

Syllabus & Course Information
Learning & Memory: Mechanisms & Pathologies (MEDS4026)
Spring Semester, 2025
Mondays, 10:00-12:50
Medical Sciences Building, Room *TBD*

Course Directors:

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Pedagogical method: Class meetings be held in-person and will use a combination of traditional and flipped classroom approaches

In the flipped classroom format students will watch a recorded lecture on their own at a time that is convenient for them (i.e. asynchronously) before coming to class. The class will then meet synchronously in-person to discuss the lecture material. The discussion will typically focus in part on questions that the students have submitted or that they raise during class about the lecture material. There will also be opportunities to expand on aspects of the topic of the week that may be of particular interest to the students. In the past we have found that this leads to an active learning process for the students and lively discussions.

The synchronous class meetings will be held on East Campus in the Medical Sciences Building on Mondays from 10:00 AM to 12:50 PM. We recognize that three hours at one sitting is a long time and we are cognizant of the principle that the mind can absorb only as much as the ass can endure. Therefore, each class session will have one or two break periods which will include an opportunity for light refreshments.

Objectives & Topics: One of the main objectives of the course is to convey a sense of the interesting questions, the fascinating cases, and the exciting answers that pervade the fields of neuroscience and neurology. Special attention will be devoted to conditions that enhance our understanding of the processes of learning and memory. Students will also gain an appreciation for the role of pathology as a great teacher.

Students will be expected to contribute discussion questions before coming to class as well as being prepared to discuss any reading that may have been assigned for that class period.

Examples of topics which may be discussed are:

- The Lost Mariner – a case of severe memory loss with a discrete biochemical basis.
- The Jennifer Aniston neuron, a single cell that responds only to pictures of Jen. What do such ‘concept cells’ tell us about the building blocks of declarative memory?
- Eidetikers – The Human Camera and other dramatic examples of individuals with photographic memories. How does it work and what are the pros & cons of having one?
- Alzheimer’s and Parkinson’s diseases – What do they have in common and what can they teach us about how memory works?
- Synesthesia: musical notes with colors and words that have flavors – mixing the senses through neuroanatomy.
- Effective versus ineffective ways to study – what does science have to say?
- Animal learning – how simple can a system be and still be able to learn & remember?
- New tools for answering old questions about memory & learning – Brainbow, Clarity, Optogenetics and more.

Readings: There is no required textbook, but there will be assigned readings of stories from the lay press as well as from the primary scientific literature. In some cases there may be online websites devoted to a topic that will be covered in class and students will be expected to utilize these resources as part of the learning experience.

Active Learning: As stated above, active learning is an important component of this course. In addition to in-class discussions, students will write periodic reflective essays, some of which will be shared with the rest of the class. There

will be one group project and one individual term paper. No written exams are planned (unless the in-class discussions prove to be disappointing).

Reflective Essays: The purpose of the reflective essays is to encourage each student to think independently and deeply about some aspect of a topic that has been recently presented in class. Evidence of such in depth thought should include references to articles which the student has found independently.

The length of reflective essays will typically be in the range of one typed page, single spaced, normal size font (not counting figures and references. In addition to its content, the essay will be graded on clarity of expression. This is in accord with the concept of writing across the curriculum. Each essay will be graded on a scale of 1-10 points. If a reflective essay is poorly written (e.g. has substantial grammatical or spelling errors, is lacking in clarity, or has a confusing flow of logic) the student will be notified that their grade is conditional on receipt of a corrected version within one week or the score for that essay will convert to zero.

Grading Policy: This syllabus should be treated as a living document rather than having been graven in stone. Thus, some changes may be made to the format as well as to the grading policy as the term progresses. This will permit building on activities that are proving successful or making corrections to those that are not working well.

The approximate weights given to each of the assessment modalities will be:

Periodic reflective essays	50%
Group project	20%
Individual term paper	20%
Contribution to in-class discussion	10%

The grading scale for the entire course will be:

90% to 100%	A/A-
80% to 89%	B+/B/B-
70%-79%	C+/C/C-
60% to 69%	D/D-
<50%	F

On occasion the ranges may be extended to account for natural breaks in the distribution of scores or to compensate for significant variations in the difficulty of the grading on individual assessment components. In no case will a student's grade be decreased based on the above scale.

The various assignments and discussions are designed so that scores will result in grades as follows:

A grade of A reflects a full understanding of the factual material presented, with a good ability to use the information creatively to solve problems. Scores of 90% or above will receive A or A- grades.

A grade of B reflects a significant understanding of the factual material presented, with a reasonable ability to use the information creatively to solve problems. Scores of 80% to 89% will receive B-, B or B+ grades.

A grade of C reflects an adequate understanding of the factual material presented, but with a limited ability to use the information creatively to solve problems. In general, scores of 70% to 79% will receive C grades.

Any student who accumulates less than 50% of the possible points on the combined assessments will receive a grade of F.