



## **PSYB03F3 – Introduction to Computers in Psychological Research Fall 2015**

***Class meeting time: Friday 12-2pm; Lab: Friday 2-3pm; Room BV498***

***Instructor: Dr. Adrian Nestor***

***Office hours: Tuesday 2-3pm***

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***(\*Please put PSYB03 in the subject line of any e-mails  
and use your U of T e-mail account when contacting the course instructor)***

***Teaching Assistants: Celia Fidalgo & Sol Sun***

***Emails: [celia.fidalgo@mail.utoronto.ca](mailto:celia.fidalgo@mail.utoronto.ca); [sol.sun@mail.utoronto.ca](mailto:sol.sun@mail.utoronto.ca)***

***Office hours: Thursday 11-12pm (SW413A) – Celia (every other week starting Sept 10)***

***Office hours: Thursday 2-3pm (SW411A- Visual Perception Lab) - Sol (every other week  
starting Sept 17)***

### **1. GENERAL COURSE INFORMATION**

Calendar description: The course will provide introductory knowledge and hands-on training in computer-based implementations of experimental design, data processing and result interpretation in psychology. The course covers implementations of experimental testing paradigms, computational explorations of empirical data structure and result visualization with the aid of specific programming tools.

Prerequisite: PSYA01H3 and PSYA02H3

Corequisite: PSYB07H3

Online resources: Blackboard

Course reading: Links to readings, resources, and software (provided through Blackboard). The student version of Matlab (ver 2010 or higher) is recommended.

### **2. COURSE DESCRIPTION**

The course aims to shape critical thinking in approaching scientific research with the aid of modern-day computer technologies while appreciating their extensive range of strengths along with the constraints that they pose. The course aims to provide students with fundamental knowledge and concrete skills regarding computer-based implementations of experimental testing, data analysis and result visualization. More generally, the course encourages and allows students to conceptualize and evaluate experimental research from a practical computational perspective.



The goals of the course target a broad set of skills related to:

- (i) understanding and demonstrating procedural abstraction when writing / evaluating computer code (identify and define a problem, design an algorithmic approach to address the problem, critically evaluate the success of a solution);
- (ii) using variables/values/types, assignment, and control flow (conditionals / loops / error handling) as well as recognizing the importance of memory considerations and file management in a programming environment;
- (iii) demonstrating good commenting and documentation practices when writing computer code;
- (iv) generating graphical data and exporting this for use in reports, presentations;
- (v) recognizing and articulating the wide scope of computer use in psychology and neuroscience.

The course will set the ground for developing the mastery of programming methods and techniques relevant to empirical and computational research. More generally, the course will be instrumental in developing critical and creative thinking skills as involved in the implementation and the evaluation of alternative solutions to a range of problems relevant for psychological research. Last, the course aims to sharpen quantitative reasoning skills related to the implementation of specific algorithms / computations as well as to improve on graphical communication skills as involved in the plotting of data sets.

The topics covered will include basic calculations, data precision, control flow, functions, basic image processing, statistical testing, graphical representation of data structure and result interpretation. Computer implementations involve the Matlab computing environment with the addition of specific toolboxes (e.g., Statistics, Image processing).

### 3. CLASS SCHEDULE

**Week 1 (September 4):** Navigating Matlab & directory structure

**Week 2 (September 11):** Matrices and basic calculations

**Week 3 (September 18):** Data types & precision

**Week 4 (September 25):** Control flow

**Week 5 (October 2):** Functions

**Week 6 (October 9):** Introduction to image processing

**October 16:** NO CLASS (Reading week)

**Week 7 (October 23):** Prompting for input & timing

**Week 8 (October 30):** Statistical tests 1

**Week 9 (November 6):** Statistical tests 2

**Week 10 (November 13):** Graphs

**Week 11 (November 20):** Applications: setting up a behavioural experiment

**Week 12 (November 27):** Applications (cont'd) and review



## 4.0 EVALUATION

Lab activities: 35%  
Midterm exam: 30%  
Final term project: 35%

### Lab activities (35%)

Activities are small exercises that are assigned multiple times throughout the term (almost once a week) as a way for you to demonstrate your knowledge of course content. They may require you to write code or provide short answers to questions in lab or online.

### Midterm exam (30%)

The midterm test will take place during regular class time and will cover material from lectures, labs, and activities.

### Final term paper (35%)

The final project will require you to submit a completed Matlab script along with a brief description of its goals and its relevance for psychology / neuroscience research. The script can involve behavioural data collection, computer simulations (e.g., of a specific psychological process), data analysis and visualization etc.

Topics must be approved by the TAs before the end of Week 11. Approval should be obtained through email (please email a short statement regarding the goal of your script for approval).

## 5.0 COURSE POLICIES

### Late assignments

A penalty of 10% will be deducted for each 24-hour period that an assignment is late. Extensions will only be granted with proper documentation (i.e. UTSC medical certificate).

Please note that, according to UTSC policy, I am not permitted to extend the deadline for any assignment past the last day of classes, so be sure to submit all materials by that time. If necessary, students may petition the Registrar's office for permission to submit assignments after the last day of classes. Such petitions are not automatically granted, and will likely be denied without a valid reason. Such petitions must be submitted by the last day of the final examination period of the term.



### **Contesting a grade**

All requests for a re-grade must be submitted **in writing** within two weeks of the day that the grade is posted. Only requests based on adequate written justification regarding an error in the original grading will be considered. Arbitrary requests for grade increases (e.g., 'I need to get into grad school') will be dismissed.

Please note that a legitimate request will entail a re-grading of the entire assignment. Hence, your grade may be raised, lowered or left intact.

### **Video and auditory recording**

For reasons of privacy and protection of copyright, unauthorized video/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 (e.g., in the case of private use by students with disabilities).

## **6.0 OTHER INFORMATION**

### **Academic integrity**

UTSC aims to ensure that a degree from the University of Toronto reflects clearly and adequately each student's academic achievement. As a result, the University takes issues of academic integrity very seriously. The Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines behaviors that constitute academic dishonesty and the process for addressing academic offences.

Potential offences include, but are not limited to:

- Using someone else's ideas or words without appropriate acknowledgement.
- Making up sources or facts.
- Obtaining or providing unauthorized assistance on any assignment.
- Looking at someone else's answers during an exam or test.
- Misrepresenting your identity.
- Falsifying institutional documents or grades.
- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

If you have questions or concerns about what constitutes appropriate academic behavior 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 (<http://www.utoronto.ca/academicintegrity/resourcesforstudents.html>).

### **AccessAbility**

Students with any type of disability/health consideration that may require specific accommodations are encouraged to contact the AccessAbility Services Office as soon as possible. After you have provided the appropriate documentation, the staff in this office will assess your needs and will determine appropriate and reasonable



accommodations. All enquiries and information that AccessAbility Services collects from students about their disabilities will be kept in strict confidence.

The UTSC AccessAbility Services (S302, 416-287-7560, [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca)) are available by appointment to assess specific needs, to provide referrals and to arrange appropriate accommodations.

### **Help with writing**

If you do not feel comfortable with your writing abilities or if you intend to improve on them, the following resources are available to you:

The Centre for Teaching and Learning (<http://ctl.utsc.utoronto.ca/twc/>) offers students one-to-one appointments and supplementary materials to help improve upon their writing skills.

The English Language Development Centre (<http://ctl.utsc.utoronto.ca/eld/>) offers support and specialized writing programs for students who do not speak English as their primary language.

Additional advice on academic writing can be found at:

<http://www.writing.utoronto.ca/advice>

### **Literature searches**

Students are encouraged to use the following resources when conducting literature searches:

The UTSC Library (<http://www.library.utoronto.ca/utsc/>)

Google Scholar (<http://scholar.google.ca/>)

PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>)

PsychINFO (<http://www.apa.org/pubs/databases/psycinfo/index.aspx>)