

PSY290H5S – Introduction to Neuroscience

Monday 3:00pm – 6:00pm

Room Location: KN 137 (Kaneff Centre)

Contact Information

Dr. Brett Beston
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Office Hours:
Wednesday 1-2pm
(Deerfield Hall, 4010)

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Course Description

The human brain is made up of billions of cells and trillions of connections that give rise to our ability to perceive, act, think, and learn. Neuroscience, the scientific exploration of the brain, is beginning to unravel how this amazing structure works. In this course, you will learn the fundamental anatomical organization and physiological properties of the brain. You will develop a greater understanding of the organization of major features of the brain, how neurons communicate, perceive, and learn. **Exclusion:** PSY290H1/PSYB64H3

LEARNING OBJECTIVES

By the end of this course, students should be able to;

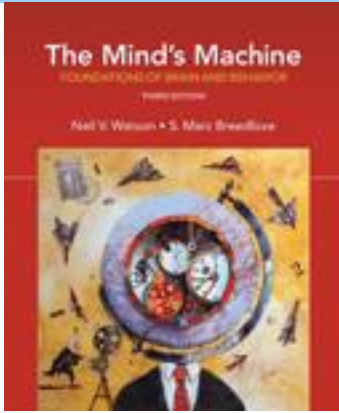
- **Identify** and **distinguish** anatomical, cellular, and functional features of the brain.
- **Explain** how neurons propagate information and communicate to other neurons.
- **Describe** the process of development
- **Explain** the neurobiological basis of learning and memory.
- **Analyze** how neuroscience findings are interpreted and communicated to broad audiences.
- Use scientific sources to critically **evaluate** neuroscience claims
- **Connect** foundational principles of neuroscience to modern-day, real-world applications.

CLASS FORMAT

Classes will consist of one 3-hour lecture each week. Please plan to attend lectures. Lecture slides will be posted on Portal before class. Recordings of may be posted after lecture. **PLEASE NOTE:**

- *Simply reviewing the posted lecture notes **will not** provide you with all the details discussed in lecture, and more importantly, a contextual framework of the material that we are learning about.*
- *Although lectures will be recorded for your benefit, **do not** rely upon recordings as your main point of contact with the course, or to supplement your attendance. In some unfortunate instances, lecture recordings will fail due to software or user error. As your instructor, I simply cannot guarantee that lecture recordings will be provided each week.*

Reading Material



The Mind's Machine: Foundations of Brain and Behavior by Watson & Breedlove, third edition, 2018, OUP. ISBN: 9781605357300.

The text is available in **digital format** for purchase or 6-month subscription access.

Readings: Students are encouraged to use the assigned readings to facilitate and extend knowledge acquired in class. Pay close (but not exclusive) attention to the material that overlaps with the lecture material. **PLEASE NOTE: TESTS WILL INCLUDE MATERIAL PRESENTED FROM BOTH LECTURE AND ASSIGNED READINGS.**

(note: The 2nd edition may also be used and assigned pages are also provided on Quercus)

Course Evaluation

Tests and Exams (70%)

Term Test 1 - 20%

Term Test 2 - 20%

(Examination period) Final Exam - 30%

Term tests and final exam will be based on the material from the textbook, lectures and additional reading (if they are assigned). The term test and the final exam will consist of multiple-choice questions, shorter and longer questions as well as diagrams requiring you to label parts of the brain (based on lectures and textbook). The shorter and longer questions will require students to recite information but also integrate knowledge analytically.

Although the **term tests** will not be explicitly cumulative (i.e., they will specifically ask questions from chapters covered during that section of the test (see course calendar), term test 2 will require students to have a foundation of knowledge from the first portion of the course. However, **the final exam will be cumulative.**

Scientific Literacy Activities (22%)

Neuroscience in the media: Convincing you with science - 8%

Neuroscience in the media: a critical analysis – 14%

This course will include guided writing activities encouraging students to explore neuroscience related research, and the general implications of this research to the public. The goal is to encourage students to develop the ability to think critically about writing and develop scientific literacy skills that will become ever more critical to your academic development. Please see the “course outline” table at the end of this syllabus for the due dates of both assignments.

These assignments will ask you to apply neuroscience-related knowledge to explore a neuroscience headline that has been presented in the media (e.g., “*A cheese sandwich is all you need for strong decision making*”). **Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism.** In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

The Robert Gillespie Academic Skill Centre will be available to provide support for your assignment. Please click here for the [RGASC drop in hours](#).

Course 'Engagement' Credit (CEC, up to a MAXIMUM 8%).

Students will receive credit for participating in course related activities. The list below outlines different ways that YOU can participate to earn course engagement credit. **Students select which activities they choose to contribute to (or not) up to a maximum of 8% towards your final grade!**

***Course Engagement Credit (CEC) must be completed by the last day of classes*.**

Ways to Participate:

Neuron participation 'easter egg' = 1%

Thank you for reviewing the course syllabus within the first three weeks of the semester! To receive 1% CEC, please [email me](#) one (1) of Santiago Ramón y Cajal's drawings of neurons, (2) identify/name one neuron depicted in the image, (3) describe one interesting feature of that neuron (e.g., is it only found in one part of the brain? ...or... What kind of activity is it involved in? ...or... Is it implicated in a type of neurological disorder? ...or... etc.?).

Your email should be sent prior to the beginning of the second class for participation credit.

Participate in PSY290 Peer Facilitated Study Group (FSG) sessions = 4%

Peer Facilitated Study Groups is joint program between the Robert Gillespie Academic Skills Centre and Instructors. Study groups use our COURSE CONTENT as a CONTEXT for focusing on study skills development. Group study sessions are led by volunteer senior students... who have previously been successful in our course... and who receive extensive training in active and collaborative learning strategies that they use in weekly sessions to help students be successful in our courses, by doing things like;

- comparing and reviewing study notes;
- discussing and clarifying concepts with peers;
- developing and evaluating study strategies;
- preparing for tests and exams

The dates and times of FSG sessions will be announced within the first few weeks of class

- Attendance and participation in 4 or more FSG sessions will be given 4% credit.
- Attendance and participation in 2-4 FSG sessions will be given 2% credit.
- Attendance and participation in 1 FSG session will be given 1% credit.

Participate in our weekly in class questions = 4%

****Please note****: A purchase of Top Hat software is required to participate in these activities.

Answer questions during class and earn credit for doing so! There will be nine classes with Top Hat activities over the course of the term. Credit will be assigned based on attendance and participation (**NOT** the number of questions in each class or by the 'correctness' of responses provided). You can earn participation credit by responding to at least one question per class. Students must be in attendance during the lecture to participate in Top Hat activities.

- Participation in 7-9 classes will be given 4% credit.
- Participation in 5-6 classes will be given 3% credit.
- Participation in 4 classes will be given 2% credit.
- Participation in 3 or fewer classes will not receive in-class participation credit.

Help-a-Peer (1% each, up to 2% per week, to a maximum of 4% over the term).

Students who provide an excellent, original answer on the Portal discussion forum, in response to another student's question regarding course material, will earn credit for their response. An excellent answer is one that correctly and articulately explains a conceptually challenging topic. The answer is original if no similar answer has been provided.

Participate in a peer review using peerScholar = 4%

In conjunction with the Scientific Literacy Activities, you will be provided with two opportunities to review the work of other students and provide helpful suggestions to improve the quality of the work of others (and your own) prior to the submission of your assignment for grading. You will be asked to provide helpful feedback on effective writing communication, presentation of evidence, and discipline specific formatting (using the APA conventions). There will be 2 opportunities during the term, **2% for each participation**.

Participate in Integrative feedback activities (maximum of 4%).

Getting feedback at the end of the course is great (...for me), but getting your perspectives *during* the course is substantially more valuable to both of us. During the term, I will be asking for input on your perceptions of the course and writing assignments. You can earn 1-2% for participating in each questionnaire. Please note, there may be less than 4 questionnaires during the semester and you may not be able to earn a full 4% from this category alone.

You can participate in any combination of CEC activities over the term. For example, consider the following two different approaches that students could take:

Student 'A' could participate by (1) answering 4 questions on our discussion forums over the course of the term (that's 4% CEC right there!) and (2) participate in two peerScholar reviews (another 4% towards CEC). In this case, 4% from discussion forums plus 4% from peerScholar would earn student 'A' the full 8% over the course of the term. This example highlights that a student potentially only needs to participate in two activities to earn the full 8% credit.

Alternatively, **Student 'B'** might decide to participate in 2 FSG sessions (2% CEC), 2 integrative feedback activities (2% CEC), 1 peerScholar activity (2% CEC), and answer 2 discussion question on Portal (2% CEC). In this case, 2% + 2% + 2% + 2% = 8% CEC. Although the approach taken by student 'B' is a little different, she/he would still earn the full 8% CEC credit at the end of term. This example highlights that any combination of activities can contribute to earning the full credit required in the course.

Course Webpage

The website associated with this course is accessible via <http://q.utoronto.ca>

Note: You don't need to create a new login for Quercus; it already knows who you are. You just need your UTORid and password. This is the same login that gets you onto the wireless network with your laptop, and the same one that you use to check your email. If you're confused about your UTORid or don't remember your password, go to: <https://www.utorid.utoronto.ca/>

In order to access course material, monitor course information, and view your grades you must log into Quercus. If you have any general questions regarding Quercus, please visit the following help site:

<https://q.utoronto.ca/courses/46670/pages/student-quercus-guide>

IMPORTANT COURSE POLICIES **PLEASE READ**

Missed Test Special Consideration Request Process

Students who miss a test due to circumstances beyond their control (e.g. illness or an accident) can request that the Department grant them special consideration. Students must present their case to the Department (NOT the Instructor) by submitting a request via the online Special Consideration Request form at:

<https://utmapp.utm.utoronto.ca/SpecialRequest>.

Students are to submit original supporting documentation (e.g., medical certificates, accident reports, etc.) to the Psychology Academic Counselor or drop it in the drop box located outside the Psychology office, Deerfield Hall, 4th Floor.

Students have up-to one week from the date of the missed test to submit request. Late submissions will NOT be considered without a letter of explanation specifying and documenting the reasons for the lateness.

Medical certificates or physician's notes must be completed by the Physician and MUST include the statement "This Student [name] was unable to write the test on [date(s)] for medical reasons". This documentation must show that the physician was consulted within one the day of the missed term test. A statement merely acknowledging a report of illness made by the student to the physician is NOT acceptable. For further information on this procedure please see:

<http://www.utm.utoronto.ca/psychology/undergraduate-studies/missed-testslate-submissions>

If you missed your test/assignment deadline for a reason connected to your registered disability, please be advised that the department will accept documentation supplied by the UTM AccessAbility Resource Centre.

IMPORTANT: The Department of Psychology verifies the authenticity of medical certificates by contacting medical offices. Students are NOT to make any changes or alteration to completed medical certificates. Students who submit forged or altered documentation are subject to severe academic penalties.

If your request is approved by the department, the value of the test will be redistributed to the final examination.

Extension of Time Special Consideration Request Process

Students who seek to be granted more time to complete their term work beyond the due date without penalty, owing to circumstances beyond their control (e.g., illness, or an accident), must do so by submitting a request directly to the Instructor for the period up to and including the last day of the term. The decision as to whether or not to apply a penalty for the specified period rests with the Instructor.

Students who seek to be granted more time to complete term work beyond the last day of the term must submit their request directly to the Department. This request covers the period following the last day of classes and ends the last day of the exam period. This is done by submitting a request via the online Special Consideration Request form at <https://utmapp.utm.utoronto.ca/SpecialRequest>.

You are advised to seek advising by the departmental Undergraduate Counsellor prior to the deadline.

Original supporting documentation (e.g., medical certificates, accident reports, etc.) must be submitted to the Psychology Academic Counselor or dropped off in the drop box located outside the Psychology office Deerfield Hall, 4th Floor. Students are expected to submit requests to the Department before the last day of the term, unless demonstrably serious reasons prevent them from doing so. In the event of an illness, medical certificates or doctor's notes must confirm that student was ill on the due date of the assignment (for a one-day extension). For a longer extension, documentation must specify the full duration during which academic work could not be carried out.

For extensions of time beyond the examination period you must submit a petition through the Office of the Registrar.

<http://www.utm.utoronto.ca/registrar/current-students/petitions> .

Penalties for Lateness

A penalty of 10% per calendar day (i.e., including week-ends and holidays, during which students are not able to submit term work) up to and including the last day of classes, will be applied by the Instructor. After the last day of classes, the penalty of 10% per calendar day will be applied by the Undergraduate Counsellor on behalf of the Department. No penalty will be assigned if request for special consideration, described above, was successful.

Academic Guidelines

It is your responsibility to ensure that you have met all prerequisites listed in the UTM Calendar for this course. If you lack any prerequisites you WILL BE REMOVED from the course up until the last day to add a course. Further information about academic regulations, course withdrawal dates and credits can be found in the University of Toronto Mississauga Calendar at: <http://www.erin.utoronto.ca/regcal/>.

You are encouraged to read this material. If you run into trouble and need advice about studying, preparing for exams, note taking or time management, free workshops and advice are available from the Robert Gillespie Academic Skills Centre at 905-828-5406.

AccessAbility Services

Students requiring academic accommodations for learning, physical, sensory, or mental health disabilities or medical conditions should contact the AccessAbility Office (2037B Davis Building), 905-828-3847.

<http://www.utm.utoronto.ca/accessability/>

Academic Honesty and Plagiarism

Honesty and fairness are considered fundamental to the university's mission, and, as a result, all those who violate those principles are dealt with as if they were damaging the integrity of the university itself. When students are suspected of cheating or a similar academic offence, they are typically surprised at how formally and seriously the matter is dealt with -- and how severe the consequences can be if it is determined that cheating did occur. The University of Toronto treats cases of cheating and plagiarism very seriously. Please take the time to review the Academic Integrity website:

<http://www.utm.utoronto.ca/academic-integrity/students>.

- Common trends in academic offences:
- Plagiarizing/concocted references
- Collaboration/unauthorized assistance
- Purchasing work
- Recycling work - "double-dipping"
- Resubmitting of altered work for re-grading
- Electronic devices (cell phones) or any unauthorized aids
- Altering medical certificates and UofT documents

From the Code of Behaviour on Academic Matters: "It shall be an offence for a student to knowingly: represent as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e. to commit plagiarism. Wherever in the Code an offence is described as depending on "knowing", the offence shall likewise be deemed to have been committed if the person ought reasonably to have known." All students must refer to this website to obtain information on what constitutes plagiarism. <http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize> .

If questions arise after reading the material on the website, consult your instructor. **Plagiarism will not be tolerated.**

Equity Statement

The University of Toronto is committed to equity and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect. As a course instructor, I will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment and hate speech will not be tolerated. If you have any questions, comments, or concerns you may contact the UTM Equity and Diversity officer at edo.utm@utoronto.ca or the University of Toronto Mississauga Students' Union Vice President Equity at vpequity@utmsu.ca.

Academic Rights

You, as a student at UTM, have the right to:

- Receive a syllabus by the first day of class.
- Rely upon a syllabus once a course is started. An instructor may only change marks' assignments by following the University Assessment and Grading Practices Policy provision 1.3.

- Refuse to use turnitin.com (you must be offered an alternative form of submission).
- Have access to your instructor for consultation during a course or follow up with the department chair if the instructor is unavailable.
- Ask the person who marked your term work for a re-evaluation if you feel it was not fairly graded. You have up to one month from the date of return of the item to inquire about the mark. If you are not satisfied with a re-evaluation, you may appeal to the instructor in charge of the course if the instructor did not mark the work. If your work is remarked, you must accept the resulting mark. You may only appeal a mark beyond the instructor if the term work was worth at least 20% of the course mark.
- Receive at least one significant mark (15% for H courses, 25% for Y courses) before the last day you can drop a course for H courses, and the last day of classes in the first week of January for Y courses taught in the Fall/Winter terms.
- Submit handwritten essays so long as they are neatly written.
- Have no assignment worth 100% of your final grade.
- Not have a term test worth 25% or more in the last two weeks of class.
- Retain intellectual property rights to your research.
- Receive all your assignments once graded.
- View your final exams. To see a final exam, you must submit an online Exam Reproduction Request within 6 months of the exam. There is a small non-refundable fee.
- Privacy of your final grades.
- Arrange for representation from Downtown Legal Services (DLS), a representative from the UTM Students' Union (UTMSU), and/or other forms of support if you are charged with an academic offence.

If questions arise after reading the material on the website, consult your instructor.

Please note that this outline is subject to change depending on the needs of the class (we may need additional time to cover a topic). Any changes to the syllabus will be announced in class one week before. However, the assignment and test dates are fixed.

Course Outline

Week	Topic	Notes
1 January 6th	Introduction, to Brain and Behaviour (Assignment 1 – Neuroscience in the Media)	Chapter 1 (read pages 2-10)
2 January 13th	Cells and Structure: The Anatomy of the Nervous System	Chapter 2 (read 30, 34-43)
3 January 20th	Micro Anatomy and Neural Transmission DUE: Assignment 1 – Neuroscience in the Media)	Chapter 2 and 3 (read 22-29, 52-54)
4 January 27th	TEST 1	
5 February 3rd	Graded Potentials and Action Potentials (Assignment 2 – Neuroscience in the Media)	Chapter 3 (read 55-67)No class
6 February 10th	The Chemistry of Behaviour	Chapter 4 (read 66-69, 78-87)
7 February 17th	Family Day ☺	No class
8 February 24th	Sensory Systems	Chapter 5 (read 110-124)
9 March 2nd	TEST 2	
10 March 9th	Neurodevelopment	Chapter 13 (read 393-401)
11 March 16th	Learning (Due Assignment 2 – Neuroscience in the Media)	Chapter 13 (read 383-393)
12 March 23rd	Memory	Chapter 13 (read 368-375)
13 March 30th	No Class	

Final exam: It is the student's responsibility to be available for the entire exam period.