

NYU Prague

CORE-UA9306P01, Life Science: Brain and Behavior Spring 2020

Instructor Information

- Eduard Kelemen, Ph.D.
- Email:
- Office hours: Thursdays after lectures or laboratories (3:00 – 3:30 PM) at RD, Seifert classroom or at the National Institute of Mental Health, room 202.09
- Telephone:

Course Information

- CORE-UA9306P01
- Life Science: Brain and Behavior
- No prerequisite
- Location:
 - Seifert – RD
 - National Institute of Mental Health (NIMH), Topolová street 748, Klecany 25067
(Transportation by a van arranged by NYU Prague)
- Lecture days and times:
 - Thursdays, 9:30 – 10:50 AM, 11:00 – 12:20 AM, 1:20 – 2:40 PM, Location:
Seifert - RD
- Laboratories (participation in laboratories is mandatory)
 - Thursdays, 10:00 AM – 3:00 PM, Location: NIMH, Room 202.06 –
seminar/lecture room or Room 201.14 – laboratory

Course Overview and Goals

The main goal of the course is to acquire a basic understanding of the brain processes that underlie cognitive abilities. The course will emphasize that the brain is a complex system of interacting units with emergent properties, rather than the more traditional approach that focuses on the activity and function of single nerve cells. The topics of the course cover key aspects of brain function such as: processing of sensory information, motor system functions, constructing mental models of the world that enable, for example, orientation in space, decision making, function of memory, function of sleep and offline states, brain in health and disease.

An additional goal is to use neuroscience to illustrate and explain the scientific method and scientific work in general. When appropriate, the course will use historical examples and stories of specific scientists to inform about the process of scientific discoveries. The course will present scientific work as a continuous dialogue between theoretical ideas and experimental results, with controversies, conflicts and endless discussions.

Lectures will take place in Richter Palace, in Prague's Old Town. Practical laboratories will take place at the National Institute of Mental Health, a recently founded institute for the treatment and research

of mental disorders. The lab sections include animal brain dissections, microscopy, behavioral and electrophysiological experiments.

Upon Completion of this Course, students will be able to:

- Express a basic understanding of the brain processes that underlie cognitive abilities.
- Understand the process of scientific work – from stating a hypothesis, to experiments that test the hypothesis, to the interpretation of data.
- Understand how knowledge of brain science impacts society, healthcare, etc.
- Conduct scientific experiments in lab.

Course Requirements

Class Participation

Students are expected to attend classes and participate in class discussions. Students will receive three to five essay questions at the end of each lecture and will be asked to prepare in groups one-page answers to hand in at the beginning of next week's class.

Laboratories

The labs are designed to give hands-on experience that is relevant to the class material. This should facilitate understanding the lecture material and concepts, which can seem abstract. The labs also provide an opportunity to experience how science works. Students will write lab reports, which document the lab experience, record notes, and express ideas. Lab reports must be handed in before the start of following week's lecture. Some labs will use animal tissue or living animals.

Tests & Quizzes

Students will receive three to five essay questions at the end of each lecture and will be asked to prepare in groups one-page answers (with text and possibly illustrations). Questions for exams will be selected from these essay questions.

Grading of Assignments

The grade for this course will be determined according to the following formula:

Assignments/Activities	% of Final Grade
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	30%
Labs	15%
Classwork and Homework	15%

Letter Grades

Letter grades for the entire course will be assigned as follows:

Letter Grade	Percent
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A	92.5% and higher
A-	90.0 – 92.49%
B+	87.5% - 89.99%
B	82.5% - 87.49%
B-	80% - 82.49%
C+	77.5% - 79.99%
C	72.5% - 77.49%
C-	70% - 72.49%
D+	67.5% - 69.99%
D	62.5% - 67.49
D-	60% - 62.49%
F	59.99% and lower

Assessment Expectations

Grade A: Excellent work (i.e. thorough understanding and knowledge of material demonstrated in homework and exams, active participation and discussion of materials in classes, active participation in laboratories)

Grade B: Very good work (very good knowledge of material, active participation in classes and laboratories)

Grade C: Good work: (good understanding and knowledge of material demonstrated in homework and exams)

Grade D: Satisfactory performance (satisfactory understanding and knowledge of material)

Grade F: unsatisfactory work

Course Schedule

Topics and Assignments

Week/Date	Topic	Reading
Session 1 Thursday, February 6	Location: Seifert - RD Lecture 1. Introduction: Brain and behavior an intimate couple (integrating across levels and scales of complexity) Lecture 2. Brain Organization: Structure and function - another intimate couple Lecture 3. Bioelectricity: Electric meat (fat, water and salt)	Chapters 1 and 2
Session 2 Thursday,	Location: Seifert - RD Lecture 4. Neural communication I: The exciting electrical language of neurons,	Chapter 3

February 13	Lecture 5. Neural communication 2: Synapses – connections, networks and influence Lecture 6. Neural communication 3: Membrane Physiology Review	
Session 3 Thursday, February 20	Location: NIMH, Room 202.06 Lab 1. Brain structure, anatomy and microscopy.	
Session 4 Thursday, February 27	Location: Seifert - RD Lecture 7. Neural communication 4: Synapses - circuits and networks for exchanging drugs Lecture 8. Neurodevelopment or how to build something really complicated Review to prepare for midterm exam	Chapter 4 Chapter 13 p.402-417
Session 5 Thursday, March 5	Location: Seifert - RD Midterm Exam 1 Lecture 9. Hormones and Sex - action at a distance	Chapter 8 p.216-233
Session 6 Thursday, March 12	Location: Seifert - RD Lecture 10. Stepping back: Evolution/Animals are models too Lecture 11. Social brain Lecture 12. Sensation and touching in your head	Viewing: https://www.youtube.com/watch?v=fgQLyqWaCbA Chapter 5 p.118-136
Session 7 Thursday, March 19	Location: NIMH, Room 202.06 Lab 2. Electrical properties of brain cells, recording electrical nerve impulses	
Session 8 Thursday, March 26	Location: Seifert - RD Lecture 13. Hearing Lecture 14. Balance and equilibrium Lecture 15. Seeing and perceiving: how brains see 1	Chapter 6 p. 152-171
Session 9 Thursday, April 2	Location: Seifert - RD Lecture 16. Seeing and perceiving: how brains see 2 Lecture 17. Moving, how complicated could it be? Lecture 18. Neural representation and computation	Chapter 7 p.182-215 Chapter 5 p.136-149 Reading: Where Am I? Where am I Going? By May-Britt and Edvard Moser, Scientific American
Session 10 Thursday, April 9	Location: NIMH, 202.06 Lab 3. Animal behavior – experiments with animal learning Review to prepare for midterm exam	
Spring Break April 11-19	Spring Break	
Session 11	Location: Seifert - RD	

Thursday, April 23	Midterm Exam 2	
Make-up Day Friday, April 24 (9am-5pm)	Make-up day for missed classes	
Session 12 Thursday, April 30	Location: Seifert - RD Lecture 19. Emotions Lecture 20. Attention Lecture 21. Memory 1: Amnesia, memory and the learning process	Chapter 11 Chapter 14 p. 418-428 Chapter 13 p. 378-391
Session 13 Thursday, May 7	Location: Seifert - RD Lecture 22. Memory 2: Synaptic and molecular plasticity, memory storage Lecture 23. Brain in sleep Lecture 24. Mental illness and brain dysfunction	Chapter 13 p. 392-402 NYT piece on PKMzeta: "Focusing on a memory molecule" A Price to Pay for Adult Neurogenesis by Mongiat and Schinder, Science 2014 Chapter 12 NPR: "Halting Schizophrenia Before It Starts"
Session 14 Thursday, May 14 (last day of classes)	Location: NIMH, 202.06 Lab 4. Sensory systems. vision, somatic sensation, response time Review to prepare for final exam, course evaluations	
Session 15 Thursday, May 21	Location: Seifert - RD Final exam	

Course Materials

Required Textbooks & Materials

- The Mind's Machine – Foundations of Brain and Behavior
- Watson and Breedlove. Oxford University Press, Third Edition

Resources

- **Access your course materials:** [NYU Classes](https://nyu.edu/its/classes) (nyu.edu/its/classes)
- **Databases, journal articles, and more:** [Bobst Library](https://library.nyu.edu) (library.nyu.edu)
- **Assistance with strengthening your writing:** [NYU Writing Center](https://nyu.mywconline.com) (nyu.mywconline.com)
- **Obtain 24/7 technology assistance:** [IT Help Desk](https://nyu.edu/it/servicedesk) (nyu.edu/it/servicedesk)
- **NYU Prague library:** [Tritius Catalog](https://nyu.tritius.cz/?lang=EN) (https://nyu.tritius.cz/?lang=EN)

Course Policies

Attendance and Tardiness

Absences only for medical reasons and for religious observance will be excused. To obtain an excused absence, you are obliged to supply either a doctor's note or corroboration of your illness by a member of the housing staff (either an RA or a Building Manager). To be excused for religious observance, you must contact the instructor and the Academic Director via e-mail one week in advance of the holiday. Your absence is excused for the holiday only and does not include days of travel associated with the holiday. Unexcused absences will be penalized with a 2% percent deduction from your final course grade for every week of classes missed.

Please note that Friday, April 24 (9am – 5pm) is reserved as a make-up day for missed classes. Do not schedule any trips for this day.

Late Submission of Work

Late submission of homework will lead to a 10% reduction of that homework's evaluation.

Academic Honesty/Plagiarism

According to the Liberal Studies Program Student Handbook, plagiarism is defined as follows:

Plagiarism is presenting someone else's work as though it were one's own. More specifically plagiarism is to present as one's own a sequence of words quoted without quotation marks from another writer, a paraphrased passage from another writer's work; facts or ideas gathered, organized and reported by someone else, orally and/or in writing. Since plagiarism is a matter of fact, not of the student's intention, it is crucial that acknowledgment of the sources be accurate and complete. Even where there is no conscious intention to deceive, the failure to make appropriate acknowledgment constitutes plagiarism.

The College of Arts and Science's Academic Handbook defines plagiarism similarly and also specifies the following:

“presenting an oral report drawn without attribution from other sources (oral or written), writing a paragraph which, despite being in different words, expresses someone else's idea without a reference to the source of the idea, or submitting essentially the same paper in two different courses (unless both teachers have given their permission in advance).

Receiving help on a take-home examination or quiz is also cheating – and so is giving that help – unless expressly permitted by the teacher (as in collaborative projects). While all this looks like a lot to remember, all you need to do is give credit where it is due, take credit only for original ideas, and ask your teacher or advisor when in doubt.”

“Penalties for plagiarism range from failure for a paper, failure for the course or dismissal from the university.” (Liberal Studies Program Student Handbook)

Classroom Etiquette

Specific rules apply to work in laboratories: Wearing lab coats is necessary and no food or beverages are allowed.

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.