Faculty of Health
Department of Psychology
PSYC 4215 3.0 A: NEUROIMAGING OF COGNITION fMRI METHODS
Wendesday/2:30-5:30pm/Sherman 1015
Fall/2019-2020

Instructor Information

Instructor: Dr. Erez Freud
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Course Prerequisite(s): Course prerequisites are strictly enforced

- HH/PSYC 1010 6.00 (Introduction to Psychology), with a minimum grade of C.
- HH/PSYC 2020 6.00 (Statistical Methods I and II) or HH/PSYC 2021 3.00 (Statistical Methods I) and HH/PSYC 2022 3.00 (Statistical Methods II)
- HH/PSYC 2010 (Writing in Psychology)
- HH/PSYC 2030 3.00 (Introduction to Research Methods) or substitutes
- HH/PSYC 2240 3.00 (Biological Basis of Behaviour) or HH/PSYC 3250 3.00 (Neural Basis of Behaviour
- Students must be in an Honours program in Psychology and have completed at least 84 credits (excluding (EDUC) education courses)

Course Credit Exclusions

Please refer to York Courses Website for a listing of any course credit exclusions.

Course website: Moodle

Course Description

This course offers fundamental knowledge on neuroimaging of cognition using fMRI, including practical aspects of experimental design and analytical approaches. The course provides the necessary theoretical perspectives of fMRI experiments and provides extensive hands-on experience in fMRI analysis.

Program Learning Outcomes

Upon completion of this course, students should be able to:

1. Demonstrate in-depth knowledge in the neuroimaging of cognition using fMRI.
2. Critically evaluate, synthesize and resolve conflicting results in the neuroimaging of cognition using fMRI.
3. Articulate trends in the neuroimaging of cognition using fMRI.
4. Locate research articles and show critical thinking about research findings in the neuroimaging of cognition using fMRI.
5. Express knowledge of the neuroimaging of cognition using fMRI in written form.
6. Engage in evidence-based dialogue with course director and peers.
7. Demonstrate an ability to work with others.

Specific Learning Objectives

At the end of this course, students should have a solid theoretical grasp of how fMRI techniques are being used in the field of cognitive neuroscience. They will have an improved ability to critically evaluate the quality of research they read. Students will also be able to design a simple neuroimaging project that addresses a cognitive-related question, and to choose the appropriate analytical approach. Finally, students should be able to clearly and effectively communicate their knowledge in both written and oral forms.

Required Text

- Poldrack, R. A., Mumford, J. A., & Nichols, T. E. (2011). Handbook of functional MRI data analysis. Cambridge University Press.
- There are additional papers to be read for each topic. These papers will be placed on the class website. Required text

Course Requirements and Assessment:

Assessment	Date of Evaluation (if known)	Weighting
Informal tutorial reports	On a weekly basis	20%
Quiz	TBD	15%
Term paper	TBD	65%
Total		100%

Description of Assignments

Students will be evaluated based on three criteria.

1. Informal tutorial reports (20%): After each informal-tutorial, students will submit a report that describes the steps that were practiced, the significance of these steps and the expected steps to follow (3 paragraphs).

2. Quiz (15%) – 25 multiple choice questions that will cover the topics discussed in class.

3. Term paper (65% undergraduate students) Students will perform an analysis of the course data or other data (e.g., obtained from an open external dataset) to address a specific cognitive-related question. A final report will describe this analysis, in the context of the theoretical background of the scientific question and the observed results. Team work will be encouraged (especially team comprised both experienced and novice imagers). The paper should follow the guidelines for formatting and referencing outlined in the Publication Manual of the American Psychological Association (6th edition).

Grading as per Senate Policy

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests* will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 89, B+ = 75 to 79, etc.)

For a full description of York grading system see the York University Undergraduate Calendar - Grading Scheme for 2019-20

Missed Tests/Midterm Exams/Late Assignment:

For any missed tests, midterm exam or late assignments, students MUST complete the following online form which will be received and reviewed in the Psychology undergraduate office.

HH PSYC: Missed Tests/Exams Form. Failure to complete the form within 48 hours of the original deadline will result in a grade of zero for the missed tests, midterm exam or late assignments.

In addition, to the online form, students documented reason for a missed tests, midterm exam or late assignments such as illness, compassionate grounds, etc., MUST submit official documentation (e.g. Attending Physician Statement)

Add/Drop Deadlines

For a list of all important dates please refer to: Fall/Winter 2019-20 - Important Dates

	FALL (F)	**YEAR (Y)**	**WINTER (W)**
Last date to add a course **without permission** of instructor (also see Financial Deadlines)	Sept. 17	Sept. 17	Jan. 19
Last date to add a course **with permission** of instructor (also see Financial Deadlines)	Oct. 1	Oct. 22	Feb. 3
Drop deadline: Last date to drop a course without receiving a grade (also see Financial Deadlines)	Nov. 8	Feb. 3	March 13
Course Withdrawal Period (withdraw from a course and receive a grade of "W" on transcript – see note below)	Nov. 9 - Dec. 3	Feb. 4 - Apr. 5	March 14 - Apr. 5

***Note**: *You may withdraw from a course using the registration and enrolment system after the drop deadline until the last day of class for the term associated with the course. When you withdraw from a course, the course remains on your transcript without a grade and is notated as "W". The withdrawal will not affect your grade point average or count towards the credits required for your degree.*

Information on Plagiarism Detection

The written assignments will be tested using online services (such as https://smallseotools.com/plagiarism-checker/) to detect cases of plagiarism.

Electronic Device Policy

Laptops will be permitted, however the usage of electronic devices for non-course related activity will be prohibited.

I will use the iclicker app to conduct in-class polls. Pleases download it to your phones/ laptops (https://www.iclicker.com/students). You will be asked to add your institution (York University) and to find the course (search for "fMRI Methods").

Attendance Policy

Weekly attendance will be recorded and contribute to the "Informal tutorial reports" component of the course grade.

Academic Integrity for Students

York University takes academic integrity very seriously; please familiarize yourself with Information about the Senate Policy on Academic Honesty.

It is recommended that you review Academic Integrity information SPARK Academic Integrity modules. These modules explain principles of academic honesty.

Test Banks

The offering for sale of, buying of, and attempting to sell or buy test banks (banks of test questions and/or answers), or any course specific test questions/answers is not permitted in the Faculty of Health. Any student found to be doing this may be considered to have breached the Senate Policy on Academic Honesty. In particular, buying and attempting to sell banks of test questions and/or answers may be considered as "Cheating in an attempt to gain an improper advantage in an academic evaluation" (article 2.1.1 from the Senate Policy) and/or "encouraging, enabling or causing others" (article 2.1.10 from the Senate Policy) to cheat.

Electronic Devices During a Test/Examination

Electronic mobile devices of any kind are not allowed during a test or examination. Students are required to turn off and secure any electronic mobile device in their bag which is to be placed under the chair while a test/exam is in progress. Any student observed with an electronic device during a test/exam may be reported to the Undergraduate Office for a potential breach of Academic Honesty.

Academic Accommodation for Students with Disabilities

While all individuals are expected to satisfy the requirements of their program of study and to aspire to do so at a level of excellence, the university recognizes that persons with disabilities may require reasonable accommodation to enable them to do so. The York University Accessibility Hub is your online stop for accessibility on campus. The Accessibility Hub provides tools, assistance and resources. Policy Statement.

Policy: York University shall make reasonable and appropriate accommodations and adaptations in order to promote the ability of students with disabilities to fulfill the academic requirements of their programs.

The nature and extent of accommodations shall be consistent with and supportive of the integrity of the curriculum and of the academic standards of programs or courses. Provided that students have given sufficient notice about their accommodation needs, instructors shall take reasonable steps to accommodate these needs in a manner consistent with the guidelines established hereunder.

For Further Information please refer to: York university academic accommodation for students with disabilities policy.

Course Materials Copyright Information

These course materials are designed for use as part of the 4215 3.0 course at York University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

Copying this material for distribution (e.g. uploading material to a commercial third-party website) may lead to a violation of Copyright law. Intellectual Property Rights Statement.

Course Schedule

This is the outline of the course schedule. This suggested schedule is subject to changes

Proposed Schedule/Topics + reading

Date	Topic	Reading
4/9/2019	Introduction – the neural basis of fMRI Basics of fMRI and data structures	Chapter 1, 2, Appendix B
11/9/2019	fMRI preprocessing and quality assurance + Spatial normalization Tutorial (pre-processing)	Chapter 3+4
18/9/2019	Statistical modeling (single subject analysis) Univariate analysis – General linear model	Chapter 5 + Appendix A
25/9/2019	Experimental designs – block design vs. event-related designs Tutorial (Univariate analysis)	
2/10/2019	Group data analysis + Instruction for term project Tutorial	Chapter 6
9/10/2019	No class / fMRI Physics: Understanding enough to discuss and choose optimal protocols (Joy Williams)	
16/10/2019	Statistical inference on images	Chapter 7
23/10/2019	Functional connectivity analysis and Resting State Tutorial	Chapter 8
30/10/2019	Multivariate approaches – Representational Similarity Analysis Tutorial	Kriegeskorte, N., Mur, M., & Bandettini, P. A. (2008). Representational similarity analysis-connecting the branches of systems neuroscience. Frontiers in systems neuroscience, 2, 4.

6/11/2019	Multivariate approaches – Machine learning and support vector machine	Chapter 9
13/11/2019	Future directions + quiz	
20/11/2019	Work on final project	
27/11/2019	Work on final project	