

## **GMS 6713: Neurobiology of Behavioral Disorders**

**E-learning Canvas Online Course**  
**3 Credit Hours**

### **Course Instructors:**

**Mark Lewis, Ph.D. Professor, Department of Psychiatry**

**Ronald Mandel, Ph.D. Professor, Department of Neuroscience**

### **Course Description**

This course is intended for students enrolled in the Online Biomedical Neuroscience MSc Program in the Department of Neuroscience. This course focuses on the neurobiological basis of neurobehavioral disorders including autism spectrum disorder, obsessive-compulsive disorder, and attention deficit hyperactivity disorder. The course will cover the clinical presentation of these disorders as well as the genetics, neuropathology, structural and functional brain changes as indexed by neuroimaging, risk factors, biomarkers, relevant animal models, and biomedical treatments.

### **Course Objectives**

After successfully completing this course, students will be able to:

- Distinguish the core clinical features of neurobehavioral and neurodevelopmental disorders.
- Identify the genetic etiology and neuropathological alterations associated with each disorder
- Describe key animal models relevant to each disorder and identify key translational findings from these models.
- Illustrate key neurobiological mechanisms that appear to mediate the expression of specific neurobehavioral disorders that have been identified from specific model systems
- Discuss the strengths and limitations of biomedical treatments for each disorder

This course is designed to integrate the clinical phenomenology of major neurobehavioral disorders with what is known about their genetic and neurobiological basis. A significant focus of the course will be the integration of pre-clinical and clinical literature, examining findings that range from molecular and cellular mechanisms to phenomenology. For each disorder, the objective will be to explore 1) clinical presentation, 2) risk factors (genetic, environmental) 3) clinical neuroscience (neuropathology and neuroimaging, neurochemistry) 3) relevant animal models and 4) biological treatments.

**Course Disclaimer:** This course (including all materials, ideas, research or clinical observations written or electronically conveyed) is for educational purposes only. The course does not substitute for and does not provide clinical or treatment recommendations or endorsements for the treatment of any individual person's condition. This course is simply a survey course whose intent is to familiarize the student with a wide variety of material relevant to the area of study and course participants should not use any of the course material as a basis for diagnosis or treatment of themselves or others. Any clinical intervention or treatment that the course participant elects to take is the sole responsibility of the course participant. Such clinically relevant decisions should always be discussed with the course participant's physician and/or other health care providers and the consequences of any action taken are the responsibility of

the course participant and his or her treating provider.

**Required Technology:** Laptop or desktop computer equipped with microphone and video camera. A microphone and video camera will be used for video conferencing with instructors if you choose to do this. You must have stable internet of > 50 Mbps at your disposal. A computer with at least 12 Mb of internal RAM, running a CPU of at least 1 GHz is recommended and should be running an iOS that is compatible with the current version of Canvas. For a complete description of computer requirements: <https://ufonline.ufl.edu/resources/computer-requirements/>.

- There is a Canvas app that can be used to access the course using your portable devices. The app is not as good as laptop or desktop computers. Under no circumstances should you take any quiz using a portable device.
- here are VoiceThread apps that are available for iOS and Android devices that can be used to view and post comments on VTs. While these portable devices are excellent for watching lectures and asking questions, we strongly recommend that you use laptop or desktop computers when working on this course. (While I often use the iOS VT app myself, I have found it to be terribly unreliable. VT often fixes issues rapidly and please feel free to contact their support which is very responsive.)
- This is an online course. Therefore, travel during the course is the student's choice. However, the requirements for high-speed internet and appropriate level computer with a modern operating system are still absolute requirements and are the students' responsibility. Unexpected emergency travel to areas with poor infrastructure can be an excused absence but the course instructors must be advised either prior to or as soon as possible during the emergency travel. Optional travel cannot be disallowed but again, it is the student's responsibility to ensure the availability of reliable high speed internet and appropriate computer equipment. Internet failure during optional travel may not be deemed an excused absence.

**General Overview of Course Content:** The course is divided into three modules. Each module introduces and presents a detailed treatment of a major neurobehavioral disorder. A typical lesson consists of:

- video lectures
- required readings
- Discussions
- quizzes

**Assignment due dates and times:** Unless otherwise noted, all quizzes are due on Sunday at 11:59 Eastern time. Only excused absences (see University policy) will be accepted to take quizzes after the deadline.

**Point breakdown:**

Quizzes account for 100% of your grade: Each Module counts 33.3% of your grade. Each quiz within a module contributes equally to that 33.3%.

**Grading Scale:** Final grades are determined by the following scale and will be posted in "Grades" in Canvas.

A >= 93%  
A- = 90-92.9%  
B+ = 87-89.9%  
B = 83-86.9%  
B- = 80-82.9%  
C+ = 77-79.9%  
C = 73-76.9%  
C- = 70-72.9%  
D+ = 67-69.9%  
D = 63-66.9%  
D- = 60-62.9%  
E < 60%

There is NO rounding but see **Discussions** below.

View the current UF Grading Policy

at <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### **Course Readings and Lectures**

No text will be required but Charney and Nestler's Neurobiology of Mental Illness (5th ed.) is recommended as an optional text. Readings will be largely made up of recent review articles with some empirical research papers. The reading load will be moderately heavy.

### **Discussions**

The instructor will post discussion questions for each section of the course. Students are encouraged to participate with each other in the course discussion board. Dr. Lewis will monitor the discussions for accuracy and correct any misinformation. The discussion portion of the course should be viewed as functioning as a study group for the class. Moreover, it is possible subjects not directly covered in the course could be explored. The discussions are not graded, however, at the instructor's discretion, **consistent** participation in discussion can be used as extra credit which would be enough to increase a final grade by up to 1 point. This extra credit feature could move a student who needs a round up on their final score to move up a grade level.

### **Course Participant Evaluations**

Performance of course participants will be evaluated based on quizzes (100%). If you must dispute a question on a quiz, use the submission comment feature in Canvas or email an instructor with the test name and question number you wish to dispute.

### **Course Schedule**

Introduction to the Course and Review of syllabus (*Week 1*)

#### **Module 1: Autism Spectrum Disorder (ASD)**

ASD clinical presentation (*week 1*)

Required readings: Lord et al., 2018; Dow et al., 2020; Lombardo et al., 2019; Tye et al., 2019; Schulz & Stevenson, 2019; Lee & Bo 2015

ASD risk factors (*week 2*)

Required readings: Tick et al., 2016; Ornoy et al., 2016; Rylaarsdam & Guemez-Gamboa, 2019; Taylor et al., 2020

ASD pathophysiology (*week 3*)

Required readings:; Supekar et al., 2018; Just et al. (2014);; Saurman et al. (2020)

ASD animal models (*week 4*)

Required readings:; Mohrle et al 2020; Bevesdorf et al. 2019; Meyza et al. 2013

ASD biomedical treatments (*week 5*)

Required readings: Rasmussen et al. 2018; DeFilippis, 2018; Cole et al., 2019

## **Module 2: Obsessive-Compulsive Disorder (OCD)**

OCD clinical presentation (*week 6*)

Required readings: Stein et al., 2019; Robbins et al., 2019; Nazeer et al., 2019

OCD risk factors (*week 7*)

Required readings: Purrry et al., 2019; Bellia et al., 2020; Brander et al., 2016

OCD pathophysiology (*week 8*)

Required readings: Lipton et al., 2019; Goodman et al., 2021; Shepard et al., 2021

OCD animal models (*week 9*)

Required readings: Pittenger et al., 2019; Zike et al., 2017; Monteiro & Feng, 2016

OCD biomedical treatments (*week 10*)

Required readings: Wu et al., 2020; Rapinesi et al., 2019; Vicheva et al., 2020; Szechtman et al., 2020

## **Module 3: Attention Deficit Hyperactivity Disorder (ADHD)**

ADHD clinical presentation (*week 11*)

Required readings: Jerome & Jerome, 2020; Faraone et al., 2021; Karalunas & Nigg, 2020

ADHD risk factors (*week 12*)

Required readings: Pujol-Gualdo et al., 2021; Tistarelli et al., 2020;

ADHD pathophysiology (*week 13*)

Required readings: Tripp & Wickens, 2009; Samea et al., 2019; Gallo & Posner, 2016

ADHD animal models (*week 14*)

Required readings: Rahi & Kumar, 2021; Wickens et al., 2011; Russell, 2011

ADHD biomedical treatments (*week 14*)

Required readings: Pitzianti et al., 2020; Carucci et al., 2021; Rubio et al., 2016

## **Policy Related to Make up Exams or Other Work**

Please note: Any requests for make-ups due to technical issues **MUST** be accompanied by the UF Computing help desk (<http://helpdesk.ufl.edu/>) correspondence. You **MUST** e-mail me within 24 hours of the technical difficulty if you wish to request a make-up.

**Policy Related to Required Class Attendance:**

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

**Excused absences must be consistent with university policies in the Graduate Catalog** (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>).

Additional information can be found here: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

**Academic Integrity:**

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

**“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”**

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

**“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>  
<http://gradschool.ufl.edu/students/introduction.html>

**Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.**

***Taking Screen shots or using a second device to take screen images of quizzes is strictly forbidden.*** If you must dispute a question on a quiz, use the submission comment feature in Canvas or email an instructor with the test name and question number you wish to dispute.

**Online Faculty Course Evaluation Process:**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

**Policy Related to Guests Attending Class:**

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee (e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all courses. No further extensions will be granted. Please note that guests are not permitted to attend either cadaver or wet labs. Students are responsible for course material regardless of attendance.

**Support Services:****Accommodations for Students with Disabilities:**

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester. The College is committed to providing reasonable accommodations to assist students in their coursework.

**Counseling and Student Health:**

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. Online and in person assistance is available.
- You Matter We Care website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at UF Health is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at UF Health offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- UF Health Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32698, [ufhealth.org/emergency-room-trauma-center](http://ufhealth.org/emergency-room-trauma-center).
- University Police Department: Visit [police.ufl.edu/](http://police.ufl.edu/) or call 352-392-1111 (or 9-1-1 for emergencies).
- Crisis intervention is always available 24/7 from:

- Alachua County Crisis Center:  
(352) 264-6789  
<http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

### **Academic Resources**

**E-learning technical support:** Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).

**Career Connections Center:** Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services [career.ufl.edu/](http://career.ufl.edu/).

**Library Support:** Find various ways to receive assistance with respect to using the libraries or finding resources. [uflib.ufl.edu/](http://uflib.ufl.edu/)

**Teaching Center:** Broward Hall 352-392-2010 or to make an appointment 352 392-6420. General study skills and tutoring. [teachingcenter.ufl.edu/](http://teachingcenter.ufl.edu/)

**Writing Studio:** 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. [writing.ufl.edu/writing-studio/](http://writing.ufl.edu/writing-studio/)

### **Student Complaints**

On-Campus Students: [sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/](http://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/)

On-Line Students: [distance.ufl.edu/student-complaint-process](http://distance.ufl.edu/student-complaint-process)