

BA 4154/5154 - Neuroscience Applications for Business

Tuesday & Thursday 12:40-14:15 @G208

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Office Hours:	Tuesday: 14:30-15:30
Course Web Page:	https://odtuclass.metu.edu.tr

Course Description:

This course integrates neuroscience, psychology and economics to comprehend the mechanisms behind decision making processes. Students will learn how brains generate decisions that will be helpful for improving relevant theories related to managerial decision making. Students will have knowledge about the basic architecture of the decision process in the human brain. Topics will include introduction to neuroscience, foundations of the psychology of decision making, core concepts in neuroscience, neural basis of different situations related to decision making and neuroscience applications. Students will explore the crucial role of applied neuroscience in various areas (i.e., neurofinance, consumer neuroscience, organizational behavior and human resources), shedding light on the neural and cognitive processes behind decision making. Students will comprehend the fundamentals of how the brain functions, how these neural processes drive decision making and the link between traditional behavioral models and brain-based models. Neuroscience offers valuable insights into managerial decision making and consumer behavior, making it a powerful tool for improving strategy and outcomes in business environments.

Course Student Learning Objectives: (CSLOs)

Upon successful completion of this course, students should be able to:

Course Specific Skills:

1. Understand the basic concepts in neuroscience and decision theory
2. Know brain systems involved in economics, more specifically, managerial decision making
3. Learn interdisciplinary approaches to study decision making
4. Become aware of neuroscience methods addressing questions of interest in economics, psychology and other decision sciences
5. Critically evaluate empirical studies in neuroscience to comprehend relevant findings

Discipline Specific Skills:

6. Recognize the importance of interdisciplinary approaches to study managerial decision making
7. Understand decision making processes
8. Understand the significance of combining different methods from different areas
9. Comprehend the significance of neuroscience in business environments

Personal and Key Skills:

10. Develop communication and problem-solving skills
11. Develop writing, academic literacy and discussion skills
12. Aware of the theories and methods applied to business life

Learning and Teaching Methods:

Formal lectures, discussions, exercises, case studies, applications, oral presentation, written report and exams in class.

Required Reading:

Purves, D., Augustine, G. J., Fitzpatrick, D., Hall, W. C., LaMantia, A., Mooney, R. D., Platt, M. L. (2018). *Neuroscience*, 6th Edition, Sinauer Associates, Oxford University Press.

Glimcher, P. W. (2014). *Neuroeconomics Decision Making and the Brain*, 2nd Edition. Elsevier Inc.
 Hardman, D. (2009). *Judgment and Decision Making: Psychological Perspectives*. UK: BPS Blackwell.
 Readings provided by the instructor in class.

Suggested Reading:

Reuter, M. and Montag, C. (2016). *Neuroeconomics*, Springer.
 Purves, D., Brannon, E. M., Cabeza, R., Huettel, S. A., LaBar, K. S., Platt, M. L. and Woldorff, M. G. (2008). *Principles of Cognitive Neuroscience*. Sinauer Associates.
 Glimcher, P. W. (2003). *Decisions, Uncertainty and the Brain: The Science of Neuroeconomics*. Cambridge, Mass: MIT Press.

Assignment and Grading (tentative):

Form of Assessment	% Contribution	Size of the Assessment	CSLOs Covered by the Assessment	Feedback Method
Midterm 1	20	Individual	1-9, 12	Written
Midterm 2	20	Individual	1-9, 12	Written
Term project presentation and report	20	Group, written report and in-class presentation	1-12	Written and oral
In-class exercises, assignments, etc.	30	Homework problems, quizzes and exercises	1-12	Written and oral
Attendance, participation	10	Class participation during lectures	1-12	Written and oral

Course Policies:

ATTENDANCE& PARTICIPATION: Students are expected to attend the regular lectures and be active in the discussions.

TERM PROJECT: The goal of this project is to develop students' academic literacy, research awareness and communication skills through a critical engagement with a scholarly research article. This project will be performed with groups. Each group needs to choose an interdisciplinary research article covering the topics of this course. It would be nice to include topics related to one of the fields of business. The article must be empirical in the field of neuroscience, consisting of one of the neuroscience methods used in this course. Students have to produce a structured critical review and perform an oral presentation addressing the following components:

1. Article Selection:

- Choose a peer-reviewed research article from a reputable academic journal.
- The article should be directly related to the topics covered in this course.
- Students must get their selected article approved by the instructor by the date to be announced.

2. Written Report (Approx. 1500–2000 words): The report must include a cover page with the each group member's name, student IDs, course name, article title and date. Students should cite all references appropriately. If you need to write slightly more than the specified number of words in each section, that's fine as long as it's not excessive. The review should include the following sections:

- a. **Summary (Approx. 300–400 words):** Provide a concise summary of the article's objectives, research question(s), key arguments, methodology and main findings.
- b. **Methodology Overview (Approx. 300–400 words):** Identify and describe the research method(s) used in the study. Explain how the authors collected and analyzed their data. Discuss whether the methodology is appropriate for the research question. (Please provide the research questions, hypotheses, and the variables along with their levels. Additionally, outline the experimental design (its type), the characteristics of the sample, the procedure, and the methods used to conduct and analyze the experiment. This should follow the stages of experimental design similar to the exercises we completed).
- c. **Critical Evaluation of Findings (Approx. 500–600 words):** Analyze the significance and reliability of the findings. Are the results well-supported by the data? Are there any limitations, biases, or gaps in interpretation? Make a critique based on logical reasoning and, if relevant, comparison with other studies.
- d. **Open Questions and Further Research (Approx. 200–300 words):** Identify one or more questions that remain unanswered or could be explored further. Suggest a possible direction for future research or an alternative approach to the same topic.

3. **Oral Presentation (Approximately 15 minutes):** Each group will deliver a 15 to 20 minute in-class presentation based on their article and report.

Presentation Guidelines:

- Present the key points of your review: summary, methods, critical insights, and proposed open questions.
- Engage your audience: speak clearly, maintain eye contact, and encourage brief questions or comments.
- Be prepared to respond to 1–2 follow-up questions from peers or the instructor.

Presentations will take place during the class hours during the semester. A detailed schedule will be announced after all article topics are approved. The deadline of the term project reports will also be announced during the term.

STUDENT DISABILITIES: Any student, who, because of a disabling condition, may require special arrangements in order to meet course requirements, should contact the instructor as soon as possible. Students should present the appropriate documentation from the university's Disability Support Office ([Engelsiz ODTÜ Birimi, ODTÜ Kütüphanesi, Solmaz İzdemir Salonu, Tel: 210.7196; engelsiz@metu.edu.tr](mailto:engelsiz@metu.edu.tr)) verifying their disability, and outlining the special arrangements required. Please note that no accommodations will be provided to the disabled students prior to the completion of this approved University process.

ACADEMIC DISHONESTY: The Department of Business Administration has no tolerance for acts of academic dishonesty. Such acts damage the reputation of METU, the department and the BS degree and demean the honest efforts of the majority of the students. The minimum penalty for an act of academic dishonesty will be a zero for that assignment or exam.

CHEATING: All university, faculty/institute, and department principles on academic honesty will be strictly enforced. The usual consequence for academic dishonesty is failure of the course and referral of the case to the Dean of the Faculty/Institute for additional disciplinary action. Examinations are individual and are to be completed without outside assistance of any sort. Persons observed cheating during examinations will receive a failing grade in the course. Homework assignments are individual, unless otherwise specified by the instructor, and are to be completed without outside assistance of any sort, as well. Persons observed cheating in their homework assignments will receive a score of zero for

the portion of the semester grade that is allocated to such assignments. Persons observed to plagiarize while preparing assignments will be referred to the Dean of the Faculty for additional disciplinary action and also they will receive a score of zero for the portion of the semester grade that is allocated to such assignments.

PLAGIARISM: The instructor assumes that students will do their own work. By placing their names on assignments (individual or team), students are affirming that the contents are their original work. Any previous work available from files or past students, as well as materials available on the internet may be used only as a suggestive model. Violation of this provision will be considered as unethical behavior, subject to disciplinary action. If you have any doubt about the use of a specific material, see the instructor ahead of time. Any material used from outside sources should be referenced appropriately.

METU HONOR CODE

Every member of METU community adopts the following honor code as one of the core principles of academic life and strives to develop an academic environment where continuous adherence to this code is promoted.

"The members of the METU community are reliable, responsible and honorable people who embrace only the success and recognition they deserve, and act with integrity in their use, evaluation and presentation of facts, data and documents."

CIVILITY IN THE CLASSROOM: Students are expected to assist in maintaining a classroom environment which is conducive to learning. In order to assure that all students have an opportunity to gain from time spent in class, unless otherwise approved by the instructor, students are prohibited from using laptop computers and cellular phones, making offensive remarks, reading newspapers, sleeping, or engaging in any other form of distraction. Inappropriate behavior in classroom shall result, minimally, in a request to leave class.

Past observations showed that the METU classroom experience is improved when the following are true:

Students arrive on time. Timely arrival ensures that classes are able to start and finish at the scheduled times. Timely arrival shows respect for both fellow students and faculty and it helps to create a better learning environment by reducing avoidable distractions.

Students are fully prepared for each class. Much of the learning in this course takes place during classroom discussions. When students are not prepared, they cannot contribute to the learning process. This affects not only the individual but also the classmates who count on them.

Students respect the views and opinions of their colleagues. Disagreement and debate are encouraged; however, intolerance for the views of others is unacceptable.

Laptops, phones and wireless devices are turned off.

STUDENT EXCUSES FOR EXAMS AND ASSIGNMENTS: In case you cannot attend one of the examinations, if and only if you can present an official (dean's or president's office approved) **excuse** or **METU Medical Center certified Health Report**, you will be eligible to take a make-up examination. Late submission of assignments will not be accepted.

ACADEMIC REGULATIONS:<http://oidb.metu.edu.tr/en/academicrules-and-regulations>

ACADEMIC CALENDAR:<http://oidb.metu.edu.tr/en/academic-calendar>

The instructor assumes that students who attend the next class have understood and accepted to agree with all the requirements and rules of this course.

The following table gives the tentative schedule for the semester. The lectures will stress the most important and/or most difficult material.

Tentative Course Schedule					
Week	Month	Day	Topic	Reading/Assignment	CSLO
1	FEBRUARY	17	Introduction		
1-2	FEBRUARY	19-24	Introduction to neuroscience (definition, history, scope)	Week 1 & 2 slides (in ODTU Class) and relevant textbook/article sections	1,3,6,8-12
2-3	FEBRUARY MARCH	26-3	Foundations of the psychology of decision making and relevance to neuroscience	Week 2 & 3 slides (in ODTU Class) and relevant textbook/article sections	1,3,6,7,9-12
3-4	MARCH	5-10	Experiments in managerial decision making, economics and neuroeconomics	Week 3 & 4 slides (in ODTU Class) and relevant textbook/article sections	1,5,7,10-12
4-5	MARCH	12-17	Core concepts: neuroscience, experimental methods in cognitive neuroscience	Week 4 & 5 slides (in ODTU Class) and relevant textbook/article sections	1,3,6-8,10-12
5	MARCH	19	Religious holiday	No class	
6	MARCH	24-26	Core concepts: neuroscience, experimental methods in cognitive neuroscience	Week 6 slides (in ODTU Class) and relevant textbook/article sections	1,3-6,8-12
7	MARCH	31	Core concepts: brain regions related to decision making	Week 7 slides (in ODTU Class) and relevant textbook/article sections	1-12
7	APRIL	TBA	Midterm 1 (outside of class hours)		1-9, 12
7	APRIL	2	How the brain values things, compares and integrates values, learns value and predicts the future during managerial decision making	Week 7 slides (in ODTU Class) and relevant textbook/article sections	1-12
8	APRIL	7-9	Basic analysis of neural data and interpretation of experimental outputs in different business fields	Week 8 slides (in ODTU Class) and relevant textbook/article sections	1-12

9-10	APRIL	14-16-21	Applied neuroscience: consumer neuroscience and neuromarketing	Week 9 & 10 slides (in ODTU Class) and relevant textbook/article sections	1-12
10	APRIL	23	National holiday	No class	
11	APRIL	28	Applied neuroscience: consumer neuroscience and neuromarketing	Week 11 slides (in ODTU Class) and relevant textbook/article sections	1-12
11-12	APRIL MAY	30-5-7	Applied neuroscience: neurofinance	Week 11 & 12 slides (in ODTU Class) and relevant textbook/article sections	1-12
12	MAY	TBA	Midterm 2 (outside of class hours)		1-9, 12
13	MAY	12	Applied neuroscience in organizational behavior and human resource management	Week 13 slides (in ODTU Class) and relevant textbook/article sections	1-12
13	MAY	14	Term project presentations		1-12
14	MAY	19	National holiday	No class	
14	MAY	21	Term project presentations		1-12
15	MAY	26	Religious holiday	No class	
15	MAY	28	Religious holiday	No class	
16	JUNE	2-4	Applied neuroscience in organizational behavior and human resource management	Week 16 slides (in ODTU Class) and relevant textbook/article sections	1-12