

PHYSIOLOGY 4680b

Cellular and Molecular Neurobiology

(Updated in December 2017)

1. Course Information

This course (0.5 course) is offered in the spring term of each academic year. There will be an enrolment limit of 45 students.

This is a 4th year course on cellular and molecular mechanisms of brain function and their link to disease. The course is taught by three professors (see below). We will cover aspects of the physiology and pathophysiology of learning and memory as well as how this relates to degenerative diseases, with special focus on Alzheimer disease. The format of the course includes professor lectures and student presentations, and discussion of research articles from the scientific literature. We expect that by the end of this course, students will be able to: 1) understand the cellular, molecular, and electrophysiological mechanisms underlying specific brain functions such as memory formation, 2) link this knowledge to the pathophysiology of diseases such as Alzheimer disease, and 3) effectively present original research papers in the field.

Professor lectures, student presentations and/or tutorials are held on Monday 2:30-4:30 pm. The lecture hours vs presentation seminar hours are approximately 3:2.

Prerequisite(s): [Physiology 3120](#) and [3140A](#); or [Neuroscience 2000](#) and [Physiology 3140A](#) and registration in Year 4 of an Honors Specialization in Neuroscience, with at least 70% for each of these courses.

Corequisite(s): None

Antirequisite(s): None

Senate regulation regarding the student's responsibility regarding requisites:

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructors	Email	Office	Phone
Dr. W.Y. Lu (Course Coordinator)	wlu53@uwo.ca	RRI-7240	931-5777 x 24282
Dr. S. Pasternak	spasternak@robarts.ca	RRI-3243	931-5777 x 25294
Dr. J. Martinez-Trujillo	jmart352@uwo.ca	RRI-7239	931-5777 x 24383

Updated course information will be posted on OWL.

Students with OWL issues should see: <https://owl.uwo.ca/portal/site/owldocs>

3. Course Syllabus

This is a course on the function of neurons and networks in the central nervous system. Topics taught by the three instructors/professors will cover cellular and molecular mechanisms of intrinsic single neurons and neuronal networks activity, excitatory and inhibitory synaptic transmission, and protein processing pathways related to neuronal signaling. Pathophysiology of some neurological illnesses such as Alzheimer's disease will also be introduced. Specific examples relevant to neuronal functions and dysregulations will be used. Each instructor/professor gives lectures of specific topics. The lecture slides will be posted on OWL before the date of lecture. It is expected that by the end of the course, students will be able to 1) understand/explain the processes of synaptic transmission and plasticity, the principle of information sorting by neural circuits, and the protein processing pathways related to neuronal signaling and degeneration; and 2) make effective presentation of original research articles.

Individual students or pairs of students will be assigned to present a selected journal paper of the lecture topic on a scheduled date. Papers to be used for students' presentations will be assigned at least one week before a presentation. The time length of a presentation is expected to be 20-30 minutes. Either power point or transparency overheads may be used for presentation. The standard order of presentation will be — the objectives and background of the research, relevant experimental methodology, results and discussion, followed by summary and conclusions. Particular attention should focus on the physiological mechanisms studied. A brief discussion of each paper, lasting about 5-10 minutes, will follow the presentation. After each presentation, the student is required to submit ONE summary of the presented paper (no more than 2 pages), which will be posted on the course website. The summary should contain the hypothesis, objectives, brief methods, and main results of the paper. If a student does not submit a summary by 5 days after the presentation, they will be deducted 25% of the presentation mark.

The presentation format, schedule, and number may change pending on the final enrollment, and updated course schedule will be posted on OWL. A tentative breakdown by week of instructor lectures and student presentations is listed below.

Tentative Schedule of Phys-4680b (Spring 2018)

(2018) Date	Instructors	Contents	Note
January 8	Wei-Yang Lu	Introduction of the course outline	*Tentative
January 15	Wei-Yang Lu	<u>Lecture:</u> <i>Glutamate receptors and glutamatergic synaptic transmission (110 min)</i>	
January 22	Wei-Yang Lu	<u>Lecture:</u> <i>Synaptic plasticity (45 min)</i> *1 paper presentations (paper reviews - Lu)	
January 29	Wei-Yang Lu	<u>Lecture:</u> <i>GABAergic signaling (45 min)</i> *1 paper presentations (paper reviews - Lu)	
February 5	Wei-Yang Lu	*3 paper presentations (paper reviews - Lu)	
February 12	Wei-Yang Lu	<i>Midterm exam</i>	
<i>February 19</i>		<i>(Feb 19-23: Reading Week)</i>	
February 26	Julio Martinez-Trujillo	<u>Lecture:</u> <i>Mapping structure into function. Single neurons and networks activity in the normal brain.</i>	
March 5	Julio Martinez-Trujillo	<u>Lecture review</u> (45 min) *1 paper presentations (paper reviews - Martinez)	
<i>March 12</i>		<i>(Reading and review)</i>	
March 19	Julio Martinez-Trujillo	*3 paper presentations (paper reviews - Martinez)	
March 26	Stephen Pasternak	<u>Lecture:</u> <i>Amyloidogenesis and Mechanisms of Alzheimer's disease</i>	
April 2	Stephen Pasternak	<u>Lecture review</u> (45 min) *1 paper presentations (paper reviews -Pasternak)	
April 9	Stephen Pasternak	*3 paper presentations (paper reviews-Pasternak)	
April 14-30		<i>Final exam (time and location: TBA)</i>	

4. Course Materials

Textbook: None

Supplemental Information: None

Electronic Devices: None

5. Evaluation:

Registered students are expected to attend all the lectures and paper presentations, and to sign the attendance sheet. Evaluation of student performance in Physiology 4680B will include paper presentation (20%), paper summary (5%), midterm examination (25%), final examination (45%) and class participation/attendance (5%). The midterm and final examinations will consist of essay and short-answer style questions. Specific topics included in midterm examinations will not be reexamined in the final examination. Other than lectures given by the instructors, students are expected to know the main results (not specific details) of the papers presented in the class. Lecture materials will be posted on OWL, which is only accessible to registered students.

Component	Date	% of Final Mark
Oral presentation	(see tentative schedule)	20%
Written summary	(a week after presentation)	5%
Midterm exam	(see tentative schedule)	25%
Final exam	(TBA)	45%
Attendance		5%

A detailed and comprehensive set of regulations concerning the scheduling of tests, assignments, etc. is available at: http://www.uwo.ca/univsec/academic_policies/examinations.html

Accessibility Statement:

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

6. Additional Information/Statements

Statement on Use of Electronic Devices

Electronic devices may not be used during tests and examinations.

Policy on Rounding and Bumping of Grades

Across the Basic Medical Sciences Undergraduate Education programs and within the department of *Physiology and Pharmacology* we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** in this course, irrespective of the number of decimal places used in marking individual assignments

and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved and the mark assigned; requests for mark “bumping” will be denied.

Policy on Plagiarism

The Department of Physiology and Pharmacology strongly condemns plagiarism. Plagiarism is the “act or instance of copying or stealing another’s words or ideas and attributing them as ones own.” (Excerpted from Black’s Law Dictionary, West Group, 1999, 7th ed. Pg 1170 and the definition used by Western’s Scholastic Discipline document). Plagiarism can be intentional or unintentional and regardless of intent, is a scholastic offence. It should be noted that self-plagiarism, plagiarizing ones own words for multiple assignments is subjected to the same penalty as plagiarizing another. Courses in Physiology and Pharmacology use *turnitin*, a similarity checking software embedded within OWL. We encourage all students to run their assignments through *turnitin* prior to submitting their reports for grading. Any report flagged as yellow (25-49% matching text), orange (50-74% matching text) or red 75-100% matching text) will be considered plagiarism (pending investigation by the instructor). It should be noted that a document could be plagiarized yet still pass the similarity check on turn it in. The *minimum* penalty for a first time plagiarism offence of any kind is a grade of zero on the assignment. In addition, details of the offence will be forwarded to Dean’s office and stored. A second offence will carry a much stricter penalty in line with Western’s Scholastic Discipline policies

(https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

Statement on Academic Offences

“Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following website: http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf.”

“All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).”

Absence from course commitments

Documentation is required for either medical or non-medical academic accommodation, such documentation must be submitted by the student directly to the appropriate Faculty Dean’s/Academic Counselling office and not to the instructor. It will be the Dean’s/Academic Counselling office that will determine if accommodation is warranted.

A. Absence for medical illness:

Students must familiarize themselves with the Policy on Accommodation for Medical Illness for Undergraduate Students, located at:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

The policy is also accessible from the Medical Accommodation Policy link at

<https://studentservices.uwo.ca/secure/index.cfm>

Statement from the Academic Counselling Office, Faculty of Science (for Science and BMSc students)

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Academic Counselling Office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved by the Academic Counselling Office and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Academic Counselling Office immediately. For further information please see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services.

The form can be found at:

<https://studentservices.uwo.ca/secure/index.cfm>

B. Absence for non-medical reasons:

Documentations are required for non-medical absences from midterms or late submission of paper summaries. The documentation must be submitted by the student directly to the appropriate Dean's/Academic Counselling Office and **not** to the instructor. It will subsequently be the Dean's/Academic Counselling Office that will determine if accommodation is warranted.

Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

C. Special Examinations

A Special Examination is any examination other than the regular final examination, and it may be offered only with the permission of the Dean/Academic Counselling Office of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents.

A Special Examination must be written at the University or an Affiliated University College no later than 30 days after the end of the examination period involved. To accommodate unusual circumstances, a date later than this may be arranged at the time permission is first given by the

Dean/Academic Counselling Office of the Faculty. The Dean/Academic Counselling Office will consult with the instructor and Department Chair and, if a later date is arranged, will communicate this to the Office of the Registrar.

If a student fails to write a scheduled Special Examination, permission to write another Special Examination will be granted only with the permission of the Dean/Academic Counselling Office in exceptional circumstances and with appropriate supporting documents. In such a case, the date of this Special Examination normally will be the scheduled date for the final exam the next time the course is offered.

When a grade of Special (SPC) or Incomplete (INC) appears on a student's record, the notations will be removed and replaced by a substantive grade as soon as the grade is available.

Support Services:

Registrarial Services: <http://www.registrar.uwo.ca>

Academic Counselling (Science and Basic Medical Sciences):
http://www.uwo.ca/sci/undergrad/academic_counselling/index.html

USC Student Support Services: <http://westernusc.ca/services/>

Student Development Services: <http://www.sdc.uwo.ca>

Student Health Services: <http://www.shs.uwo.ca/>

Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.