Course Syllabus

PSY 5150/6150.001 I ADVANCED COGNITIVE ELECTROPHYSIOLOGY

Spring 2019

The University of Utah - Department of Psychology

Course location: GC 1855 Canvas: https://utah.instructure.com/courses/539048

Class Times 3 hours weekly: Fridays 9-12pm

This syllabus is not a binding legal contract. With reasonable notice to students, the instructor may modify the syllabus and course schedule at any time, to accommodate the needs of the class. Should you have any questions or concerns, it is your responsibility to contact the instructor for clarification. Version date: 1/1/2019

Lead Instructor: Dr. Trafton Drew

Co-Instructors: Drs. Brennan Payne and Matthew Euler

Office 1003 BEHS

Instructor Email Trafton.Drew@psych.utah.edu

Office hours by appointment

Course Description and Learning Objectives

This is intended to serve the following purposes:

1. ***Provide an overview of what we can and cannot infer from encephalographic (EEG) data.***
2. ***Teach best practices for strong experimental design involving EEG.***
3. ***Provide hands-on demonstrations of how to record and analyze human EEG data.***
4. ***Teach the basic implementation of EEG and ERP analysis methods in MATLAB.***

Required Materials

- Luck, S. J. (2014). *An introduction to the event-related potential technique*. MIT press. Second edition.

Course Format

The course as a whole will be divided into two primary sections dealing with (1) an introduction to the principles of EEG/ERP study design and analysis, (2) development of actual EEG/ERP experiments or secondary data analyses. Each individual class meeting will be divided into two sections consisting of (1) either a lecture or a student presentation, and (2) a lab section focused on learning data analysis techniques. Each class will meet in a computer lab where all

students will have access the relevant analysis software (MATLAB, EEGLAB and ERPLAB). Students will be encouraged to apply what was learned in the first part the class period during the second portion of the class. Students who do not have access to competed EEG datasets will be given access to anonymized EEG datasets from one of the instructors' laboratories. During the second portion of the class, the instructor(s) will help students with any analysis difficulties they face.

During the first weeks of the class, students will form project groups. These groups will then work on a proposed final project that will be the focus of their work during the latter portion of the class. Group projects will fall into two broad categories:

1. Designing, running and analyzing data for a novel pilot EEG study.
2. Secondary data analysis of an existing dataset.

Data collection for the pilot study will take place in Dr. Drew, Dr. Euler, or Dr. Payne's laboratory. Students who select option 1 will be expected to participate in the pilot experiment as subjects (unless health concerns prevent this) and serve as experimenters for the experiment.

In addition, students will be asked to perform 1 class presentation during the term. Presentations may cover relevant academic articles, new analyses on the student's data, or a proposed new experiment or analysis. Students will also be expected to carry out short homework assignments: For example, performing short-time FFT (fast Fourier transform) on an example EEG dataset in MATLAB. Students will be asked to turn in the code and final output.

Evaluation Methods/Assignments

1. Class participation: 20%

You are expected to contribute to class discussion during class. Each of you brings our own background, ideas, opinions and research interests that will enrich the class for all of us – but only if you share your thoughts! There will be occasional pass/fail homework assignments that will involve analyzing EEG data, suggesting a class experiment, and the design and analysis of the class experiment.

2. Group proposal: 20%

In week 7, students will propose their final project to the group in a short oral presentation. Proposals will include a week-by-week estimate of what steps will be taken for the proposed project. Presentations will be graded with respect to how well the project is described.

3. Final Group Project Paper & Presentation: 50%

Each group will prepare a final paper and an oral presentation of their final project. The group paper will be a maximum of 20 single-space pages. The paper must describe the EEG experiment design, data collection, analysis of resultant data and interpretation of results. We will work together on related analyses throughout the term, but students will be expected to analyze the data for the final project independently.

4. Fulfillment of personal goals: 10%

Each student will be asked to articulate a personal goal for the class by week 6. At the end of the term, we will evaluate whether the personal goal has been met. The goals should be challenging, but realistic and tractable. Examples of possible personal goals include:
Creating a working analysis pre-processing script for EEG analysis.
Successfully implementing ICA artifact correction on a pre-existing dataset.

Lower limit for grades: A (93%), A- (90%), B+ (87%), B (83%), B- (80%), C+ (77%), C (73%), C- (70%), D+ (67%), D (63%), D- (60%), E (<60%)

Student Rights and Responsibilities

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, detailed in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors. Students have the right to appeal such action to the Student Behavior Committee. For Student Rights and Responsibilities, see
http://www.regulations.utah.edu/academics/6-400.html

Department of Psychology Undergraduate Academic Misconduct Policy

The Department of Psychology has a zero tolerance policy for academic misconduct. Academic misconduct includes cheating, plagiarizing, research misconduct, misrepresenting one's work, and inappropriately collaborating. This applies to any work students turn in for evaluation or course credit. Definitions can be found in the Student Code at
http://www.regulations.utah.edu/academics/6-400.html

If you are suspected of academic misconduct, the process proceeds according to the rules found in the
Student Code, University Policy 6-400(V). **If you are found responsible for misconduct, consequences range from failure on the assignment to dismissal from the program**, consistent with both University and Psychology Department Policy.

Minor offenses include failure to use citations correctly, because of lack of understanding of proper procedures for crediting ideas, rather than intention to cheat (with no evidence of lifted/stolen text). Major Offenses include:

1. Cheating on a test, quiz, problem set, or other independent work
2. Plagiarism in written work: Copying any quantity of text from another source or another student without quoting and citing the copied text.
3. Plagiarism in written work: Flagrant misuse of citations, such that a student clearly attempted to represent ideas that were not his/hers as if they were, even if the ideas were presented in the student's own words.

Both minor and major offenses will have consequences, as outlined in the full Psychology Department Policy (which you can find here in PDF format).

Assignments turned in on Canvas will be screened using Turnitin, and the above policy will be followed when misconduct is found.

Student Support & Accommodations

Americans with Disabilities Act (ADA) Statement
The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

More information can be found in the CDS Student Handbook:
http://disability.utah.edu/documents/CDS-Student-Handbook.pdf.

Student Rights and Responsibilities
All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, detailed in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content.

The Department of Psychology has a zero tolerance policy for academic misconduct. Academic misconduct includes cheating, plagiarizing, research misconduct, misrepresenting one's work, and inappropriately collaborating. Definitions can be found in the Student Code at http://www.regulations.utah.edu/academics/6-400.html.

If you are suspected of academic misconduct, the process proceeds according to the rules found in the Student Code, University Policy 6-400(V). If you are found responsible for misconduct, consequences range from failure on the assignment to dismissal from the program, consistent with both University and Psychology Department Policy.

Respect for Diversity
We intend that students from diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to class be viewed as a resource. Please let me know ways to improve the effectiveness of the course for you personally or for other students.

Wellness Statement
Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness - www.wellness.utah.edu (801-581-7776). The Counseling Center is another excellent resource, offering services that include counseling and a mindfulness clinic (see http://counselingcenter.utah.edu).

Academic Calendar

http://www.sa.utah.edu/regist/calendar/datesDeadlines/deadlines.htm

Course Schedule

This schedule is subject to changes depending on the interests/ experience of the students. Check the Canvas site for an up to date schedule.

Date	Lecture Topic	Readings	Things that are due
11-Jan	intro		
18-Jan	background & components	Luck Chapters 2&3	
25-Jan	design of ERP experiments	Luck chapter 4	
1-Feb	recording EEG	Luck chapter 5	
8-Feb	artifact rejection	Luck chapter 6	
15-Feb	filtering	Luck Chapter 7	
22-Feb	averaging	Luck Chapter 8	**Project proposals and self assessment due**
1-Mar	plotting		
8-Mar	stats	Luck Chapter 9	
15-Mar	**SPRING BREAK**		
22-Mar	time frequency analyses	**Cohen Chapter 9**	
29-Mar	Writing ERP papers	**Luck Chapter 15 (online)**	
5-Apr	Single trial analyses		
12-Apr	setting up an ERP lab	**Luck Chapter 16**	
19-Apr	**Final Project Presentations**		**Final paper**