BME 4350/6350 – Computational Neuroergonomics and Healthcare Applications

Course Description
Principles and application of computational methods and technologies to neuroergonomics and neuroengineering, including applications to healthcare; analysis of applications related to brain-system interface and augmented sensory perception; articulation of various methods of non-invasive neuroscience measurements.

Undergraduate/Graduate level – 3 credit hours

Graduate Students are required to complete an extra assignment/presentation. Therefore for graduate grade will be out for a total of 120 points that would be scaled to 100 points versus the undergraduate of 100 total points.

Graduate Student Individual Project: All graduate students are required to perform a literature review related to a topic within human-computer interaction or interface design and to present the information in an oral presentation. You do not have to write a paper. But you must use references that will be reflected in your presentation. If you are a distance student you may use voice over on the PowerPoint slides, or if you live locally you are invited to give the talk in person if possible. Your presentation is due 24 hours before your scheduled date so they can be loaded onto the website.

Offered both face-to-face and online

Course Learning Objectives
Students will learn to articulate the different methods of non-invasive measurements of neuroscience. Students will be able to apply the different computational methods for real-world problems.

Course Learning Outcomes
Upon successful completion of this course, students will be able to articulate the different methods of non-invasive measurements of
neuroscience. Students will be able to apply the different computational methods for real-world problems.

Tentative Weekly Schedule

1 Analysis of Brain and Human Behavior, EEG

2 ERPs & Attention and Workload, Paper Discussion 1

3 fMRI

4 Application of fMRI, Augmented Sensory Information- Eye movements

5 Perception and Cognition, **Mid-term Exam 1**

6 Mental workload Analysis

7 NASA TLX**,** PETs Overview

8 Paper discussion 2, Virtual Reality

9 Paper Discussion 3, Introduction to BMI

10 Design of Experiments, **Mid Term 2**

11 Installing Python, Anaconda, Intro to Python Programming

12 Python Programming, Intro to Machine Learning (Graduate Paper due)

13 Intro to TensorFlow, Project proposal due

14 TensorFlow; Application of Python/TensorFlow