PSY 401A/501A, Principles of Psychophysiology
Spring, 2019, Mondays, 1:00-3:45 P.M.
Room 323 Psychology

Instructor
John J.B. Allen
424 Psychology
Email: John.JB.Allen@Arizona.edu
Phone: 621-4992
Office Hours: 4:00-5:00 P.M. Mondays

Teaching Assistant
Michael Medrano
Email: michael18@email.arizona.edu

Course Description and Objectives
This course will provide an overview of the principles, theory, and applications of psychophysiological assessment. The course has three main objectives:
   a) to provide an introduction to major psychophysiological measures, covering their physiological bases, proper recording and signal processing procedures, and appropriate interpretation;
   b) to provide an introduction to theory and research in major areas of human psychophysiology with specific applications to the study of cognition, affect, and psychopathology; and,
   c) to provide an introduction to laboratory techniques and methodological principles in human psychophysiology.

Expected Learning Outcomes
Students will be able to:
   a) understand and critically evaluate psychophysiological methods reported in scientific papers;
   b) critique the interpretation of findings from psychophysiological research, evaluating the extent to which researchers have appropriately interpreted their psychophysiological findings;
   c) propose a study that utilizes psychophysiological measures to answer a question of psychological significance.

Course Webpage
Please visit the course webpage (jallen.faculty.arizona.edu, courses) for links to:
   - Copies of lecture slides
   - The reading list with links to download pdfs and access the book electronically
   - A copy of the research proposal requirements and guidelines

Any changes to the course content or schedule will be reflected on the course webpage.

D2L
Despite my general dislike of D2L, we will use it for calendar, gradebook, and assignments. Many other materials will be available from the course webpage (jallen.faculty.arizona.edu, courses).

Course Structure
The course will involve a combination of lecture, discussion, and demonstrations. I will bring in samples of physiological signals for us to examine, and if you have psychophysiological data you are interested in examining, please let me know. There is no explicit participation requirement, but you will get more out of the course if you ask questions as they arise. We will be covering technical material, and you should feel quite free to interject your questions when they occur to you. Each class period, you will hand in a 3x5 card with your name and a question or comment that arose for you in the context of the lecture. This feedback mechanism, in addition to serving to keep attendance, will provide me with feedback in terms of how the material is being understood (or not understood!).
Readings
Readings will be taken from two textbooks. The *Handbook of Psychophysiology* is a rather expensive but comprehensive handbook that will serve as a great reference for those of you who have continuing interest in the field. This book is also available as an electronic book (follow link on the class webpage to the reading list for downloads). The other book is out of print, but is available as a pdf, available for download at that same link. Readings will also be taken from other sources, which are available as pdf files for downloading (from that same link).

The main single source of readings for the course is:


The assigned readings from this text are listed below under the schedule of topics and readings. The other textbook is a programmed-learning text in basic electricity that is available for download from the link above:


You should complete Chapters 1-5 of the Ryan programmed text. There will be a pass/fail test covering this material to be administered at the beginning of class 11 February, 2019. You must score above 80% to pass; you may retake the test should you need to do so.

Evaluation
Students in 401A will be evaluated separately from those in 501A. Your grade will be determined by:

- The electricity test (passing gives you 20% of the total points; failing = no points);
- Attendance (10%);
- Your grade on a research proposal/report (40%, details will be available on the course webpage, due May 1, 2019, 5 pm, via D2L)
- Your performance on a take-home final (30%, due 6 May, 2016, 1 pm, hard copy in my mailbox). The take-home final will be given to students on the last day of class and be due one week later during the final exam time.

Late papers or exams will receive a 10% reduction in possible points for each day such papers or exams are late.

The research proposal/report will have different requirements for those enrolled in 401A versus 501A. Full details will be available later in the semester. In short, 401A students will propose a research study. Those in 501A will have this option to propose a research study, or an option to analyze data they may have access to, and to present the analysis in the form of a methods/results section.

Your letter grade will be determined in the following way: The highest total score (based on the electricity test, attendance, the research proposal/report, and the take home final) attained by any student in the class (for 401A and for 501A, considered separately) will become the reference score for grading. There will therefore be one reference score for 401A, and one for 501A. The student(s) with this highest total score will receive a grade of 100%. All other students will receive a percentage grade based upon this highest score, and the following scale will be applied:

- 90% & above = A
- 80%-89% = B
- 70%-79% = C
- 60%-69% = D
- Below 60% = Fail

Incompletes
Short of major medical illness or global catastrophe, there is virtually no reason I will award an incomplete grade for this course. Incompletes merely move a crisis from one time to another.

Absences
If you need to miss class, you will lose attendance credit for that day. You can get notes and a video podcast of that day’s lecture and activities from the course website.
Students with Special Needs
If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

Academic Integrity
Students are expected to adhere to the UA Code of Academic Integrity as described in the UA the Academic Integrity policy: https://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity. Cheating or plagiarism on the exam or the paper will result in a failing grade for the course, a notice will be sent to the Dean’s office, and expulsion from the University of Arizona can result. Plagiarism is defined as any case where one person tries to take credit for the ideas or work of another, including fellow students, or published authors (please see: http://www.library.arizona.edu/help/tutorials/plagiarism).

Other University Classroom Policies that Apply to this Class
Please familiarize yourself with these additional University Policies:

- Non-Discrimination and Anti-Harassment Policy. The University of Arizona is committed to creating and maintaining an environment free of discrimination: http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy
- Threatening Behavior by Students. The University seeks to promote a safe environment where students and employees may participate in the educational process without compromising their health, safety, or welfare: http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students

Classroom Behavior Policy and the Use of Electronic Gizmos Specifically
It is my intent, and I ask you to join me, in creating a positive learning environment that is free from distractions. Computers or tablets may be used for note-taking and downloading lecture notes. As such they can be useful, but alas, they can also be a potent distraction. Please do not use them for other purposes (e.g. social media, e-chatting/texting, shopping, catching up on email, organizing a flash mob, plotting mass insurrection) or you will be asked to leave the classroom. Please turn your phones to silent mode and do not use them during class or you will be asked to leave the classroom.

Changes in Course Content, Schedule, Requirements
The information contained in this syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor. In fact, the topics and readings are very likely to change, but I will make announcements as they do.

Tentative Schedule of Topics & Readings
Links for all readings available from course website

14 January: Overviews

21 January: Martin Luther King Holiday

28 January: Foundations: Basic Electricity, Neuroanatomy and Neuropyschology
4 February: **Electrodermal Activity: Basics and Application to Polygraph Testing**


**OPTIONAL**


11 February: **BASIC ELECTRICITY TEST ADMINISTERED AT START OF CLASS**

**Catch Up Class: Electrodermal Activity continued, Possibly The Oculomotor System**


**OPTIONAL**


18 February: **Cardiovascular Psychophysiology**


**OPTIONAL**


25 February: **Functional Neuroimaging: PET and fMRI**


**OPTIONAL**


4 March: **Spring Recess!!!!!!!!!!**

11 March: **The Skeletomotor System**


**OPTIONAL**


18 March:  **The Electroencephalogram, Basics in Recording EEG, Frequency Domain Analysis and its Applications I -- Mood Disorders & Emotions**


**OPTIONAL**


25 March:  **Frequency Domain Analysis and its Applications II -- Oscillatory and "40 Hertz" Phenomena**


**OPTIONAL**


1 April:  **The Event-Related Potential: Basics and Applications (CNV, early components & P300)**


**OPTIONAL**


8 April:  **(RESEARCH PROSPECTUS DUE)**

**More Applications of the ERP: P300, N400, ERN**


Hajcak, G. (2012). What we've learned from mistakes: Insights from error-related brain activity. Current Directions in


**OPTIONAL**


15 April: **Neurostimulation and Neuromodulation**


**OPTIONAL**


22 April: **Advanced Signal Processing I**


**OPTIONAL**


29 April: **(PAPER DUE 2 PM) Advanced Signal Processing II**


**OPTIONAL**


6 May: **FINAL EXAM DUE 1 PM**
Other recommended sources for the seriously inclined:
PSY 401B/501B
Psychophysiology Laboratory
Some Wednesdays, 3-5 pm
Room 321
Spring, 2019

Supervising Instructor: John JB Allen (John.JB.Allen@Arizona.edu)
Laboratory Teaching Assistant: Michael Medrano (michael18@email.arizona.edu)

Full Syllabus
A full syllabus is available from the instructor's website and will also be made available during the first meeting of the laboratory section 401B/501B on January 23rd.

Laboratory Location
Although didactic sessions will begin in room 321, we will then move to the laboratory for demonstrations. This is also where you will collect data. The Psychophysiology Laboratory, room 409 Psychology, is a research laboratory, but times will be made available for class members to conduct experiments, under the supervision of the teaching assistant.

Meeting Times and Important Dates

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<thead>
<tr>
<th>Lab Mtg</th>
<th>Report Due</th>
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<tbody>
<tr>
<td>Jan 23</td>
<td>4:00-5:00</td>
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<tr>
<td>Feb 13</td>
<td>3:00-5:00</td>
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<td>Mar 13</td>
<td>3:00-5:00</td>
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<td>Apr 3</td>
<td>3:00-5:00</td>
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<tr>
<td>Apr 17</td>
<td>3:00-5:00</td>
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Lab Introduction & Tour
Skin Conductance (2/27)
Cardiovascular/EMG (3/27)
EEG (4/17)
ERP (5/1)

Description
Psychophysiology Laboratory must be taken concurrently with PSY 401A/501A, Psychophysiology Seminar. The objective of the laboratory is to provide a pragmatic "hands-on" experience in psychophysiological recording and analysis. The laboratory will involve learning the many facets of psychophysiological signal acquisition and analysis. Four experiments will be conducted, each involving different response systems, offering you the opportunity to gain experience acquiring, analyzing, and interpreting autonomic and electrocortical psychophysiological measures.

Evaluation
For each experiment, students will be required to write an APA-style method and results section. These four papers will form the basis of your grade for the lab.

Experiments to be conducted
Experiment 1: Skin-conductance Guilty Knowledge Technique
Experiment 2: Electrocardiographic (EKG) responses to stress
Experiment 3: Frontal electroencephalographic (EEG) spectral changes
Experiment 4: Event-related brain potentials (ERPs)

Readings:

Readings will be provided as required in addition to the following, which should be read in advance of the first laboratory session (available from reading list for downloads on class website):