LIFESCI 4XX3 – Structure and Function of the Synapse

Instructor
Nikol Piskuric, Ph.D.

Office location
Psychology Building, Room 108

Email
piskurn@mcmaster.ca (Please send emails from your McMaster address and include LIFESCI 4XX3 in the subject heading.)

Office hours
By appointment.

Course Website
avenue.mcmaster.ca. Please check this site regularly for updates.

*If you require this information in an alternate/accessible format, please contact Dr. Piskuric at (905) 525-9140 ext. 21331.

Course Description
Synapses are the sites of communication between neurons, and convey all information about our senses, behaviors, thoughts and emotions. This course will examine synapse physiology, including vesicle dynamics and signaling through ionotropic and metabotropic receptors. We will also discuss long-term potentiation, specialized synapses at sensory receptors and the neuromuscular junction, and diseases associated with synaptic dysfunction.

This is a communication-intensive course, in which students have the opportunity to practice scientific writing for expert and lay audiences, as well as scientific discourse. A second major focus of the course is on understanding and communicating primary research.

Intended Learning Outcomes
By the end of this course, you should be able to:
1. Describe several classical/foundational experiments that led to our current understanding of synapse structure and function.
2. Describe some anatomical and physiological techniques that are used to study synapse structure and function.
3. Evaluate the usefulness of a scientific technique to answer a given research question; select a technique to answer a given question, and justify your selection.
4. Read and analyze a primary research article.
5. Present a succinct and informative oral seminar to an audience of your peers.
6. Participate in scientific discourse.
7. Work in a group to propose a solution to a novel scientific question.
8. Write a scientific research proposal.
9. Identify the appropriate medium, content, and language for scientific communication to a lay audience.
10. Communicate complex scientific information to a high school audience, and create an informative and accurate supporting infographic.

Course Format
This course consists of one 3-hr seminar per week.
Fri 14:30-17:20 ETB 237

Prerequisites
LIFESCI 3BB3. Note that students who have completed LIFESCI 2C03 or 2CC3 (but not 3BB3) can petition to enroll in LIFESCI 4XX3; these students must seek approval from the Instructor and will be allowed to enroll on a case-by-case basis.
Course Materials
There is no textbook for this course. Reading materials and lecture notes will be posted as PDF files on the course website through Avenue to Learn. You are directed to the following textbooks for supplementary reading.


Course Assessment

Participation 10
You will be graded on the *quality and quantity* of your contributions to the general class discussion. Quality contributions are thoughtful, appropriate, and productive to the conversation.

Research proposal 33
In groups of 3, you will write an NSERC-style scientific research proposal on a topic of your choice (topics must be approved by Dr. Piskuric). Throughout the term, you will submit components of your proposal to Dr. Piskuric for review and feedback. See Avenue to Learn for more details.

Article analyses 12
As a group, we will perform an Article Analysis in every class. An Article Analysis is a deconstruction of a primary research article, in order to identify the rationale and hypotheses, explain the methods and results, state the conclusions, and provide the significance and contribution to the field. Students will be randomly selected each week to lead portions of the Article Analysis; each student will lead 3-4 analyses throughout the term.

Brain Bee Handbook 15
Each year, McMaster University hosts the National Brain Bee competition, which is a neuroscience competition for high school students from across Canada. In preparation for the Brain Bee, competitors study from a handbook prepared by the Society for Neuroscience (SfN). However, the handbook is old, and needs extensive revision, updating, and modernizing. In groups, you will re-write one section of the SfN handbook, and create an informative and professional infographic to support your text.

Midterm 15
The midterm will be scheduled during class time, and will consist of short and long answer questions. Questions will be based on lecture material as well as assigned readings. There is no make-up midterm in LIFESCI 4XX3. Given appropriate documentation (i.e., MSAF), students who miss the midterm will have the weight of the midterm transferred to the final exam.

Exam 15
The final examination is cumulative, and will consist of short and long answer questions. The exam will be scheduled by the registrar and written during the final examination period.
Academic Accommodation of Students With Disabilities

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s Policy for Academic Accommodation of Students with Disabilities.

Other Student Services

The Student Wellness Centre (http://wellness.mcmaster.ca) provides a range of counseling options, medical services, and wellness programs. The Student Success Centre (http://studentsuccess.mcmaster.ca) offers academic, personal, and professional support through a variety of programs, tools and resources.

Seeking Help

Please ask the course Instructor for help at any time if you need it. As a learner, it is your responsibility to recognize when you need help and then ask for it.

Missed Work Policy

For absences from classes lasting up to 3 days due to a medical or personal reason:

Using the McMaster Student Absence Form (MSAF) on-line self-reporting tool, undergraduate students may report absences lasting up to 3 days and may also request relief for missed academic work worth less than 25% of the final grade. The submission of medical documentation is normally not required. Students may use this tool to submit a maximum of one request for relief for missed academic work per term. Students must immediately (within 2 days of the missed work) follow up with their course instructors regarding the nature of the relief. Failure to do so may negate the opportunity for relief. **The MSAF tool cannot be used to apply for relief for any final examination or its equivalent.**

Students who (1) are absent for more than 3 days, (2) wish to submit more than one request for relief of missed academic work per term, (3) are absent for reasons other than a medical situation, or (4) missed work worth 25% or more of their grade, cannot use the MSAF tool to request relief. They MUST report to their Faculty Office to discuss their situation and may be required to provide appropriate supporting documentation. If warranted, students will be approved to use a discretionary version of the MSAF on-line, self-reporting tool.

For absences from classes lasting more than 3 days, for work worth 25% or more, or for the reporting of more than one request for relief per term:

If the reason was medical, the approved McMaster University Medical Form covering the relevant dates must be submitted. The student must be seen by a doctor at the earliest possible date, normally on or before the date of the missed work and the doctor must verify the duration of the illness. Relief will not be considered for minor illnesses. If the reason is non-medical, appropriate documentation with verifiable origin covering the relevant dates must be submitted, normally within five working days. In some circumstances, students may be advised to submit a Petition for Special Consideration (Form A) seeking relief for missed academic work. In deciding whether or not to grant a petition, adequacy of the supporting documentation, including the timing in relation to the due date of the missed work and the degree of the student’s incapacitation, may be taken into account. If the petition is approved the Faculty Office will notify the instructor(s) recommending relief. The student must contact the instructor promptly to discuss the appropriate relief. Failure to do so may negate the opportunity for relief. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.
Academic Dishonesty
You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

Notice of changes to course structure
The university reserves the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

The professor reserves the right to change any and all course requirements if the need should arise. Any change in the course requirements will be posted on the webpage, and the details will be announced in class. Any concerns about announced changes should be addressed with the professor as soon as the changes are announced.

Grades
Grades obtained in LIFESCI 4XX3 will be converted according to the following scheme, which is in general use at McMaster University.

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<tr>
<th>Percentage Range</th>
<th>Grade</th>
<th>Credit</th>
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<tr>
<td>85-89%</td>
<td>A</td>
<td>11</td>
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<tr>
<td>80-84%</td>
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<tr>
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