

Syllabus PSY 493 Section 005: Neuroscience of Psychopathologies

Spring 2024; MW 10.20-11.40 am; Akers Hall 140

Note that lectures are **in-person (Akers Hall 140+TopHat)**, except for the first week of class when the first lecture is **synchronous (Zoom+TopHat)** and the second lecture is **asynchronous (D2L+Tophat)**. Check the class schedule below for details.

Instructor

Dr. Alexa Veenema; Office: 4018 ISTB; Office Hours: by appointment; aveenema@msu.edu

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 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.

Access to course materials

The syllabus, the required readings, and information about the writing assignment (see below) are posted on D2L (<https://d2l.msu.edu/>). The lecture slides will be posted on D2L before the corresponding lecture. The lecture slides are also available on TopHat (see below) after the corresponding lecture.

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 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 to allow for paperless online exams 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.

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/949212>

Note: The PSY493 Neuroscience of Psychopathologies Course Join Code is 949212

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.

Access to Lectures

This course will be given **in-person, except for the first week of class:**

- **The first lecture on 1/8 will be synchronous:** Live lecture will occur through Zoom (the link will be sent to you by D2L email) and there will be in-class TopHat questions to earn bonus points.
- **The second lecture on 1/10 will be asynchronous:** Recorded lectures are posted on D2L and you can earn bonus points by answering TopHat questions of the corresponding lecture posted on TopHat.
- **As of 1/15, lectures will be in-person:** Lectures will occur in **Akers Hall 140**, and we will make use of TopHat to discuss the lecture slides and to have in-class Tophat questions to earn bonus points.

Exams

There will be **three exams** (consisting of multiple choice-, true/false, and short essay-type questions) that will take place during class time using **TopHat**. Exams are not cumulative. There is no final exam. You will be tested on class lecture material and your readings. The exams will be available for you to look over after they have been graded. You can do this by making an appointment with Dr. Veenema.

There will be no make-up exams, except for medical or family emergencies. If you missed an exam due to an emergency, you 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.

Review sessions

Exam review sessions will be held during class time. During these review sessions, we will go over the most important slides and there is time for answering your questions. You can ask questions in advance through email or in class. Come prepared with questions to get the most out of these review sessions!

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 **January 31st** 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 **April 1st**.

Overall grade

The three exams and the writing assignment together will count for 100% (with each component worth 25%). Each exam consists of multiple choice-, true/false, and short essay-type questions with a total worth of 100 points per exam. You can earn bonus points for each of the three exams with your responses to in-lecture Top Hat questions: If you answered 40-50% of the in-class TopHat questions correct, you will earn 2 bonus points; If you answered 51-60% of the in-class TopHat questions correct, you will earn 3 bonus points; If you answered > 60% of the in-class TopHat questions correct, you will earn 4 bonus points.

No other extra credit points will be given to any student in this course and emails from students asking for extra credit will not be answered.

Grades

Grades will be assigned according to 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.

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.

Course Schedule (in-person = P; synchronous = S; asynchronous = A)

1/8	Topic 1 (S)	A decade for psychiatric disorders (2010); Insel (2010) Faulty circuits
1/10	Topic 1 (A)	Nestler & Hyman (2010) Animal models of neuropsychiatric disorders
1/15	No class	
1/17	Topic 2 (P)	Castren (2005) Is mood chemistry?
1/22	Topic 2 (P)	Castren (2005) Is mood chemistry?
1/24	Topic 2 (P)	Berton & Nestler (2006) New approaches to antidepressant discovery
1/29	Topic 2 (P)	Berton & Nestler (2006) New approaches to antidepressant discovery
1/31	Topic 2 (P)	Schlapfer & Bewernick (2009) Deep brain stimulation for psychiatric disorders
1/31	Writ. Assign.	Deadline to email your article of choice to Prof. Veenema for approval
2/5	Topics 1&2 (P)	Review session
2/7	Exam 1 (P)	Topics 1 & 2
2/12	Topic 3 (P)	Dalgleish (2004) The emotional brain
2/14	Topic 3 (P)	Dalgleish (2004) The emotional brain
2/19	Topic 3 (P)	Quirk & Milad (2010) Editing out fear
2/21	Topic 3 (P)	Quirk & Milad (2010) Editing out fear
2/26	Spring Break	

2/28	Spring Break	
3/4	Topic 4 (P)	Nelson & Trainor (2007) Neural mechanisms of aggression
3/6	Topic 4 (P)	Nelson & Trainor (2007) Neural mechanisms of aggression
3/11	Topic 4 (P)	Davidson et al (2000) Dysfunction in the neural circuitry of emotion regulation
3/13	Topic 3 & 4 (P)	Review session
3/18	Exam 2 (P)	Topic 3 & 4
3/20	Topic 5 (P)	Modi & Young (2012) The oxytocin system in drug discovery for autism
3/25	Topic 5 (P)	Modi & Young (2012) The oxytocin system in drug discovery for autism
3/27	Topic 5 (P)	Modi & Young (2012) The oxytocin system in drug discovery for autism
4/1	Writ. Assign.	Writing assignment due! Submit on D2L.
4/1	Topic 5 (P)	Modi & Young (2012) The oxytocin system in drug discovery for autism
4/3	Topic 5 (P)	Meyer-Lindenberg et al (2011) Oxytocin and vasopressin in the human brain
4/8	Topic 5 (P)	Meyer-Lindenberg et al (2011) Oxytocin and vasopressin in the human brain
4/10	Topic 5 (P)	Meyer-Lindenberg et al (2011) Oxytocin and vasopressin in the human brain
4/15	Topic 5 (P)	Review session Topic 5
4/17	Exam 3 (P)	Topic 5

Other issues

The professor is here to help you learn. We are happy to discuss with you any questions related to the course material as well as questions you might have that go beyond what we are able to cover in class. We also would like to help students that are having difficulties with the class and might like general advice about how to study more effectively.

Please email the professor if you have any concerns about your ability to succeed in this course due to challenges of online learning, technology, and the Tophat platform with differing availability by country. We will try to work with you so that you have full access to all course materials.

Please email the professor if you must miss class due to illness or self-isolation. We will try to work with you so that missed classes will not harm your performance or put you at a disadvantage in the class.

If you stay on MSU campus, please obey all MSU policies including those policies to slow the spread of COVID-19 (<https://msu.edu/together-we-will/keeping-spartans-safe/>).

Use of generative artificial intelligence (AI) tools

Students are **not permitted to use AI tools during in-class examinations**. The use of AI tools during in-class examinations is considered a violation of Michigan State University's policy on academic integrity, the Spartan Code of Honor Academic Pledge and Student Rights and Responsibilities. However, students are permitted to use AI tools wisely and intelligently to

prepare and study for exams when the use of AI tools is aimed to deepen understanding of subject matter and to support learning.

Academic Honesty

The Spartan Code of Honor states, "As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do." In addition, Article 2.III.B.2 of the Student Rights and Responsibilities ([SRR](#)) states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." The Psychology Department adheres to the policies on academic honesty as specified in [General Student Regulations 1.0, Protection of Scholarship and Grades](#); [the all-University Policy on Integrity of Scholarship and Grades](#); and [Ordinance 17.00, Examinations](#). Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com Web site to complete any course work in this course. Students who violate MSU academic integrity rules may receive a penalty grade, including a failing grade on the assignment or in the course. Contact your instructor if you are unsure about the appropriateness of your course work. See also the [Academic Integrity webpage](#).

Inclusive Environment

MSU is committed to creating and maintaining an inclusive community in which students, faculty, and staff can work together in an atmosphere free from all forms of discrimination. The Office of Institutional Equity (OIE) reviews concerns related to discrimination and harassment based on sex, gender, gender identity, race, national origin, religion, disability status, and any other protected categories under the University Anti-Discrimination Policy (https://www.hr.msu.edu/policies-procedures/university-wide/ADP_policy.html) and Policy on Relationship Violence and Sexual Misconduct (<https://civilrights.msu.edu/policies/rvsm.html>). If you experience or witness acts of bias, discrimination, or harassment, please report these to OIE: <http://oie.msu.edu/>.

Limits to Confidentiality

Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees, including instructors, may not be able to maintain confidentiality when it conflicts with their responsibility to report certain issues to protect the health and safety of MSU community members and others. As the instructor, I must report the following information to other University offices (including the MSU Police Department) if you share it with me:

- Suspected child abuse/neglect, even if this maltreatment happened when you were a child,

- Allegations of sexual assault or sexual harassment when they involve MSU students, faculty, or staff, and
- Credible threats of harm to oneself or to others.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In almost all cases, it will be your decision whether you wish to speak with that individual. If you would like to talk about these events in a more confidential setting you are encouraged to make an appointment with the [MSU Counseling Center](#).

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 (e.g., additional time.) you must contact me and present your VISA *at least two weeks before the exam date* to schedule an alternative exam.

Disruptive Behavior

Article 2.III.B.4 of the [Student Rights and Responsibilities \(SRR\)](#) for students at Michigan State University states: "The student's behavior in the classroom shall be conducive to the teaching and learning process for all concerned." Article 2.III.B.10 of the [SRR](#) states that "The student and the faculty share the responsibility for maintaining professional relationships based on mutual trust and civility." [General Student Regulation 5.02](#) states: "No student shall . . . interfere with the functions and services of the University (for example, but not limited to, classes . . .) such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action."

Supportive resources for students

A comprehensive list of support resources for MSU students is centralized on the Department of Psychology website (<https://psychology.msu.edu/>) with a direct link (<https://psychology.msu.edu/undergraduates/student-resources.html>). This list includes resources related to Academic Learning, Mental Health, Culture, and Identity. This list has been compiled and centralized to assist students in their search throughout the MSU website for these resources.

Additional resources for students:

[Spartan Code of Honor](#)

[Mental Health](#)

[Tolerance and civility](#)

[Religious Observance Policy](#)

[Student Athletes](#)

[Pronouns](#)