Special Topics Course: Exercise Meditation and the Brain

Spring 2016

**Instructor:** Prof. Wendy Suzuki  e-mail: wendy@cns.nyu.edu

**Guest Instructor:** Kim Brown, certified meditation instructor.

**Writing Tutors:** Ruth Hirsch ([rh1561@nyu.edu](mailto:rh1561@nyu.edu)) and Savannah Lim ([ssl399@nyu.edu](mailto:ssl399@nyu.edu))

**Writing Tutor Supervisor:** Dr. Tara Parmiter, Senior Language Lecturer and Mentor Undergraduate Writing Tutors Program ([tkp201@nyu.edu](mailto:tkp201@nyu.edu))

**Meeting time:** Mondays 1:30 to 4:00 p.m.  Meyer 808

**Suzuki Office Hours:** Any time by appointment

**Prerequisites:** INTRONS (NEURL-UA 100)

**Co-requisites:** BINS

**Course Objectives:**

In this course we will explore the history, animal studies and human studies underlying our understanding of the effects of exercise and meditation on brain function. We will do this through a combination of lectures, journal based readings, group learning sessions, debates as well as 2 special sessions where you will participate in aerobic exercise and meditation sessions. The course objectives are three fold. The first is to provide a deep understanding of the human and animal literature on the effects of exercise and meditation on the brain. There is currently an enormous interest in the cognitive benefits of exercise and meditation and we will examine the scientific evidence for these effects. A second objective is to develop skills in experimental design and hypothesis generation by spending time developing new experiments to test the next important question based on the scientific literature examined in class. The third objective is to develop scientific writing skills. In particular we will focus on developing the skills to write a compelling scientific justification for new experiments that students will develop in class with the assistance of NYU’s writing tutor program (see description below).

**Learning Objectives:**
1) To become familiar with the neuroscientific literature on the effects of exercise and meditation on brain function.
2) To sharpen the ability to develop novel experiments using principles of experimental design.
3) To master critical and analytical skills required to evaluate scientific literature
4) To hone your scientific writing skills.
5) To sharpen verbal scientific communication skills through oral presentations and discussion in class.

Description of Writing Tutors Program

In this class, we are fortunate to have help from the Undergraduate Writing Tutors Program. Writing tutors are curious, well-trained peers who provide feedback to students on drafts of writing assignments. Their role is to encourage and challenge students to strengthen their writing and clarify their ideas. Writing tutors are trained to support the aims of the class, learning about the expectations for writing in the class and listening and responding carefully to individual student writers. While writing tutors are not Teaching Assistants and will not assess papers, they will focus writing conferences on questions that generate clearer writing and stronger thinking about the content. Writing tutors will also look for patterns of grammatical error in student papers, explaining how students can learn to correct these errors. The writing tutors’ main goals are to help students develop their writing and thinking in response to particular assignments and to become better writers over the long term.

Writing tutors take a semester-long practicum to learn to think more deeply about writing and to develop practices for working with peers on writing during individualized conferences. Tutors audit several classes or recitations and read some course materials in the classes where they tutor. Their primary aim is, however, to work with students through a practice-based approach to writing and revising. That is, they will ask questions and work to prompt students to reread, rethink, revise, and craft new writing during conferences.

Students are required to participate in the program for each designated paper assignment, submitting a draft of their paper on time for written feedback and attending a scheduled, 30-minute long, one-on-one conference. Writing tutors should receive complete drafts from students, not outlines or rough notes. Late submission of drafts to tutors and missed conferences are reported to the Professor, who may reduce a student’s final grade as a consequence.

Readings: All reading will be original papers and reviews from the literature and will be posted on Classes
Extra Credit Project: The extra credit project this semester will be a 2-week experiment on yourself involving either exercise or meditation. Design an experiment for yourself including a working hypothesis, justification from the literature and a schedule of adherence. The results, will not be statistically significant, but will instead consist of a series of diary entries (once every other day at a minimum where you comment on the features that you are exploring. The idea is to start exploring the relationship between exercise or meditation and your own brain function to start to get you thinking about the kinds of functions that might be affected and that can be studied at an experimental level. The experiment should be carried out over a period of no shorter than 2 weeks and all proposals need to be approved by Prof. Suzuki before you can start them. Credit: Full credit for this extra credit will bump up your lowest homework grade by a full grade (from B and A). Half credit will increase your lowest homework grade a half a grade (B+ to A-). You will never loose points by doing the extra credit assignment.

Grading and Evaluation

- Grades from Homework 1 and 2 (develop your own experiment): 15% each
- Attendance and class participation: 15%
- In -Class Debate: 10%
- Final Experimental Oral Presentation: 15%
- Final Experiment: 25%

Homework and In-class Debate. There will be 2 big graded homework assignments that will consist of the development of novel experiments based on the literature we will be discussing in class. Detailed rubric for these assignments will be given in class. In addition there will be an in-class debate where we will discuss the comparisons between the brain effects of meditation and exercise or debate topics within the exercise and meditation literature. This debate participation and performance will be worth 10% of your grade.

Attendance and Participation – Students are required to actively participate during all class sessions and attendance is mandatory. Missing 3 class lectures without prior approval (not counting religious holidays) will result in a 2-5% drop in your overall class grade. If you arrive more than 15 minutes late to class, you will not be permitted to attend class and it will be considered an unexcused absence.

Final Project: This project is worth 40% of your grade and includes 2 components. A little less than half of this grade (15% overall) will consist of an oral presentation that each student will give to the class based on their original research idea. The remaining part of the grade (25% overall) will be determined by a final written paper which will consist of the description of a
novel experiment similar to the 2 major homework assignments of the semester, but this experiment will be more substantial with additional requirements for a possible results and discussion sections.

**Course Schedule:**

- **Jan 25** Historical Introduction: From Lashley to Enriched Environments
- **Feb 1** Effects of Exercise on Motor Circuits (First draft of first hypothesis due)
- **Feb 8** BDNF, Exercise and the Brain **Special exercise session in class** (Second draft hypothesis with introduction due and start working with writing tutors)
- **Feb 15** Holiday
- **Feb 22** Neurogenesis and the brain: Exercise and enrichment (Final first experiment due with feedback from Tutors).
- **Feb 29** Exercise and cognitive performance: animal studies
- **March 7** Exercise and cognitive performance: Human studies (Draft of Experiment 2 due) (Start working on Draft 2 of Experiment 2 with Writing Tutor right after class this week)
- **March 14** Spring Break
- **March 21** Effects of exercise in mental disease
- **March 28** Meditation and the brain: Introduction (Final draft of Experiment 2 due today)
- **April 4** Meditation: Studies of expert meditators ***Special Meditation instruction in class***
- **April 11** Meditation: Studies of non-expert meditators (Provide a first of your final project to tutors) (Discuss final project in class)
- **April 18** Debate: “An Exercise Meditation Smackdown”
- **April 25** Final Student presentations in Class (Continue to work with writing tutors)
- **May 2** Final Students presentations in class (Continue working with writing tutors)
- **May 9** Final Student presentations in class (Continue working with writing tutors)