Brain Imaging Laboratory (PSYC04H3 S LEC01)
COURSE SYLLABUS – Spring 2018

INSTRUCTORS:

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Class Time and Location: Thursdays @ 1:00-3:00pm in Science Wing, Room 316

Tutorials: This course is composed of three separate modules (one for each brain imaging technique). Module-specific syllabi will be distributed at the beginning of each module and will describe the times and locations of required tutorials and readings and how to submit assignments for each module.

Brain Imaging Laboratory is a course designed to familiarize you with cutting-edge techniques used by psychologists to study the neural basis of cognition, perception and motor control. Specifically, you will obtain hands-on experience with data collection, signal processing and statistical analysis for functional magnetic resonance imaging (fMRI), functional near-infrared spectroscopy (fNIRS), and electroencephalography (EEG). You will also learn the core principles of experimental designs for brain imaging research and learn how to interpret findings using each of these brain imaging techniques.

Weekly Topics, Readings and Important Dates

1	January 11	fMRI (Prof. Thavabalasingam)
2	January 16 (Tuesday)	fMRI (Prof. Thavabalasingam) ***Data collection at the Centre for Addiction and Mental Health, College Street. NO CLASS THURSDAY JANUARY 18**.*
3	January 25	fMRI (Prof. Thavabalasingam) Univariate data analysis in class
4	February 1	EEG (Dr. Nemrodov) - Introduction
5	February 8	EEG (Dr. Pérez) – ERP components and ICA **Due: fMRI Assignment: Feb 8**
6	February 15	EEG (Dr. Pérez) – Data collection at UTSC (CAP Lab at room SW150)
	February 22	*READING WEEK (NO CLASS)*
7	March 1	EEG (Dr. Nemrodov) – ERP Data analysis
8	March 8	EEG (Dr. Pérez) – Time-frequency analyses
9	March 15	EEG (Dr. Nemrodov) - MVPA and source localization **Due: ERP Analysis Assignment: March 15**

10	March 22	fNIRS (Rodrigo) Introduction to fNIRS principles and methods
11	March 29	fNIRS (Rodrigo) ***fNIRS laboratory demonstrations in SW132E. NO CLASS THURSDAY MARCH 29**.* **Due: EEG study proposal: March 29**
12	April 5	fNIRS (Rodrigo) fNIRS signal processing basics and fNIRS applications
	April 6	**Due: fNIRS Assignment: April 6** Last day of classes and last day for submission of term assignments in S courses.
	April 6	Last day to drop UTSC S courses and have them remain on the transcript with a grade of LWD indicating withdrawal without academic penalty. After this date grades are recorded on transcripts whether course work is completed or not (with a '0' assigned for Incomplete work) and they are calculated into GPAs.

Course evaluation

20% - fMRI
- 5% - Participation
- 15% - fMRI poster

20% - Research proposal with the research question, hypothesis and the description of the methods for an EEG study.

20% - Analysis of EEG data

20% - fNIRS
- 5% - Participation
- 15% - fNIRS Assignment

20% - Final exam

fMRI Poster Grading

A marking rubric will be used to assess the posters. Each poster will be marked out of 15 points:

1. Formatting & Organization (max 3 points)

Are all expected components of the poster present? Is the poster laid out in a clear and logical manner? Has there been good and appropriate use of the different sections of the poster?

2. Accuracy (max 3 points)

Is the content of the poster accurate? Are there any errors in the description of the experimental details? Is the text free of spelling or typographical errors?

3. Clarity (max 4 points)

How clearly written is the text of the poster? Is the text concise? Is it evident that the aims and findings of the experimental study have been understood fully? Are figures/tables appropriate and clear?

4. Originality (max 5 points)

Are the conclusions justified on the basis of the presented data? Is there evidence of critical thinking and original ideas? Has an attempt been made to fit the present work to the wider literature? Has thought been given to possible future experiments?

EEG Research Proposal Grading

A marking rubric will be used to assess the proposals. Each proposal will be marked out of 20 points:

1. Research question (max 5 points)
    a. Is the research problem well motivated in the proposal?
    b. Is formulation of the research question relevant to the research problem, feasible?
    c. Are operational definitions of the research variables provided?
    d. Is the relevant literature provided? (max 3 sources)
    e. Is the hypothesis correctly formulated?
2. Is EEG appropriate? (max 5 points)
    a. Is EEG an appropriate and effective tool to answer the research question?
    b. Does the proposal make use of the unique advantages of the EGG technique?
3. Analysis (max 5 points)
    a. Is the suggested analysis appropriated?

    b. Are possible conclusions described?
    c. Are the appropriate future experiments suggested?
4. Clarity and originality (max 5 points)
    a. Is the language of the proposal clear and succinct?
    b. Is the proposal original?

fNIRS Assignment

The fNIRS assignment will consist of 3 open ended questions that will require you to demonstrate your understanding of fNIRS principles, applications, and limitations. To this end, you will be asked to provide brief, yet well thought out, and empirically supported written responses (each response should be a maximum of 1 page, using APA style formatting, excluding references). Each question will be graded out of 5 points, and responses will be assessed for understanding of concepts covered in class/lab, accuracy, and empirical support (at least one peer-reviewed journal article per question).

Questions about Grading: Any questions about grading on quizzes or assignments should be made in writing to your Teaching Assistant within one week of receiving the graded material and should detail the point of contention.

Missed Quizzes and Late Assignments: Given the time constraints of this course, there will be NO make-up quizzes without legitimate documentation for a missed quiz. If you miss a quiz and do not provide legitimate documentation, you will receive a mark of zero for that quiz. If you have provided legitimate documentation for your missed quiz (for example, UTSC Student Medical Certificate completed in full by a physician), you must arrange with the Teaching Assistant for that specific course module to write an alternate version of the quiz during the next available office hours. Late assignments will have 10% deducted for each day beyond the deadline for that assignment unless you have provided legitimate documentation for your late assignment (for example, UTSC Student Medical Certificate).

Any medical documentation that you provide must indicate the dates that you needed to be excused from course work, which must include the date of the quiz that you missed, or for a late assignment, the due date for that assignment. You are advised to see your physician within one day of the missed examination or late assignment. You must contact the course instructor within one week of a missed examination or late assignment. The form for medical documentation can be found at the following link:

http://www.utsc.utoronto.ca/~registrar/resources/pdf_general/UTSCmedicalcertificate.pdf
Please Note: The UTSC Medical Certificate must be signed by a registered member in good standing with the College of Physicians and Surgeons of Ontario.

Accessibility:

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the Access*Ability* Services Office as soon as possible. I will work with you and Access*Ability* Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC Access*Ability* Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca**.**

Video and Auditory Recording

For reasons of privacy as well as protection of copyright, unauthorized video or audio recording in classrooms is prohibited. This is outlined in the Provost's guidelines on *Appropriate Use of Information and Communication Technology*. Note, however, that these guidelines include the provision that students may obtain consent to record lectures and, "in the case of private use by students with disabilities, the instructor's consent must not be unreasonably withheld."

Academic Integrity:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's *Code of Behaviour on Academic Matters* (http://www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

- Using someone else's ideas or words without appropriate acknowledgement.
- Submitting your own work in more than one course without the permission of the instructor.
- Making up sources or facts.
- Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

- Using or possessing unauthorized aids.
- Looking at someone else's answers during an exam or test.
- Misrepresenting your identity.

In academic work:

- Falsifying institutional documents or grades.

- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see http://www.utoronto.ca/academicintegrity/).

Grade Scales

NUMERICAL MARKS	LETTER GRADE	GRADE POINT VALUE
90 - 100%	A+	4.0
85 - 89%	A	4.0
80 - 84%	A-	3.7
77 - 79%	B+	3.3
73 - 76%	B	3.0
70 - 72%	B-	2.7
67 - 69%	C+	2.3
63 - 66%	C	2.0
60 - 62%	C-	1.7
57 - 59%	D+	1.3
53 - 56%	D	1.0
50 - 52%	D-	0.7
0 - 49%	F	0.0