Syllabus PSY 493 Section 002: Neuroscience of Psychopathologies

Fall 2019; W/F 3 – 4.20; Room 103 Berkey Hall

Instructor

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Co-instructors

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Course prerequisites

PSY 209 Brain & Behavior or NEU 301 Intro to Neuroscience I. Students should have a basic knowledge of the central nervous system.

Course Description

The course provides an overview of the neurobiological mechanisms underlying developmental and adult psychopathologies including depression, anxiety disorders, violence, personality disorders, autism, and schizophrenia. We will explore the involvement of neurotransmitters in psychopathology, including serotonin and dopamine, neuropeptides such as vasopressin and oxytocin, stress hormones, neuronal connectivity, and neural circuits. We will discuss how genetic background and early environment can be risk factors for the development of psychopathologies. We will review how neurotransmitters, neuropeptides, stress hormones, and impaired neuronal connectivity may mediate abnormal regulation of emotion, cognition, and social behavior. The course will discuss current findings from human studies and from animal models of psychopathology.

Course Readings

The course material consists of recent scientific journal articles (research reviews and primary research articles). All journal articles will be posted on D2L (https://d2l.msu.edu/). To provide the option to discuss the latest discoveries in the field, primary research articles may be posted only one week before the articles are discussed in class. The journal articles serve as a basis for the class lectures in which we will further elaborate on the specific topics. Please read the journal articles in advance and be prepared to discuss them in class.

Top Hat

This course requires the use of Top Hat (www.tophat.com), a classroom engagement tool that is designed to assess your understanding of course material in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message. *All student responses to Top Hat questions will be graded on participation and correctness* (See **Overall Grade** for further details).

You can visit the Top Hat Overview (https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

In addition to allowing for immediate response to questions in class through your device, this course will be using Top Hat with *Top Hat Test* to allow us to go paperless and *run exams online from any personal or mobile device* (i.e., your phone or laptop) in a secure testing environment. If you leave the browser during a test, you will be automatically locked out of the test. It is very important that you purchase your Top Hat subscription with Top Hat Test option at the beginning of this course so that there are no complications when it is time for the first Top Hat exam! See this article for more information on purchasing Top Hat Test: https://success.tophat.com/s/article/Student-Purchasing-Top-Hat-Test.

If you signed up for the course, an email invitation from Top Hat will be sent to you by email. If you didn't receive this email, you can register by visiting the PSY493 course website: https://app.tophat.com/e/051155
Note: The PSY493 Neuroscience of Psychopathologies Course Join Code is 051155

Top Hat will require a paid subscription, and a full breakdown of all subscription options available can be found here: www.tophat.com/pricing.

Should you require assistance with Top Hat, please contact their Support Team directly by way of email (support@tophat.com), the in app support button, or by calling 1-888-663-5491.

Exams
There will be three exams (consisting of multiple choice-, true/false, and short essay-type questions) during class days. Exams are not cumulative. There is no final exam. You will be tested on class lecture material and your readings.

Make up exam
No make-up exams will be scheduled during the semester. If you missed an exam, you will need to discuss your options with the instructor. *Please be aware that it is against MSU policy for a professor to give any individual student a special opportunity that is not provided to all students. We will not be allowed to provide individuals special chances for extra credit or extra opportunities to make up exams, etc.*

Writing assignment
There will be one writing assignment. For this assignment, you will select a peer-reviewed primary research article related to this course. *Your peer-reviewed article of choice must be emailed to Prof. Veenema by September 23rd for approval*. You will then critically review and analyze the peer-reviewed article: (1) Write a summary of the article, including why the research is important, what their hypotheses were, what methods were used, and what the results/conclusions were. (2) Include a critical analysis of the paper, including aspects of the

article that could be improved, and your own ideas/interpretation of the results. (3) Come up with a brief explanation (about ½ page) of an experiment that would be a good follow-up experiment to the paper (i.e., what questions are still left unanswered? What should the experimenters do next?). The written assignment should be 2-3 pages (not longer!). Text should be double-spaced. Font size should be 12. _The writing assignment is due **October 28th**_.

Overall grade
Each of the three exams will count for 25%, the writing assignment will count for 15% and Top Hat in-class responses count for 10% toward your final grade. _Note that you can earn bonus points with your Top Hat responses for each of the three exams_: If you have 40-50% of the Top Hat answers correct, you will earn 2/100 points, if you have 50-60% of the answers correct, you will earn 3/100 points, if you have >60% of the answers correct, you will earn 4/100 points.

Grades
Grades will be assigned according the following scale: 90-100% = 4.0; 85-89% = 3.5; 80-84% = 3.0; 75-79% = 2.5; 70-74% = 2.0; 65-69% = 1.5; 60-64% = 1.0; < 60% = 0.

D2L Course Site
The syllabus, the required readings, and information about the writing assignment are posted on D2L (https://d2l.msu.edu/). The lecture slides will be posted on D2L before the corresponding lecture.

Academic honesty
Article 2.3.3 of the Academic Freedom Report states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." The Department of Psychology adheres to the policies on academic honesty as specified in General Student Regulations 1.0, _Protection of Scholarship and Grades_; see https://www.msu.edu/~ombud/academic-integrity/index.html). Cheating will be taken very seriously and any student that violates MSU rules (i.e. is caught cheating on any assignment) will be given a failing grade for the class, the incident will appear permanently on the students' record and the case will be brought to the attention of the Psychology Department advisors who may take further action.

Accommodations for students with disabilities
Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or **two weeks prior to the accommodation date** (test, project, etc.). Requests received after this date may not be honored.

If you require testing accommodations, you must contact the instructor and present your VISA **at least two weeks before the exam date** to schedule an alternative exam. Typically, the exam

will be scheduled during a special exam sessions offered by the Psychology Department. Those exams occur in small group settings and are offered every Wednesday and Thursday at 3 pm in Giltner 346. If you are unable to make either of those times, or that option does not meet your VISA accommodations, you may be able to schedule to take your exam at the RCPD office. In either case, the exam must be scheduled well in advance, so you need to adhere to the two weeks prior notification requirement.

Organization of the course

Topic 1: Psychopathologies: an overview
1. A decade for psychiatric disorders. Nature 2010, 463:9.
2. Insel TR. Faulty circuits. Scientific American 2010, 302:44-51.
3. Nestler EJ, Hyman SE. Animal models of neuropsychiatric disorders. Nature Neuroscience 2010, 13:1161-1169.

Topic 2: Novel insights in the neurobiology of depression and anxiety disorders
1. Castren E. Is mood chemistry? Nature Reviews Neuroscience 2005, 6:241-246.
2. Berton O, Nestler EJ. New approaches to antidepressant discovery: beyond monoamines. Nature Reviews Neuroscience 2006, 7:137-151.
3. Schläpfer TE, Bewernick BH. Deep brain stimulation for psychiatric disorders--state of the art. Adv Tech Stand Neurosurg. 2009, 34:37-57.

Topic 3: Emotion dysregulation in psychopathology
1. Dalgleish T. The emotional brain. Nature Reviews Neuroscience 2004, 5:582-589.
2. Quirk GJ, Milad MR. Neuroscience: Editing out fear. Nature 2010, 463:36-7.

Topic 4: Neural circuits of aggression: relevance for personality disorders and violence
1. Nelson RJ, Trainor BC. Neural mechanisms of aggression. Nature Reviews Neuroscience 2007, 8:536-546.
2. Davidson RJ, Putnam KM, Larson CL. Dysfunction in the neural circuitry of emotion regulation – a possible prelude to violence. Science 2000, 289:591-594.

Topic 5: Vasopressin and oxytocin as potent regulators of social behavior: clinical implications for autism & schizophrenia
1. Modi ME, Young LJ. The oxytocin system in drug discovery for autism: Animal models and novel therapeutic strategies. Hormones and Behavior 2012, 61:340-50.
2. Meyer-Lindenberg A, Domes G, Kirsch P, Heinrichs M. Oxytocin and vasopressin in the human brain: social neuropeptides for translational medicine. Nature Reviews Neuroscience 2011, 12:524-538.

Schedule

8/28	No class	
8/30	Topic 1	A decade for psychiatric disorders (2010); Insel (2010) Faulty circuits
9/4	Topic 1	Nestler & Hyman (2010) Animal models of neuropsychiatric disorders
9/6	Topic 2	Castren (2005) Is mood chemistry?
9/11	Topic 2	Castren (2005)
9/13	Topic 2	Berton & Nestler (2006) New approaches to antidepressant discovery
9/18	Topic 2	Berton & Nestler (2006)
9/20	Topic 2	Schlapfer & Bewernick (2009) Deep brain stimulation for psychiatric disorders
9/25	Topic 1&2	Review session
9/27	**Exam #1**	
10/2	Topic 3	Dalgleish (2004) The emotional brain
10/4	Topic 3	Dalgleish (2004)
10/9	Topic 3	Quirck & Milad (2010) Editing out fear
10/11	Topic 3	Quirck & Milad (2010)
10/16	Topic 4	Nelson & Trainor (2007) Neural mechanisms of aggression
10/18	No class	Writing assignment
10/23	No class	Writing assignment
10/25	Topic 4	Nelson & Trainor (2007)
10/30	Topic 4	Davidson et al (2000) Dysfunction in the neural circuitry of emotion regulation
11/1	Topic 3&4	Review session
11/6	**Exam #2**	
11/8	Topic 5	Modi & Young (2012)
11/13	Topic 5	Modi & Young (2012)
11/15	Topic 5	Modi & Young (2012)
11/20	Topic 5	Modi & Young (2012)
11/22	Topic 5	Meyer-Lindenberg et al (2011) Oxytocin and vasopressin in the human brain
11/27	Topic 5	Meyer-Lindenberg et al (2011)
11/29	Topic 5	Meyer-Lindenberg et al (2011)
12/4	Topic 5	Review session
12/6	**Exam #3**	