UNIVERSITY OF FLORIDA COLLEGE OF MEDICINE SYLLABUS
NEUROSCIENCE

# GMS 6029 Neuroscience Artificial Intelligence/Machine Learning (Journal Club)
# GMS6029 (1 credit)

Fall 2023

Delivery Format: In person, Friday 10:40am-12:00pm in HPNP G-112

Instructors: Drs. Damon Lamb and Ben Shickel

Room Number: HPNP G-112

Phone Number: 352-548-6924 (Lamb)

Email Address: dlamb@ufl.edu; shickelb@ufl.edu

Office Hours: By Appointment

Preferred Course Communications: Email must include **GMS6029** in subject

Prerequisites: Current 1st year ERS program student or approval of instructor(s)

Textbook: Recommended (not required) Magnus Ekman, *Learning Deep Learning: Theory and Practice of Neural Networks, Computer Vision, Natural Language Processing, and Transformers Using TensorFlow* 2021 Addison-Wesley Professional, ISBN-10: 0-13-747035-5, ISBN-13: 978-0-13-747035-8, https://ldlbook.com

## Purpose and Outcome:

This course is intended for 1st year ERS students. Other students may enroll only with approval of the instructors. This course will cover a broad range of AI/ML methods. We will welcome experts in both methods and applications of AI/ML for guest lectures for the majority of classes. All students are expected to read the assigned papers or other materials associated with each lecture prior to the corresponding lecture. Please come to class prepared to contribute to the discussion and to raise any issues or questions of your own on the assigned topic(s). Brief canvas assessments (quizzes) or other assignments covering key topics may be associated with lectures.

## Course Overview:

The growth of computational capacity and improved AI/ML algorithms has led to a rapid expansion of these methods in biomedical research. Selection of appropriate techniques/algorithms/models, application and interpretation is often challenging. This course is intended to provide a broad perspective on many important AI/ML methods.

## Course Objectives and/or Goals:

Upon successful completion of this course, students will be able to interpret results from research using AI/ML methods, select appropriate AI/ML methods for their own work, and seek guidance and support for further skill development or specific implementation.

### Instructional Methods:

We will operate as an advanced graduate seminar, with students taking an active role in initiating and leading discussions. Attendance and active participation in all class discussions are required. We will hold seminar in person in HPNP G-112. Reading, discussions, assignments and quizzes will be posted to canvas. Students out for illness may participate via Zoom if available in the room but should be prepared to have their camera turned on and to actively participate in discussion for the entirety of the class. Discussions will not be recorded or available for asynchronous viewing. HiPerGator resources will be made available to all students in the course. Students are expected to explore the methods and models presented during the course using these resources. Please be respectful with your resource requests when submitting compute jobs to ensure all students have access. All students must complete new user training https://help.rc.ufl.edu/doc/New_user_training for access to HiPerGator.

### Description of Course Content:

Note, this schedule is tentative and may changed during the semester, for example to accommodate major weather events or unexpected changes in guest lecturers' availability.

### Schedule:

| Date | Discussion Topic |
|------|------------------|
| 8/25/2023 | Introduction & Motivations |
| 9/1/2023 | AI/ML on HPG |
| 9/8/2023 | Image Analysis |
| 9/15/2023 | Image Analysis |
| 9/22/2023 | XAI |
| 9/29/2023 | Applied Image Analysis |
| 10/13/2023 | Ethics in AI Workshop |
| 10/20/2023 | OMICS |
| 10/27/2023 | NLP/LLM |
| 11/3/2023 | MONAI |
| 11/17/2023 | Success and Failure in AI |
| 12/1/2023 | Wrap-up |

### Note regarding respect for diverse ideas:

At times your instructors may make provocative statements related to course content to spark discussion. This is not an endorsement of a position. We welcome and have respect for dissenting opinions. Moreover, we feel that hearing and sharing diverse ideas is an essential component of the active learning process. Please discuss with course faculty if you ever feel that your ideas are not being heard or respected.

## Course Materials and Technology:

A digital version of the research articles in PDF format will be available on canvas in advance to all enrolled students and instructors.

For technical support for this class, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- UF eLearning

## Academic Requirements and Grading:

Assignments:

Each student is expected to present at least once during the semester and actively participate in the discussion every week. Student presenters will be selected by the instructors.

## Grading:

Satisfactory/Unsatisfactory. Grades will be determined based on class attendance and participation in paper discussions.

More information on UF grading policy may be found at:

http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades

Exam Policy: No exam

## 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.**

**Hipergator Acceptable Use Policy**

Students acknowledge and abide by the following:

I acknowledge that the access to the HPC resources operated by UF Research Computing is subject to the UF Acceptable Use Policy at https://it.ufl.edu/policies/acceptable-use/acceptable-use-policy/ and the Research Computing policies at https://www.rc.ufl.edu/documentation/policies/ and that I am responsible for following these policies.

RESTRICTED DATA

I also certify that using restricted data and software on the HPC resources requires extra steps described at UFRC Policies and at UFRC Export Policies, and that I will notify both my account sponsor and the Office of Research (Research Compliance) and Research Computing at support.rc.ufl.edu when I am working with such data.

**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. For additional information, please review the Classroom Guests of Students policy in its entirety.

### 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. On line 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.

- University Police Department: Visit 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.

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

**Library Support:** cms.uflib.ufl.edu/ ask various ways to receive assistance with respect to using the libraries or finding resources.

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

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

**Student Complaints On-Campus**: sccr.dso.ufl.edu/policies/student-honor-code-student- conduct-code/

**On-Line Students Complaints**: distance.ufl.edu/student-complaint-process