

Syllabus
Introduction to Neuroeconomics: How the Brain Makes Decisions
(3 ECTS)

Author:

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Psychology Programme

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1. Course Description

a. **Title of a Course:** Introduction to Neuroeconomics: How the Brain Makes Decisions

b. **Pre-requisites:**

Basic in Statistical Analysis

c. **Course Type** (compulsory, elective, optional): elective

d. **Abstract:**

The course does not require any prior study of economics and neuroscience; however, it might require you to study novel interdisciplinary materials. The course provides an introduction to the methodology, assumptions, and main findings of Neuroeconomics. Our students have different backgrounds; therefore, I have adapted and simplified the course to allow all students to understand the interdisciplinary content. This course will help you to start your progress in the field of Neuroeconomics and to further develop your skills during other more advanced courses and trainings in the future.

2. Learning Objectives:

The purpose of this module is:

1. To learn the added value of Neuroeconomics
2. To learn major assumptions of decision theories
3. To understand the interdisciplinary nature of Neuroeconomics
4. To discuss possible implications of Neuroeconomics to our fundamental understanding of human behavior

3. Learning Outcomes :

By the end of this module, students should be able to:

1. Understand advantages and disadvantages of various neuroscience methods.
2. Be able to read the results of neuroeconomics studies
3. Understand that we have to combine various methods to understand mechanisms of decision-making

4. Course Plan

1. Introduction to Neuroeconomics
2. Brain anatomy and functions
3. Introducing brain models of decision making and choice
4. Neural representation of the subjective value, basal ganglia and choice value
5. Affective mechanisms of decision-making
6. Dual-processing hypothesis of “temporal discounting”
7. The social brain
8. Taking an evolutionary perspective: the ‘economic animal’
9. Multiple Comparisons

5. Reading List:

a. Required:

Bickel, W., Mueller, E., MacKillop, J., & Yi, R. (2016-09-15). Behavioral-Economic and Neuroeconomic Perspectives on Addiction. In (Ed.), *The Oxford Handbook of Substance Use and Substance Use Disorders: Volume 1.* : Oxford University Press,.
<http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199381678.001.0001/oxfordhb-9780199381678-e-015>.– ЭБС: Oxford Handbooks Online

Davis, J. (2009-03-26). Competing Conceptions of the Individual in Recent Economics. In (Ed.), *The Oxford Handbook of Philosophy of Economics.* : Oxford University Press,.
<http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780195189254.001.0001/oxfordhb-9780195189254-e-008>.– ЭБС: Oxford Handbooks Online

Bhatt, M., & Camerer, C. (2011-09-12). The Cognitive Neuroscience of Strategic Thinking. In (Ed.), *The Oxford Handbook of Social Neuroscience.* : Oxford University Press,.
<http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780195342161.001.0001/oxfordhb-9780195342161-e-062>.– ЭБС: Oxford Handbooks Online

b. Optional:

COLIN F. CAMERER. Neuroeconomics: Using Neuroscience to Make Economic Predictions. *The Economic Journal*, [s. l.], v. 117, n. 519, p. C26, 2007.
Cognitive neuroscience; the biology of the mind, 4th ed.(Brief article)(Book review). *Reference & Research Book News*, [s. l.], n. 6, p. NA, 2013.

In this course, information on recommended readings will be provided at the beginning of each module. At the end of each module, we will also give a list of additional resources to help further expand your knowledge on the topics discussed.

6. Grading System:

In-video quizzes come along with each lecture. They do not count toward your final grade. You will have one attempt to answer each in-video quiz question. They are provided to help you comprehend the content of the lecture.

- After each lecture, you will be asked to take a quiz. Each quiz will contain 15 questions. To pass the quiz you must answer at least 12 out of 15 questions. You have an unlimited number of attempts to take the quiz.

The final grade is calculated on the basis of: the final exam (100%). The grades will be given on a scale of 1 to 10 throughout the class. All grades, having a fractional part greater than 0.5, are rounded up. greater than 0.5, are rounded up.

7. Examination Type:

Sample Questions for assessing the quality of knowledge:

1. The drift-diffusion model of monkeys' perceptual decisions
2. Applying the drift-diffusion model to the activity of LIP neurons
3. The drift-diffusion model explains human perceptual decisions
4. The risk-related activity of dopaminergic neurons

5. Different forms of reward-related uncertainty
6. Anticipatory affect model
7. Dual-system theory
8. Self-regulation & valuation brain signals
9. The role of the dorsolateral prefrontal cortex (DLPFC) in self-control
10. The role of the dorsolateral prefrontal cortex (DLPFC) in fairness-related decision-making
11. Dual-processing hypothesis of “temporal discounting
12. Risk aversion / Risk attitude
13. Prospect Theory
14. Game theory
15. Prisoner's dilemma
16. A neural basis for social cooperation
17. Mirror neurons mechanism of social interaction
18. Empathy for pain & Neuroeconomics
19. Ontogenetic origin of cooperation
20. Cooperation in great ape societies
21. Biological market theory

8. Methods of Instruction:

Blended course: On-line lectures (<https://www.coursera.org/learn/neuroeconomics>) and out-of-class work.

9. Special Equipment and Software Support (if required): PC, internet access