

SYLLABUS

COGNITION AND DECISION MAKING

01:185:301 sections 01 (06504) & 02 (06505)
Spring 2024

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COURSE OVERVIEW

Logistics

Main page: <https://canvas.rutgers.edu>

Pre-requisites: Cognitive Science: A Multi-disciplinary Introduction (01:185:201)

Lectures:

- Mondays and Wednesdays 3:50pm – 5:10pm (in-person at 208 Murray Hall)

Recitations:

- Section 01: Tuesdays, 10:35am – 11:30am (in-person at 209 Tillett Hall)
- Section 02: Tuesdays, 4:05pm – 5:00pm (in-person at A121 Lucy Stone Hall)

Instructor: Paul Robinson

- Email: paul.d.robinson@rutgers.edu (response within 1 working day)
- Office hours / student support hours: Tuesdays 12:00pm – 1:00pm (Rm A104, RuCCS, Psychology Building) & by appointment

Course description

Which subject should I major in? Should I eat meat? Who should I vote for? Should I get vaccinated? Which stocks should I buy? Should I overlook unethical behavior by my employer?

The length and quality of your life is largely determined by the decisions you and others make. Human choices also impact animals and the environment. What is it for a decision to be rational or irrational? Why do we make the decisions we do? Can knowledge of how our minds work be used to manipulate our decisions? These are some of most pressing questions of our time.

This course addresses these kinds of questions about decision-making from the interdisciplinary perspective of cognitive science. It uses knowledge and techniques from disciplines such as psychology, neuroscience, anthropology, economics, and philosophy, to investigate the “mental machinery” that underlies human decision-making. Topics covered include unconscious influences on decisions, heuristics that people use to make decisions, and systematic biases displayed by decisions. The course concludes by examining how we can improve decision-making. Examples are drawn from domains such as marketing, finance, healthcare, public policy, and everyday life. Throughout the course there will be a focus on (i) understanding the mathematical formalisms that guide research on decision-making, such as Bayesian probability theory and expected utility theory, and (ii) critically evaluating the research methods and experimental paradigms employed by classic studies of decision-making.

Core Curriculum Learning Goals



This course fulfills the “**Quantitative and Formal Reasoning**” goal (QQ): You will formulate, evaluate, and communicate conclusions and inferences from quantitative information.

Department Learning Goals

Upon successful completion of the course, students will:

- i. Appreciate the interdisciplinary nature of cognitive science and be able to read, summarize, and critically evaluate scientific research papers from multiple disciplines.
- ii. Understand the factors that influence decision making, the biases that decisions tend to display, and theories of the mental processes that underlie decision-making.
- iii. Develop strategies for making better decisions.

HOW THIS COURSE WORKS

Mode of delivery

This course is fully in-person.

Attendance policy

Students are expected to attend all classes. If you expect to miss one or two classes, please use the University absence reporting website - <https://sims.rutgers.edu/ssra/> - to indicate the date and reason for your absence. An email will automatically be sent to me from this system. Please provide timely notification about necessary absences for religious observances.

Note that if you must miss classes for longer than one week, you should contact a dean of students to help verify your circumstances.

To further incentivize attendance, I will take roll call and students who attend can earn a bonus of up to 2% on their final score.

Electronic devices

You are permitted to have your phones out to check for important messages but please do not use phones to browse the internet or record classroom conversations. You may use a laptop for class-related activities only. Typically, at various points during class I will ask you to close your laptops.

Course requirements

- **Reading quizzes:** Each week, by Monday at 3:30pm, you will use Canvas to complete a brief multiple-choice quiz on the reading for that week. Each quiz will open after class on the previous Wednesday, thus giving you five days to do the reading.
- **Lecture quizzes:** Each week, by Wednesday at 11:59pm, you will use Canvas to complete a brief multiple-choice quiz on the lectures for that week. Each quiz will open after class on Wednesday.
- **Module reflection posts:** This course is divided into six two-week modules. By 11:59pm on Fridays that fall at the end of a module you will submit a reflection post to a discussion board on Canvas. These posts will be used for class discussion and may also help you choose a topic for your final paper. Your reflection should consist of four sentences: (1) state the most interesting thing that you learned; (2) explain why you find it interesting; (3) ask a question concerning something you didn't understand or are unsure about; (4) explain why you didn't understand or why you are unsure.
- **Writing assignments:** You will submit four short writing assignments. Further details will be provided in Canvas (Files > Assignments). The first three are reflection pieces and the final one is designed to help you with your final paper:

Assignment A: Analyze one good decision and one bad decision that you made in the past year.

Assignment B: Write a memo to your future boss explaining how the cognitive science of decision-making relates to your imagined future profession.

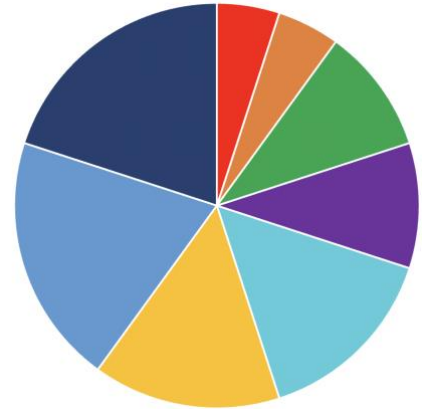
Assignment C: Design an educational poster on the communication of uncertainties.

Assignment D: Develop a brief literature review – of the type that might be found in the introductory section of a journal article – on a course-related subject of your choice. (This assignment may serve as the foundation for your final paper).

- **Mathematical homework assignments:** There will be five mathematics assignments on probability theory, expected utility theory, and game theory.
- **Presentation:** In groups, students will create a short video on an object or idea that we work together to select.
- **Midterm exam:** You will take a multiple-choice and short-answer quiz, which will be in-person and held in our classroom.
- **Final examination:** This two-part exam will be partly in-person. The in-person component will be a multiple-choice quiz. The other component will be an original research paper on a course-related topic of your choosing, which you will submit electronically to Canvas.

How your final grade is calculated

ASSIGNMENT CATEGORY	PERCENTAGE
Reflection posts	5%
Presentation	5%
Reading quizzes	10%
Lecture quizzes	10%
Math homeworks	15%
Writing assignments	15%
Midterm exam	20%
Final exam	20%
Total	100



I use the following grade scale, where $[x - y)$ denotes values from x up to but not including y :

[90 – 100]:	A
[85 – 90):	B+
[80 – 85):	B
[75 – 80):	C+
[70 – 75):	C
[60 – 70):	D
Below 60:	F

Late assignments

If you experience a situation that prevents you from completing work on time, please inform me as soon as possible. Late work will be given a score of “0” on Canvas by default. However, I am happy to consider both granting extensions and giving you full or partial credit for late work (by manually overriding the default 0 grade on Canvas), depending on the circumstances. Please do not hesitate to contact me about any aspect of the course that you are having difficulty with. I am here to help you learn and succeed in the course, not to make your life more difficult.

There will be no personalized end-of-semester extra-credit assignments. If you have concerns about your final grade, please speak to me early in the semester.

Required reading

There is one required textbook for this class:

- Kim, Nancy. (2017). *Judgment and Decision-Making: In the Lab and the World*. Macmillan International Higher Education. ISBN: 9781137269560, 1137269561

Copies are available in the Rutgers bookstore.

Other required readings will be uploaded to Canvas in pdf form.

RIGHTS AND RESPONSIBILITIES

Health and safety

Masks must be worn during class meetings; any student not wearing a mask will be asked to leave. Masks should conform to CDC guidelines and should cover the nose and mouth:

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>

Academic integrity policy

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Student Conduct.

Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly
- Fabrication
- Using another person's ideas or words without attribution—re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work

If in doubt, please consult the instructor. Please review the Academic Integrity Policy:

<http://nbacademicintegrity.rutgers.edu/home/academic-integrity-policy/>

Copyright disclaimer

Almost all original work is the intellectual property of its authors. This includes not just books and articles, but the syllabi, lectures, lecture slides, recorded lectures, course materials, presentations, homework problems, exams, and other materials used in this course, in either printed or electronic form.

Providing course materials to commercial suppliers such as CourseHero, Chegg, etc. and/or publicly distributing or displaying course materials, or helping others to do so, is a violation of academic integrity.

The authors hold copyrights in their works, which are protected by U.S. statutes. Copying this work or posting it online without the permission of the author may violate the author's rights. More importantly, these works are the product of the author's efforts; respect for these efforts and for the author's intellectual property rights is an important value that members of the university community take seriously. For more instructions on copyright protections at Rutgers University, please refer to:

<https://www.libraries.rutgers.edu/research-tools-and-services/copyright-guidance/copyright-students>

Requesting accommodations

Rutgers students are expected to attend all scheduled course meetings. University policy excuses absences due to religious observance or participation in Rutgers-approved activities, and permits students to make up work missed for these circumstances. If you will be absent from a class, lab, or exam for any reason, please report your absence here:

<https://sims.rutgers.edu/ssra/>

If you have been told to quarantine, or are experiencing symptoms of any transmittable disease, please remain at home and do not attend in-person class meetings. If you need help to catch up on material you missed, I am happy to schedule personal sessions with you.

Rutgers University welcomes students with disabilities into all the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>.

If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Full disability policies and procedures are at: (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Accessibility of course technology

This course requires use of Canvas and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

Please visit the [Rutgers Student Tech Guide](#) page for resources available to all students. If you do not have the appropriate technology for financial reasons, please email Dean of Students deanofstudents@echo.rutgers.edu for assistance.

If you are facing other financial hardships, please visit the Office of Financial Aid at <https://financialaid.rutgers.edu/>.

Student wellness resources

- Student Success Essentials: <https://success.rutgers.edu>
- Student Support Services: <https://www.rutgers.edu/academics/student-support>
- The Learning Centers: <https://rlc.rutgers.edu/>
- Rutgers Libraries: <https://www.libraries.rutgers.edu/>
- Bias Incident Reporting: <https://studentaffairs.rutgers.edu/bias-incident-reporting>
- Dean of Students – Student Support Office: <https://success.rutgers.edu/resource/dean-students-student-support-office>
- Office of Veteran and Military Programs and Services: <https://veterans.rutgers.edu>
- Student Health Services: <http://health.rutgers.edu/>
- Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services (CAPS): <http://health.rutgers.edu/medical-counseling-services/counseling/>
- UWill: free immediate access to teletherapy; you can choose a therapist based on your preferences including issue, gender, language, ethnicity. <http://health.rutgers.edu/uwill/>
- Office for Violence Prevention and Victim Assistance: www.vpva.rutgers.edu/
- Office of Disability Services: <https://ods.rutgers.edu/>
- Basic Needs Assistance (food, housing, and other essentials): <https://ruoffcampus.rutgers.edu/basic-needs>
- Rutgers Student Food Pantry: <https://ruoffcampus.rutgers.edu/food-pantry>

COURSE SCHEDULE

Module A: Cognitive Architecture

Week 1 material

Reading	Kim (2018): Introduction.
Optional reading	Nisbett & Wilson (1977): Telling more than we can know.
Lectures	Dual-process theories of cognition.
Recitation	Introspection and verbal reports.

Week 1 schedule

Tuesday, January 16	Recitation
Wednesday, January 17	Lecture; lecture quiz due
Thursday, January 18	
Friday, January 19	
Saturday, January 20	
Sunday, January 21	

Week 2 material

Reading	Dijksterhuis & Nordgren (2006): A theory of unconscious thought.
Optional reading	Dijksterhuis et al. (2006): On making the right choice.
Lectures	Conscious and unconscious decision making.
Recitation	Probability theory.

Week 2 schedule

Monday, January 22	Lecture; reading quiz due
Tuesday, January 23	Recitation
Wednesday, January 24	Lecture; lecture quiz due
Thursday, January 25	
Friday, January 26	Module A reflection post due
Saturday, January 27	
Sunday, January 28	Writing assignment A due

Module B: Heuristics and Biases

Week 3 material

Reading	Kim (2018): Availability and representativeness.
Optional reading	Tversky & Kahneman (1983): Extensional versus intuitive reasoning.
Lectures	Availability and representativeness.
Recitation	Research methods and reading empirical studies.

Week 3 schedule

Monday, January 29	Lecture; reading quiz due
Tuesday, January 30	Recitation
Wednesday, January 31	Lecture; lecture quiz due
Thursday, February 1	
Friday, February 2	
Saturday, February 3	
Sunday, February 4	Math homework 1 due

Week 4 material

Reading	Kim (2018): Anchoring and primacy effects in judgment.
Optional reading	Tversky & Kahneman (1974): Judgment under uncertainty.
Lectures	Anchoring and primacy effects.
Recitation	Bayes Theorem.

Week 4 schedule

Monday, February 5	Lecture; reading quiz due
Tuesday, February 6	Recitation
Wednesday, February 7	Lecture; lecture quiz due
Thursday, February 8	
Friday, February 9	Module B reflection post due
Saturday, February 10	
Sunday, February 11	

Module C: Learning and Prediction

Week 5 material

Reading	Kim (2018): Hindsight bias.
Optional reading	Baron & Hershey (1988): Outcome bias in decision evaluation.
Lectures	Learning from past decisions.
Recitation	Bayes theorem

Week 5 schedule

Monday, February 12	Lecture; reading quiz due
Tuesday, February 13	Recitation
Wednesday, February 14	Lecture; lecture quiz due
Thursday, February 15	
Friday, February 16	
Saturday, February 17	
Sunday, February 18	Math homework 2 due

Week 6 material

Reading	Kim (2018): Risk perception; Prediction.
Optional reading	Eddy (1982): Probabilistic reasoning in clinical medicine
Lectures	Risk analysis.
Recitation	Study session for midterm exam.

Week 6 schedule

Monday, February 19	Lecture; reading quiz due
Tuesday, February 20	Recitation
Wednesday, February 21	Lecture; lecture quiz due
Thursday, February 22	
Friday, February 23	Module C reflection post due
Saturday, February 24	
Sunday, February 25	Writing assignment B due

Midterm Exam

Week 7 material

Reading	None
Optional reading	None
Lectures	None
Recitation	None

Week 7 schedule

Monday, February 26	Study session for midterm exam
Tuesday, February 27	Exam (in-person)
Wednesday, February 28	Exam (in-person)
Thursday, February 29	
Friday, March 1	
Saturday, March 2	
Sunday, March 3	

Module D: Choosing Resources

Week 8 material

Reading	Kim (2018): Choice and mental accounting.
Optional reading	Knutson et al. (2007): Neural predictors of purchases.
Lectures	Choice architecture.
Recitation	Expected utility theory.

Week 8 Schedule

Monday, March 4	Lecture; reading quiz due
Tuesday, March 5	Recitation
Wednesday, March 6	Lecture; lecture quiz due
Thursday, March 7	
Friday, March 8	
Saturday, March 9	
Sunday, March 10	

Module D continues after Spring Break.

Spring Break

Week 9 material

Reading	None
Optional reading	None
Lectures	None
Recitation	

Week 9 schedule

Monday, March 11	
Tuesday, March 12	
Wednesday, March 13	
Thursday, March 14	
Friday, March 15	
Saturday, March 16	
Sunday, March 17	

Module D: Choosing Resources (continued)

Week 10 material

Reading	Kim (2018): Expected utility theory; Framing effects and prospect theory.
Optional reading	Shafir (1993): Choosing versus rejecting
Lectures	Expected utility theory.
Recitation	Literature reviews.

Week 10 schedule

Monday, March 18	Lecture; reading quiz due
Tuesday, March 19	Recitation
Wednesday, March 20	Lecture; lecture quiz due
Thursday, March 21	
Friday, March 22	Module D reflection post due
Saturday, March 23	
Sunday, March 24	Math homework 3 due

Module E: Modeling Reality

Week 11 material

Reading	Kim (2018): Schemas & framework theories; Judging covariation, contingency & cause.
Optional reading	Pennington & Hastie (1986): Evidence evaluation in complex decision making.
Lectures	Explanation-based decisions.
Recitation	Bayesian rationality.

Week 11 schedule

Monday, March 25	Lecture; reading quiz due
Tuesday, March 26	Recitation
Wednesday, March 27	Lecture; lecture quiz due
Thursday, March 28	
Friday, March 29	
Saturday, March 30	
Sunday, March 31	

Week 12 material

Reading	Kim (2018): Hypothesis testing and confirmation bias; Belief.
Optional reading	Shafir, Simonson, & Tversky, (1993): Reason-based choice.
Lectures	Rationalizing decisions.
Recitation	Bayesian rationality.

Week 12 schedule

Monday, April 1	Lecture; reading quiz due
Tuesday, April 2	Recitation
Wednesday, April 3	Lecture; lecture quiz due
Thursday, April 4	
Friday, April 5	Module E reflection post due
Saturday, April 6	
Sunday, April 7	Writing assignment C due

Module F: Society and Groups

Week 13 material

Reading	Newell, Lagnado, Shanks (2015): Group decision making.
Optional reading	Leana (1985): A partial test of Janis' groupthink model.
Lectures	Group decision making.
Recitation	Game theory.

Week 13 schedule

Monday, April 8	Lecture; reading quiz due
Tuesday, April 9	Recitation
Wednesday, April 10	Lecture; lecture quiz due
Thursday, April 11	
Friday, April 12	
Saturday, April 13	
Sunday, April 14	Math homework 4 due

Week 14 material

Reading	Kim (2018): Moral judgment and cooperation.
Optional reading	Henrich et al. (2005): "Economic man" in cross-cultural perspective.
Lectures	Moral decision making.
Recitation	WEIRD sampling.

Week 14 schedule

Monday, April 15	Lecture; reading quiz due
Tuesday, April 16	Recitation
Wednesday, April 17	Lecture; lecture quiz due
Thursday, April 18	
Friday, April 19	Module F reflection post due
Saturday, April 20	
Sunday, April 21	Writing assignment D due

Module G: Improving Decision-Making

Week 15 material

Reading	Kahneman, Lovallo, Sibony (2011): Before you make that big decision...
Optional reading	Pronin (2007): Valuing thoughts, ignoring behavior.
Lectures	Improving decision-making.
Recitation	Study session for final exam.

Week 15 schedule

Monday, April 22	Lecture; reading quiz due
Tuesday, April 23	Recitation
Wednesday, April 24	Lecture; lecture quiz due
Thursday, April 25	
Friday, April 26	Module G reflection post due
Saturday, April 27	
Sunday, April 28	Math homework 5 due

Final Exam TBA

Monday, April 29	Study session for final exam
Tuesday, April 30	
Wednesday, May 1	
Thursday, May 2	
Friday, May 3	
Saturday, May 4	
Sunday, May 5	
Monday, May 6	
Tuesday, May 7	
Wednesday, May 8	