Attention!
This is a representative syllabus. The syllabus for the course when you enroll may be different.

Use the syllabus provided by your instructor for the most up-to-date information. Please refer to your instructor for more information for the specific requirements for a given semester.

Feel free to contact the Psychology Advising Office for any questions regarding psychology courses either by email (psychadvising@osu.edu) or phone (614.292.5750).

Thank you!
Psych 5425 Introduction to Functional Magnetic Resonance Imaging

Course Description: A general introduction to the physical bases of Magnetic Resonance Imaging (MRI), the physiological bases and principles of functional MRI, MRI related safety issues, design and analysis of fMRI experiments, and the operation of the Siemens 3T Trio system with hands-on experience.


Course Requirements: The course consists of lecture, lab, and project components. Students are required to participate in safety training, and are required to participate in group projects. Safety training consists of a 45-minute course on operating procedures in the high magnetic field environment at CCBBI. Ideas of group projects will be proposed by students. Two to three topics will be selected. Groups will be organized around the selected topics. Each group will be given 3 hours of scanner time to conduct the experiment. Group members will be expected to participate in designing and executing the experiment, performing data analysis, and presenting the project to the class. There will be a mid-term and a final project presentation. The mid-term will consists of short-answer questions that cover basic concepts of MRI and fMRI. Class grades will be assigned according to the following weights: Class Participation: 10%; Midterm, 30%; Group participation: 30%; Group Project, 30%.

Grading Scale: Letter (A, B, C, D, E).

Class Attendance Policy: Attendance for this course is mandatory and accounts for 10% of the grade. It is assumed that you will come to class for both lectures and lab sessions. If you are forced by circumstances to miss a class, it is your responsibility to find out what information you may have missed - including both notes from the lecture and any announcements that may have been given in the class you missed.

Sexual misconduct/relationship violence: Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged
academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at http://studentconduct.osu.edu

Disability Services: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Syllabus

Aug 22 Administrative matters
   Lecture 1: Introduction to MRI and fMRI
   Reading: Chapter 1, An Introduction to fMRI, pp 1-30.

Aug 29 Lecture 2: Basic principles of MR signal generation
   Lecture 3: Basic principles of MR image formation
   Reading: Chapter 3, Basic Principles of MR Signal Generation, pp 57-88
   Chapter 4, Basic Principles of MR Image Formation, pp 89-120

Sept 5 Lecture 4: Contrast mechanisms and pulse sequences
   Lecture 5: Hemodynamic activity
   Lecture 6: BOLD fMRI
   Reading: Chapter 5, MR Contrast Mechanisms and Pulse Sequences, pp 123-158
   Chapter 6, From Neuronal to Hemodynamic Activity, pp 159-207
   Chapter 7, BOLD fMRI: Origins and Properties, pp 211-266

Sept 12 Lecture 7: Spatial and temporal properties of fMRI
   Lecture 8: Signal and noise in fMRI
   Lecture 9: Preprocessing of fMRI data
   Reading: Chapter 8, Signal, Noise, and Preprocessing of fMRI Data, pp 271-320

Sept 19 Lecture 10: Safety training (Deborah Hardesty)
   Lab 1, Patient Registration, Viewing Task Card, Exam Card
   Reading: Chapter 2, MRI Scanners, pp 31-56

Sept 26 Mid-Term
   Lecture 11: Experimental design
   Reading: Chapter 9, Experimental Design, pp 323-359

Oct 3 Lab 2: Protocol Development + Structural Imaging
Oct 10  Lecture 12: Principles of fMRI data analysis
   Reading: Chapter 10, Statistical Analysis: Basic Analyses, pp 363-409

Oct 17  Lab 3: BOLD Imaging (block design)

Oct 24  Lecture 13: Anatomical analysis with FSL (Dr. Xiangrui Li)
   Lecture 14: Block-design analysis with FSL (Dr. Xiangrui Li)

Oct 31  Lab 4: BOLD Imaging (event related design)

Nov 7   Lecture 15: Event-related design analysis with FSL (Dr. Xiangrui Li)

Nov 14-Dec 5 Group Projects

Dec 8   Final Presentation (4:00 pm – 5:45 pm)