**PSYC G4440y: Topics in Neurobiology & Behavior**

**Meeting Time: Monday 6:10-8:00 pm, Room 405 Schermerhorn Hall**

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| **Instructors** | Prof. Carl L. Hart | Dr. Kate O’Malley |
| **Office Location** | Schermerhorn 416 | Schermerhorn 510 |
| **Office Phone** | (212) 854-5313 |  |
| **Office Hours** | By appointment | By appointment |
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***Course Description***.

This seminar evaluates the scientific evidence supporting neural correlates of substance use and substance use disorders. Students will obtain a basic working knowledge of the neural mechanisms that are thought to mediate acute and long-term effects of so-called recreational drugs. Special emphasis will be placed on neuro-imaging data seeking to explain substance use by adolescents. The degree to which brain findings – compared with other variables such as sociodemographic characteristics – predict substance use and substance use disorders will be a major focus of discussion in this seminar. Required readings will focus heavily on the empirical literature generated from the ABCD Study (Adolescent Brain Cognitive Development). Upon completion of the seminar, students will be able to better evaluate claims made about biomarkers that underlie substance use disorders. More broadly, the skills obtained in this seminar will help students hone critical-thinking skills.

***Course Requirements: Basis for Student Evaluation.***

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|  | **Percentage of course grade** |
| Attendance | 52 (4 points/session) |
| Class Participation / Weekly Journals | 26 (1/1 point/session) |
| Student Presentations | 7 |
| Letter to the Editor (Final Paper) | 15 |

***Attendance.*** Attendance is mandatory and absences are rarely excused.

***Class Participation and Weekly Journals.***This seminar requires that all students be active participants, interrogating weekly readings. Students are expected to come to class prepared with discussion issues related to the current readings. To facilitate this process, students will keep a journal documenting important questions or issues about the readings. Journal entries will be collected at the start of each session; late entries will not be accepted. They should summarize assigned readings and should address the following questions:

1. What was the study questions under investigation?
2. What was the methodological approach taken to answer this question?
3. What were the study findings?
4. What conclusions were drawn by the investigators?
5. What are your conclusions, i.e., your take-home message, after accounting for the study’s merits and limitations?

***Student Presentations.*** Each week, two related papers will be discussed. The discussion of each paper will be led by a student, who will, first, give a 30-minute presentation of one paper. Each student will be expected to use PowerPoint or other visual aids that will facilitate communication of the paper. Presentations will be judged by the following criteria:

1. Presentation skills
   1. ability to facilitate discussion
   2. engagement with the audience
2. Concise overview of the article
   1. rational
   2. hypothesis tested
   3. experimental design/methodology
   4. results and researchers’ conclusions
3. Evaluation of researchers’ conclusions, taking into account merits and limitations of the study

***Letter to the Editor***. A large portion of each student's course grade will be based on a publishable letter submitted to a journal editor. Letters will raise issues/concerns about a recently published paper in the area of substance use or abuse. Typically, such letters are no more than 500 words. Letters are expected to incorporate topics, concepts, and principles covered in class. For example, students should ask questions such as the following: Have the authors satisfied the criteria for determining causation? Is the model being used appropriate for the stated goals of the study? Do the data collected in laboratory animals correspond with those obtained in humans? Students are expected to work with Prof. Hart throughout the semester to discuss their topics but are required to have selected a topic by March 17. One point will be subtracted from the Paper’s total grade for each day the topic selection is late.

Students are also expected to submit several drafts to Prof. Hart before submitting their letters to a journal for consideration for publication. Three points will be deducted from the Paper/Letter grade if a first draft is turned in beyond April 21. It is the student’s responsibility to research the targeted journal’s Letter Submission Requirements. All final Letter submissions are due prior to May 12th at 6 pm.

***Grading Scale*.**

97-100% -       A+

93-96% -         A

90-92% -         A-

87-89% -         B+

83-86% -         B

80-82% -         B-

77-79% -         C+

73-76% -         C

70-72% -         C-

60-69.9% -      D

Below 60% -   F

***Note****: Aspects of this course may be changed if unforeseen circumstances arise; these changes, however, will be announced before they are initiated.*

***Class Schedule*.**

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| Dates | Readings | Topics |
| 1-27-25 |  | Introduction |
| 2-3-25 | [Koob and Volkow 2016](https://courseworks2.columbia.edu/courses/214212/files/23062280?wrap=1)  [Actions](https://courseworks2.columbia.edu/courses/214212/assignments/syllabus)    [Sullivan et al. 2022](https://courseworks2.columbia.edu/courses/214212/files/23062285?wrap=1)[Download Sullivan et al. 2022](https://courseworks2.columbia.edu/courses/214212/files/23062285/download?download_frd=1) | Overview of substance use and neural mechanisms involved |
| 2-10-25 | DiDomenico & Eaton 1988    [Olds & Milner 1954](https://courseworks2.columbia.edu/courses/214212/files/23062288?wrap=1)  [Actions](https://courseworks2.columbia.edu/courses/214212/assignments/syllabus) | Determining neural causation |
| 2-17-25 | [Langenecker et al. 2020](https://courseworks2.columbia.edu/courses/214212/files/23062292?wrap=1)  [Actions](https://courseworks2.columbia.edu/courses/214212/assignments/syllabus)    [Manza et al. 2023](https://courseworks2.columbia.edu/courses/214212/files/23062302?wrap=1)  [Actions](https://courseworks2.columbia.edu/courses/214212/assignments/syllabus) | Connecting “drug reward” to brain structures |