

**University of Florida**  
**College of Public Health & Health Professions Syllabus**  
**CLP 7934: CLINICAL AND COGNITIVE NEUROSCIENCE: METHODS AND THEORY (3 hrs)**  
**Fall Semester 2017**

Meeting Time/Place: Thursday, 9:35AM-12:35PM (3 hour slot), Room TBD

Delivery Format: On campus, Regular

Course Projects Drive: p:\clin\_cog\_methods

**Instructor Name:** Adam J. Woods, Ph.D.

Assistant Professor, Clinical & Health Psychology and Neuroscience

**Office:** HPNP 4132

**Email Address:** [ajwoods@pnhp.ufl.edu](mailto:ajwoods@pnhp.ufl.edu)

**Office Hours:** By Appointment

**Preferred Course Communication:** email

**Prerequisites** Must be a graduate student in good standing in Clinical and Health Psychology. All others must petition. Prior coursework in neuroanatomy will be an important precursor, but can be waived based on a student's prior experience on a case-by-case basis.

### **Course Overview and Objectives**

This course addresses theory and methods that allow an integration of core knowledge of cognitive psychology and key biological bases of complex behavior. This course will provide an overview of methods in clinical and cognitive neuroscience with lab-based exposure to methodology. Methods covered will include, but are not limited to, structural and functional magnetic resonance imaging, electroencephalography, transcranial electrical stimulation, transcranial magnetic stimulation, positron emission tomography, etc. You will learn the most important conceptual background underlying human neuroscience methods common in clinical and research settings, as well as an understanding of the types of information each of these methods provide to answer clinical and research questions. You will also gain initial exposure to the equipment central to these methods.

### **The Peptalk**

For some of you, this may be your first formal clinical and cognitive neuroscience methods course in graduate school. Some of you may not have used the methods covered in this course or had neuroanatomy. That's ok. Regardless of your past experience, this is going to be a lot of work/fun. You are going to read a good bit and there are all sorts of different methods peppered throughout. This is not a typical lecture type class. This course will involve a mix of expert lectures, student presentations and facilitate discussion, and time spent in the lab getting to know the equipment that makes these methods possible. These lab excursions will involve demos by experts in the field and hands on experience when possible. The hope is that you will come away not only knowing more about what these methods can provide in a clinical and research setting, but also excitement about using the methods in your work.

### **Course Materials**

Readings will involve selected seminal papers/chapters on each methodological topic. Each week, you will read two seminal papers and each will be presented by one of the students in the course. There will not be a required textbook for this course. Articles/chapters will be distributed electronically and placed in a designated class folder on our class p-drive (clin\_cog\_methods).

Make sure you have access to this p- drive. If not, it is your responsibility to let me know so that you can be given access by IT. I will try to make handouts/slides available in this class folder after class.

### **Course Format**

This course will be conducted in the form of a graduate seminar. Class will meet TBD from TBD (3 hour slot) in Room TBD on the first floor of the HPNP building. This is a participatory course. Classes will typically consist of an expert lecture (1 hour), presentation of one to two seminal papers by students (30 minutes), student facilitated group discussion (30 minutes), and a one to three hour methods lab exposing students to the method (location dependent on location of lab equipment) and in some cases providing hands on experience with methods (e.g., preparing transcranial electrical stimulation electrodes, preparing EEG electrodes, etc.). Please be on time.

### **Course Requirements, Evaluation, and Grading**

Grades will be weighted according to the number of points available for each component, as described below. Final grades will be calculated as a percentage of the highest score. Evaluation in the course will be based on the following components

Final Paper 50% (cumulative)

Methods Paper Presentation and Discussion Facilitation 20%

Methods Discussions 10%

Methods Labs 20%

#### **1. Final Paper**

The Final Paper will comprise 50% of your grade. This paper will be an R21/R03 style research project proposal (6 pages single spaced) with a one-page specific aims page (7 pages total). This proposal can focus on the student's specific area of graduate research and will be expected to integrate one or more methods as a central feature of the research proposal and demonstrate integration of core knowledge of cognitive psychology and key biological bases of complex behavior. This is intended to demonstrate the student's mastery of the conceptual and practical application of methods and theoretical content covered during the course into their research program.

#### **2. Methods Paper Presentations and Discussion Facilitation**

Methods Paper Presentations and Discussion Facilitation will comprise 20% of your grade. Each student will take the lead in presenting a seminal method paper to the class and engaging discussion about the paper. At the first course, students will sign up for topics of presentation. Part of this assignment will involve learning something more about the "method" at hand in addition to examining/discussing the importance of the chosen method for clinical and research application and what information the method can provide. You will also serve as discussion leader for a 30-minute discussion of your presented paper and the expert speaker content. The format of the discussion will be left up to the person leading it that day. Examples of Discussion Facilitation methods are available upon request.

#### **3. Methods Discussions**

Methods Discussions activity will comprise 10% of your grade. Students are expected to actively participate in the weekly methods discussion based on the expert lecture and the paper presented by your fellow students in the course. That weeks student presenter will facilitate the discussion, but it is important for fellow students to use this opportunity to explore their questions related to the week's content on the method presented.

#### 4. Methods Labs

Methods Labs activity will comprise 20% of your grade. You will not be required to personally undergo any form of method (e.g., MRI, CT, etc.) presented in the course. The Methods Lab portion of this course will be organized around in lab demos organized by the instructor with exposure to the types of equipment and practical considerations needed for use of equipment central to the methods covered. The instructor or the week's expert speaker will provide a guided overview of important considerations for using the method in research or clinical settings.

#### Grading

Scores will be rounded to the nearest percent (rounded up or down, whichever is closest) for grade determination in accordance with the grading table below

% of points earned	93%-100%	90%-92%	87%-89%	83%-86%	80%-82%	77%-79%	73%-76%	70%-72%	67%-69%	63%-66%	60%-62%	Below 60%
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

Below is a table linking letter grades to grade points.

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	WF	I	NG	S-U
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0	0.0	0.0	0.0	0.0

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

#### Policy Related to Class Attendance

Attendance and class participation is required. Students are expected to complete assigned readings prior to coming to class. Students needing to miss class for personal or professional reasons should consult with the instructor prior to the date on which they will be unable to attend. It is the student's responsibility to acquire any handouts or notes from a colleague in the class for any sessions missed.

#### Statement of University's Honesty Policy (cheating and use of copyrighted materials)

Students are expected to act in accordance with the University of Florida policy on academic integrity (see Student Conduct Code, the Graduate Student Handbook or this web site for more details: [www.dso.ufl.edu/judicial/procedures/academicguide.php](http://www.dso.ufl.edu/judicial/procedures/academicguide.php)). Cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

#### Policy Related to Make-up Exams or Other Work

Students are expected to complete assigned readings prior to coming to class. Personal issues with respect to class attendance or fulfillment of course requirements will be handled on an individual basis. Students must make *prior* arrangements with Dr. Woods if they must miss any in-class activities, and an alternative completion time/method must be arranged (when possible).

### **Accommodations for Students with Disabilities**

If you require classroom accommodation because of a disability, you must first register with the Dean of Students Office (<http://oss.ufl.edu/>). The Dean of Students Office will provide documentation to you, which you then give to the instructor when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework.

### **Counseling and Student Health**

Students may occasionally have personal issues that arise in the course of pursuing higher education or that may interfere with their academic performance. If you find yourself facing problems affecting your coursework, you are encouraged to talk with an instructor and to seek confidential assistance at the University of Florida Counseling Center, 352-392-1575, or Student Mental Health Services, 352-392-1171. Visit their web sites for more information: <http://www.counsel.ufl.edu/> or <http://www.health.ufl.edu/shcc/smhs/index.htm#urgent>

The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services, including primary care, women's health care, immunizations, mental health care, and pharmacy services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: [www.health.ufl.edu/shcc](http://www.health.ufl.edu/shcc)

Crisis intervention is always available 24/7 from: Alachua County Crisis Center: (352) 264-6789. BUT – *Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.*

## Class Syllabus

### Clinical and Cognitive Neuroscience Methods

The course is divided into 3 sections: 1) Brain imaging and spectroscopy, 2) Brain stimulation, 3) Human electrophysiology. Within these three sections, we will cover major methodologies that you are likely to encounter in clinical and research settings. These topics will be covered through a mixture of expert lectures, student led paper presentations and facilitated discussions, excursions to facilities where this equipment is used, exposure to common processing software for different methods and hands on experience with different accessible techniques.

#### **Section 1: Brain Imaging and Spectroscopy**

##### **Week 1 – Structural Brain Imaging – MRI (T1 and FLAIR) and CT**

Introduction to Course and Requirements

Overview of course topics to be covered

Assignment of Method Paper Presentation Topics

Survey of student prior experience with clinical and cognitive neuroscience methods

Expert Lecture: Dr. Adam Woods, PhD (1.5 hour)

##### **Week 2 – Structural Brain Imaging – MRI T1 processing**

Lab: 3-hours on Freesurfer processing for T1s

##### **Week 3 – Structural MRI – Diffusion Weighted Imaging (Tom Mareci)**

Expert Lecture: Dr. Tom Mareci, PhD (1 hour)

Student Method Paper Presentation

Student Facilitated Discussion

Lab: 1 hour on DWI processing

##### **Week 4 – Functional MRI – BOLD – Block and Event-related design (Woods)**

Expert Lecture: Dr. Adam Woods, PhD (1 hour)

Student Method Paper Presentation

Student Facilitated Discussion

Lab: 1 hour at MRI scanner

##### **Week 5 – fMRI Processing**

Lab: 3-hours intro lab on fMRI processing using SPM

##### **Week 6 – Magnetic Resonance Spectroscopy – 1H and 31P**

Expert Lecture: Dr. Adam Woods, PhD (1 hour)

Student Method Paper Presentation

Student Facilitated Discussion

Lab: 1 hour at MRI scanner

##### **Week 7 – Positron Emission Tomography (PET)**

Expert Lecture: Dr. Steve DeKosky, MD (1 hour)

Student Method Paper Presentation

Student Facilitated Discussion

Lab: 1 hour at PET scanner facility

## **Section 2: Brain Stimulation**

### **Week 8 – Transcranial Electrical Stimulation (tES) methods**

Expert Lecture: Dr. Adam Woods, PhD (1 hour)  
Student Method Paper Presentation  
Student Facilitated Discussion  
Lab: 1 hour on tES stimulators and operation

### **Week 9 – Transcranial Electrical Stimulation (tES) methods**

Lab: 3-hour lab on tES preparation and electrode placement (hands on)

### **Week 10 – Transcranial Magnetic Stimulation (TMS)**

Expert Lecture: Dr. Adam Woods, PhD (1 hour)  
Student Method Paper Presentation  
Student Facilitated Discussion  
Lab: 1 hour with TMS system and MEPs

### **Week 11 – Deep Brain Stimulation (DBS)**

Expert Lecture: Dr. Michael Okun/Chris Hess (1 hour)  
Student Method Paper Presentation  
Student Facilitated Discussion  
Lab: 1-hour observation of DBS surgical video or in DBS lab

## **Section 3: Human Electrophysiology**

### **Week 12 – Psychophysiology**

Expert Lecture: Dr. Eric Porges, PhD (1 hour)  
Student Method Paper Presentation  
Student Facilitated Discussion  
Lab: 1-hour demo of Psychophys recording in lab

### **Week 13 – Electroencephalography (EEG) and Event-related potentials – Spectral EEG (Andreas Keil) and ERP (Woods)**

Expert Lecture: Drs. Andreas Kiel (EEG, 1 hour) and Adam Woods (ERP, 1 hour)  
Student Method Paper Presentation  
Student Facilitated Discussion

### **Week 14 – Electroencephalography Lab**

Lab: 3 hours on EEG/ERP prep, recording and processing (hands on)

### **Week 15 – Magnetoencephelography (MEG)**

Expert Lecture: TBD (1 hour)  
Student Method Paper Presentation  
Student Facilitated Discussion  
Lab: 1 hour at MEG facility

**Final Paper Due** electronically to Dr. Woods on **December 13<sup>th</sup> by 5PM:**

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