Overview:
This course will explore the molecular and cell biological events underlying neurological disease. This will be an advanced course, designed for upper-division undergraduates and graduate students. Students must have taken BIOL 22a and 22b (or BIOL14 and BIOL15) AND either already had a course at the level of NBIO 140, BIOL 100, BIOL 103 or similar. In special circumstances, the latter list of prerequisites may be taken concurrently (but ONLY with my permission). Success in this 4 credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, papers, discussion sections, preparation for exams, etc.).

Learning Goals:
1. Learn about the cellular and molecular defects underlying some common neurological diseases.
2. Learn how to effectively read, evaluate and present (written and oral) current primary literature in neurological disease research.
3. Learn how to hypothesize a molecular mechanism underlying a disease, and propose an experimental test of your hypothesis.
4. Dissect the strengths and weaknesses in our ability to relate cell and molecular defects to clinical symptoms in neurological disease.
5. Dissect the strengths and weaknesses in our ability to design diagnostic and therapeutic strategies for diseases using information about cell and molecular defects.

Course format:
This will be a student-participation, active learning, and lecture-based course focused on cellular mechanisms of neurological disease. Each topic will begin with a student-led medical “case study” of a neurological disease. This will be followed by a one to two lecture overview of our current understanding of the cellular defects underlying the disease, featuring open or controversial questions that remain unanswered. Students will learn which tools are being used to experimentally answer these questions. To finish up the topic, students will present an assigned primary literature paper that proposes an answer to one of these open questions.

Grading:
• Assignments (25% of final grade) - There will be two small assignments (4/25 points) and one large assignment (21/25 points), to be turned on LATTE. For the large assignment, students will design a novel hypothesis for a neurological disease mechanism and communicate it to a variety of audiences. Details on the large assignment will be provided mid-semester.

• Paper summaries (25% of final grade). – A summary (~2 pages) outlining the major findings of your choice of 6 of the assigned papers will be due online from each student. Your own presentation cannot be used towards these 6. Reports are due on LATTE by 9 AM the morning that the paper is
discussed. No late submissions will be accepted. Paper summary guidelines can be found on LATTE and at the end of this syllabus.

- Case studies – (15% of the final grade; 12/15 points assigned to the entire team/group, 3/15 points from peer evaluation). Case study guidelines can be found on LATTE and at the end of this syllabus.

- Paper presentations – (15% of the final grade; 12/15 points assigned to the entire team/group, 3/15 points from peer evaluation). Paper presentation guidelines can be found on LATTE and at the end of this syllabus.

- Quizzes – (20% of the final grade) There will be two 45-minute in-class quizzes. These will test conceptual understanding and will be experiment-based (i.e. I will show you experimental results highly related (but not directly the same) as what we discussed in lecture or in assigned papers, and ask specific questions about how you would interpret these data). Makeups will only be allowed under extenuating circumstances and/or with a doctor’s note.

- Written assignments are due on LATTE by 9AM on the date noted. There will be NO LATE SUBMISSIONS or DEADLINE EXTENSIONS without a doctor’s or similar note. Therefore, all written assignments should be completed well ahead of time.

- If you are ill on the day of your case study or paper presentation (with a doctor’s note), you will be reassigned ONCE to another group to make it up. Each group should be prepared to execute the presentation even if a member is missing, since you will have prepared it all together.

**Reading:**

The required reading will be primary research papers assigned by the instructors, announced in class, and available on LATTE. In addition, if you need additional background material I can recommend a textbook; however, this is not mandatory reading. Kandel (5th edition; available in bookstore)

**Attendance and expectations in class**

The textbook, papers, and other readings will not be a substitute for attendance, as reading only covers a small portion of the material discussed in class. Lecture notes will be posted on LATTE before class but will only consist of bullet points, figures and sketches. Class will be highly discussion-based, and attendance is essential to fully engage with the material. Lectures are recorded and will be available after ~24 hours at: https://echo360.org/section/65eb6b2b-785b-404b-91b0-dbd4255d083a/homeCELL

PHONES AND OTHER HANDHELD E-DEVICES are prohibited in class. Laptops and tablets are allowed but must be used ONLY for note taking – NO emailing, facebooking, texting, or shopping. NO INTERNET USE OF ANY KIND. And please turn OFF your cell phone, skype, and email alerts and notifications; no Beeps, BUZZzes, or annoying vibrations. NO working on assignments for other classes; if you have to do this, please just don’t come to class. This policy will be strictly enforced by the TA who will sit at the back of the class.

**Learning/ other disabilities:**

If you are a student with a documented disability at Brandeis University and if you wish to request a reasonable accommodation for this class, please see me immediately. Please keep in mind that reasonable accommodations are not provided retroactively.

**Academic integrity:**

Conduct inconsistent with the policies on academic honesty in "Rights and Responsibilities" will not be allowed, and if it occurs, will be referred to the Office of Campus Life without exception.
**Schedule is subject to change**