own words.
- Finally, write some of your own questions about tricky concepts: "What is an example of X in real life?" or "How is Theory X different from Theory Z?"

OTHER GENERAL TIPS.

- Get organized early in the semester: Put major due dates and exams on your calendar, set reminders to get start studying early, and be sure to look at your calendar at least once a week so you can plan ahead.

- Get some exercise. Going for a 50-min walk in nature can enhance your ability to focus on difficult tasks.

- Sleep! Sleeping is critical for ensuring that memories are successfully stored in long-term memory.

- Be proactive about stress and anxiety – it's important to find healthy ways to cope. Reach out to a trusted friend, professor (like me), or your TA if you're having problems (early & often). Please visit https://students.ubc.ca/health for resources available to you as a UBC student.

ADDITIONAL INFORMATION AND RESOURCES

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 (https://senate.ubc.ca/policies-resources-support-student-success).

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, & Zoom/Collaborate Ultra. 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, track your progress in order to provide you with personalized feedback, review statistics on course content being accessed to support improvements in the course, track participation in discussion forums, and assess your participation in the course.

COPYRIGHT & AUDIO/VIDEO RECORDING POLICY

All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the Course Instructor or licensed to be used in this course 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 may request permission to record any lectures or other formal teaching sessions. All such requests should be made in writing (including by email) prior to the lecture course or equivalent, to the instructor. The decision on whether to grant permission is at the discretion of the instructor; recording a lecture also requires the observation of privacy guidelines and regulations for students in the class whose presence or statements might also be recorded. Students may only record lectures where the instructor for the session has given their consent prior to the start of the lecture in writing (e.g. by email), and students may not make recordings of lectures unless this consent has been given. Retrospective requests are not permissible under this policy and covert recording of lectures will be treated as a disciplinary offence. Recordings of lectures or other formal teaching sessions may only be made for the personal and private use of the student. As such, students may not publish such recordings in any form (this includes, but is not limited to, the internet and hard copy publication). Students creating unauthorized recording violate an instructor's intellectual property rights and the Canadian Copyright Act and will be subject to disciplinary actions.

DEPARTMENTAL POLICY ON MISSED TESTS AND EXTENSIONS

For first occurrences of an acute illness likely to be quickly resolved without seeing a health professional, a self-declaration will suffice (more info available at https://www.arts.ubc.ca/degree-planning/academic-performance/academic-concession/). Health professionals are not able to provide meaningful reports for students who have not been under their care prior to the illness. ***Make-up exams will consist of an oral exam to be conducted in the presence of the professor and the teaching assistant.*** You will receive THREE 1-Day-Late Passes (no request necessary). Use them all at once (3 days for one assignment/deadline), or separate (e.g., 1 day each for 3 assignments/deadlines). After those three days have been used, standard 5% per day deductions will apply (except in emergency circumstances). In the interest of fairness to your classmates and to allow sufficient time to evaluate thoroughly research proposals, NO extensions beyond the max 3-day 24-hr extensions for the research paper will be given past the due date except in *exceptional* circumstances. Papers submitted after midnight on Dec. 4 will be penalized 5% per calendar day. Late papers will not receive credit after Dec. 11.

PSYCHOLOGY DEPARTMENT'S POSITION ON 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. In the first place, the Department has implemented software that can reliably detect cheating on multiple-choice exams by analyzing the patterns of students' responses. In addition, the Department subscribes to TurnItIn.com – a service designed to detect plagiarism. All materials (term papers, lab reports) that students submit for grading will be scanned and compared to over 4.5 billion pages of content located on the Internet or in TurnItIn's own proprietary databases. The results of these comparisons are compiled into customized "Originality Reports" containing several sensitive measures of plagiarism; instructors receive copies of these reports for every student in their class.

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 or plagiarism 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.

All graded work in this course, unless otherwise specified, is to be original work done independently by individuals. If you have any questions as to whether or not what you are doing is even a borderline case of academic misconduct, please consult your instructor. For details on pertinent University policies and procedures, please see Chapter 5 in the UBC Calendar (http://www.calendar.ubc.ca/vancouver/index.cfm).

SPECIAL ACCOMODATIONS

The University accommodates students with disabilities who have registered with the **Centre for Accessibility**. The University accommodates students whose religious obligations conflict with attendance, submitting assignments, or completing scheduled tests and examinations. Please let your instructor know in advance, preferably in the first week of class, if you will require any accommodation on these grounds. Students who plan to be absent for varsity athletics, family obligations, or other similar commitments, cannot assume they will be accommodated, and should discuss their commitments with the instructor before the drop date. 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.

EXAM REVIEW

Students have the right to view their marked examinations with their TA, providing they apply to do so within a month of receiving their final grades. This review is for pedagogic purposes. The examination remains the property of the University.

UBC & PSYCHOLOGY DEPARTMENT'S POLICY ON GRADE DISTRIBUTIONS AND SCALING

Faculties, departments and schools reserve the right to scale grades in order to maintain equity among sections and conformity to university, faculty, department or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department or school. Grades are not official until they appear on a student's academic record.

In order to reduce grade inflation and maintain equity across multiple course sections, all psychology courses are required to comply with departmental norms regarding grade distributions. According to departmental norms, the mean grade in a 400-level class is 70 for a good class, 68 for an average class, and 66 for a weak class, with a standard deviation of 13). The corresponding figures for 100- and 200-level Psychology courses are 67, 65, and 63, with a standard deviation of 14. Scaling is likely to be used in order to comply with these norms; grades may be scaled up or down as necessary by the professor or department.

ADDITIONAL INFORMATION

Further information about academic regulations, course withdrawal dates and credits can be found in the University Calendar. You are encouraged to read this material. If you run into trouble and need information about studying, preparing for exams, note taking or time management, free workshops and advice are available from the Student Resources Centre, which can be reached through the School and College Liaison Office at 822-4319 and from Student Success, http://www.students.ubc.ca/success/.

SYLLABUS REFERENCES

Cargill M, O'Connor P. (2013). Writing scientific research articles: Strategy and steps (2nd ed.). West Sussex, UK: Wiley-Blackwell.

National Institutes of Health [NIH]. (2017). SF424 (R&R) Application Packages. Retrieved from https://grants.nih.gov/grants/how-to-apply-application-guide/forms-d/fellowship-forms-d.pdf

Putnam AL, Sungkhasettee VW, Roediger HL. (2016). Optimizing learning in college: Tips from cognitive psychology. *Perspectives on Psychological Science.* 11(5):652-660.

Rawn CD. (2020). PSYC 417A Section 921 Seminar in Applied Psychology of Teaching and Learning Course Syllabus 2020 – V3. The University of British Columbia, Vancouver Canada. Retrieved from http://blogs.ubc.ca/catherinerawn.

Richmond AS. (2016). Constructing a learner-centered syllabus: One professor's journey. *IDEA, #60*, 1-14.

Skene A, Fedko S. Assignment scaffolding. Retrieved from https://www.utsc.utoronto.ca/technology/assignment-scaffolding

Stanford Teaching Commons. (n.d.). Designing effective discussion questions. Retrieved from https://teachingcommons.stanford.edu/resources/teaching/student-teacher-communication/designing-effective-discussion-questions