NSC4V90 — Special Topic in Neuroscience
***HUMAN NEUROSCIENCE LAB* — Fall 2016**
JO 3.209 THURS 5:30 PM– 8:15 PM

Professor

Dr. Sven Vanneste
sven.vanneste@utdallas.edu
http://www.lab-clint.org

Office: BSB 14.538, 972-883-7277
Office hours: on appointment

T.A.: Anusha Mohan
(axm145030@utdallas.edu)
Office: GR 4.608, Tue 4:00 – 5:00 pm

T.A.: Justin Eroh (jxe106020@utdallas.edu)
Office: GR 4.608, Mon. 1:00 – 2:00 pm

Prerequisites
None.

Course Description
This laboratory course provides hands-on experience with the use of electrophysiological techniques for the theory, collection, and analysis of neuroscience data. Students will gain hands-on experience learning professional data analysis techniques for human electrophysiology using applications of EEG and ERP software, and will cover critical elements of experimental design neuroscience.

Course Scope
Neuroscience is one of the fastest growing and important scientific areas in the world. Most human neuroscience is accomplished in the digital age by meticulous work on computers. Having the best data in the world is useless unless you can crack the code to get access to it and know how to work with it to reveal its secrets that are contained within. In modern human neuroscience, the critical laboratory is the computer laboratory, and the code to crack lies in the representation of 1's and 0's. This is where the secrets of the mind lie, and this is where we will go exploring. This is designed for you to learn to steer your own way by the end of it.

Course Goals
The goal is to teach high level professional scientific data analysis and communication skills that are necessary for human neurophysiology and in the course of this goal you will also learn a lot about neuroscience and about experimental design in neuroscience and psychology as well. The course is focused on applied hands-on aspects of that content working with the data. Skills with scientific data are great, but science also requires skills to communicate your discoveries, or we will die like Gregor Mendel with no one knowing what you discovered with your brilliant efforts. Hence, to help make us better scientists and communicators, we will practice writing. Good scientific writing is aided by skills in scientific reading too, so we will practice scientific readings as well. It will be a busy course, but one in which you will learn a myriad of skills, knowledge, and understanding of human neuroscience.

Student Learning Objectives
1. Introduce students to lab methods in human neuroscience, particular electrophysiology.
2. Develop critical thinking skills and an understanding of issues in neuroscience research.
3. Develop skills for analyzing EEG data of human neuroscience.
4. Develop communication skills for quality scientific writing.

Required Textbooks
Readings as needed will be posted on my website.

Attendance
Your attendance will not be scored in this course, but it may be reflected in the scores that you demonstrate on your assignments exams. This is a hands-on lab course that meets only once a week: if you miss class you will quickly be far behind. Further, successful completion of the course requires written lab reports of the data analysis that we conduct in class. Hence, it is critical to attend class, and to be there on time.

E-learning
I will post relevant course materials when available, as well as announcements and updates to the course which students are responsible for

being familiarized with. Discussion boards and Chat are available for use among your peers to discuss class topics and questions.

Summary
Before each class (indicated by a (S) in schedule) you have to review a research paper related to the technique that is going to be discussed in class. The paper will be provided. You have to write a one page summary explaining the research question, method used, the results and conclusion. The summary needs to be sent to the T.A. before each class starts. This will account towards for 30% of the final grade.

(Class) Assignments
For each technique learned in class you will get an assignment (indicated by an (A) in schedule) or class assignment (indicated by a (CA) in schedule) where you need to apply the technique learned in class and write up a lab report in a concise, thoughtful way. Explain the experimental design and results. The assignment needs to be sent to the T.A. before each class starts. This will account towards for 45% of the final grade.

Final Exams
The final exam will be a take-home exam in the form of substantial written lab reports. This will account towards for 25% of the final grade.

Grading Policy
A final grade will be submitted: A: 90-100%, B: 80-89%, C: 70-79%, D: 50-69%, F < 50. The instructor reserves the right to change the evaluation criteria (grade brackets) at his discretion, even from test to test.

Course & Instructor Policies
PLEASE DON'T BE LATE! Lectures begin promptly, and lateness is rude to your instructor and fellow students. Excused absences will be given only if: (a) you are seriously ill and have verifiable documentation from a physician, or (b) you were detained by law at the exam time, or (c) you made prior arrangements to attend a verifiable religious or family event. In ALL of these cases except (b), you must notify the instructor in advance by email; for (b), your court order will suffice. Otherwise, you will receive a zero (0) for that assignment/exam. A maximum extension of one week (7 days) beyond the scheduled assignment/exam date can be granted, except for the final exam.

Grades will be posted on eLearning, and assignments and exams will be reviewed in a timely fashion to give you feedback to study for your next assignments. Audio recordings, cell/smart phone use and any form of photography/video recording is prohibited during class. Laptops are allowed at the discretion of the instructor.

Research clearly demonstrates that you remember information better if you write it down yourself rather than passively view it, so please take good notes in class!

UT Dallas Syllabus Policies and Procedures
http://go.utdallas.edu/syllabus-policies

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.

Class schedule

(Subject to change at the discretion of the instructor, or the dictates of Texas weather)

Date	Topic
Aug. 25	Introduction
Sep. 01	Theoretical background: Exploring the network dynamics underlying brain activity during rest
Sep. 08	Lab: Cleaning up data
Sep. 15	Lab: Cleaning up data & Frequency analysis (S)
Sep. 22	Lab: Source reconstruction (S)
Sep. 29	*Lab: collecting data (group A)/Cleaning up data (group B)(CA)*
Oct. 06	*Lab: collecting data (group B) /Cleaning up data (group A)(CA)*
Oct. 13	*Lab: collecting data (group C) /Cleaning up data (group D)(CA)*
Oct. 20	*Lab: collecting data (group D) /Cleaning up data (group C)(CA)*
Oct. 27	Lab: Source reconstruction & Region of interest analysis (S)(A)
Nov. 03	Lab: Independent Component Analysis (S)(A)
Nov. 10	Lab: Connectivity: functional and effective (S) (A)
Nov. 17	Lab: Cross frequency coupling (S) (A)
Nov. 24	Fall Break
Dec. 01	Theoretical background: Graph theory & Event related potentials