Course Schedule

Important: **ALL TIMES EASTERN** - Please see the [University Policies](#) section of your Course Outline for details

Week	Module	Readings	Activities and Assessments	End/Due Date	Weight
1	[Module 01: Introduction to the Cognitive Revolution](#)	Miller, George A. "The Cognitive Revolution: A Historical Perspective" Thagard, Paul. "Why Cognitive Science Needs Philosophy and Vice Versa"			
2	[Module 02: The Pre-History of Cognitive Science](#)	Aristotle. "De Anima" Descartes, René. "Meditations on First Philosophy" Cohen, S. M., Curd, P., & Reeve, C. D. C. (Eds.). Selected Pages from Phaedo		[Introduce Yourself](#) **Due** Wednesday, May 11, 2022 at 11:55 PM	Ungraded
3	[Module 03: From Turing Machines to Functionalism](#)	Putnam, Hilary. "The Nature of Mental States" Turing, Alan. "Computing Machinery and Intelligence" Searle, John. "Minds, Brains, and Programs"	[Essay Assignment 1](#) **Available** Wednesday, May 18, 2022 at 12:05 AM		
4	[Module 04: Logic and Cognition](#)	Dennett, Daniel. "Cognitive Wheels: The Frame Problem of AI" Frege, Gottlob. "The Thought: A Logical Inquiry"			

5	Module 05: Cognition and Linguistic Ability	Chomsky, Noah. "Acquisition of Language" Everett, Dan. "Cultural Constraints on Grammar and Cognition in Pirahã." Sapir, Edward. "The Status of Linguistics as a Science"	Essay Assignment 1 **Due** Wednesday, June 1, 2022 at 11:55 PM **15%**
6	Module 06: Concepts, Part I: The Classical View and Definitions	Fodor, Jerry. "Concepts: A Potboiler" Murphy, Gregory. "Typicality and the Classical View of Categories" Prinz, Jesse. "Desiderata on a Theory of Concepts"	
7	Module 07: Concepts, Part II: Prototypes, Exemplars and Beyond	Fodor, Jerry. "Concepts: A Potboiler" Rosch, Eleanor. "Principles of Categorization" Medin. "The Exemplar View"	Midterm Take-home Examination **Available** Wednesday, June 15, 2022 at 12:05 AM
8	Module 08: Mental Imagery	Kosslyn, Stephen, Giorgio Ganis, and William Thompson. "Mental Images and Mental Representations" Pylyshyn, Zenon. "Mental Imagery: In Search of a Theory," NOTE: Read pp. 157-182. The "Open Peer Commentary" section, pp. 182-238, is provided for interest only, and is not required reading. Eliasmith, Chris. "How to Build a Brain: From Function to Implementation"	Midterm Take-home Examination **Due** Wednesday, June 22, 2022 at 11:55 PM **25%**

9	[Module 09: Fake Brains: Connectionism and Artificial Neural Networks](#)	Fodor, Jerry. "Connectionism and the Problem of Systematicity: Why Smolensky's Solution Still Doesn't Work" Hinton, Geoffrey. "How Neural Networks Learn from Experience"	[Essay Assignment 2](#) **Available** Wednesday, June 29, 2022 at 12:05 AM	
10	[Module 10: Emotion and Cognition](#)	Oatley, Keith, W. Gerrod Parrott, Craig Smith, and Fraswer Watts. "Cognition and Emotion Over 25 Years" Damasio, Antonio. "A Passion for Reasoning" Prinz, Jesse. "Is Emotion a Form of Perception?"		
11	[Module 11: Extended Minds](#)	Clark, Andy and David Chalmers. "The Extended Mind" Adams, Fred and Kenneth Aizawa. "Why the mind is still in the head"		
12	[Module 12: Situated Cognition](#)	de Bruin, Leon, and Lena Kästner. "Dynamic Embodied Cognition" Jacobsen, Ann Jaap. "Seeing as a Social Phenomenon"		[Essay Assignment 2](#) **Due** Wednesday, July 20, 2022 at 11:55 PM	**30%**
	[Take-home Final Examination](#)		[Take-home Final Examination](#) **Available** Tuesday, July 26, 2022 at 12:05 AM	[Take-home Final Examination](#) **Due** Tuesday, August 9, 2022 at 11:55 PM	**30%**

Contact Information

Announcements

Your instructor uses the **Announcements** widget on the **Course Home** page during the term to communicate new or changing information regarding due dates, instructor absence, etc., as needed.

You are expected to read the announcements on a regular basis.

To ensure you are viewing the complete list of announcements, you may need to click **Show All Announcements**.

Discussions

A General Discussion topic* has also been made available to allow students to communicate with peers in the course. Your instructor may drop in at this discussion topic.

Contact Us

Who and Why	Contact Details
Instructor and TA • Course-related questions (e.g., course content, deadlines, assignments, etc.) • Questions of a personal nature	**Post your course-related questions** to the Ask the Instructor discussion topic*. This allows other students to benefit from your question as well. **Questions of a personal nature** can be directed to your instructor or your TA. Instructor: Troy Freiburger tafreibu@uwaterloo.ca Instructor: Chris Longley c3longle@uwaterloo.ca Your instructor checks email and the Ask the Instructor discussion topic* frequently and will make every effort to reply to your questions within 24–48 hours, Monday to Friday. **The Philosophy Department** can be reached at phil-online@uwaterloo.ca or +1 519-888-4567 ext. 46886.

learnhelp@uwaterloo.ca

Technical Support,
Centre for Extended Learning

- Technical problems with Waterloo LEARN

Include your full name, WatIAM user ID, student number, and course name and number.

Technical support is available during regular business hours, Monday to Friday, 8:30 AM to 4:30 PM (Eastern Time).

IST Knowledge Base: For Students

Learner Support Services,
Centre for Extended Learning

- General inquiries
- Examination information

Student Resources

extendedlearning@uwaterloo.ca

Include your full name, WatIAM user ID, student number, and course name and number.

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*Discussion topics can be accessed by clicking **Connect and then **Discussions** on the course navigation bar above.

Course Description and Learning Outcomes

Course Description

This course will be a historical and philosophical introduction to some of the main themes and interdisciplinary questions at the heart of cognitive science. As a relatively new scientific discipline (in comparison with, say, physics or chemistry), many of the foundational issues are still to be settled. This has led to lively debate and congress between people from competing schools of thought, bringing with them insights from a wide range of backgrounds, including philosophy, psychology, linguistics, anthropology, computing and AI research, mathematics, and neuroscience (to name but a few). While cognitive science gets its proper start after WWII, we will see how the roots of cognitive science go back much deeper in the Western intellectual tradition. One should not be surprised about this much longer history, given that cognitive science asks a range of very specific questions about how thinking works, but also very general philosophical questions, such as:

- What is intelligence? How is it studied?
- Can we make intelligent machines?
- Is the mind a computer? If so, what kind of computer? What is the nature of computation?
- Do we think by using discrete rules?
- What is the content of thought — is it quasi-linguistic, conceptual, imagistic, analogical?
- What differences and similarities are there between cognition in humans and non-human animals?
- Is some cognition inherently social?
- Does cognition happen in the head, or does it extend into the world?
- What is the role of emotion in cognition?

While we will discuss different things minds can do, and the different ways various disciplines study the mind, we will concentrate primarily on theories of mental functioning and mental content. The first two weeks of the course will cover the philosophical and psychological prehistory of cognitive science, and then we will start looking at views of the mind that have been developed since the 1950s.

Learning Outcomes

The hope is that everyone learns new ways of thinking about how the mind works, and comes to

gain a respect for interdisciplinary studies of the mind. Beyond this, we also hope to achieve some learning outcomes not specifically tied to course content, including critical thinking skills and writing skills. By the end of this class, students should be able to:

- conceptualize the different views of mental functioning and mental representation we will encounter;
- critically assess arguments made for different theories of mind (mental function and mental content);
- distinguish between normative/evaluative questions about how we ought to think and descriptive/factual questions about how we actually do think;
- identify, analyse/define, and apply key terminology from the various disciplines we will encounter;
- appreciate the promises and pitfalls of interdisciplinary research regarding cognition;
- communicate your own analyses and evaluative arguements effectively in written work.

This online course was developed by Nicholas Ray, with instructional design and multimedia development support provided by the Centre for Extended Learning. Further media production was provided by Instructional Technologies and Multimedia Services.

About the Course Author

Course Author — Nick Ray

Educational Background

Professor Nick Ray received his BA from Wilfrid Laurier University in 2003, studying Philosophy and History. He received his MA in Philosophy from The University of Western Ontario in 2004, and his PhD, also from Western, in 2012. His PhD research focussed on perceptual judgements of magnitude, position, orientation, and displacement of medium-sized objects and how we might be able to recover a significant fragment of modern theories of space and time (in physical theory) from such judgements.

Current Research

Nick's research is concerned with the relationship between perception and cognition, and the ways in which we produce content-rich thoughts about the

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world based on the comparatively meagre fund of stimuli that sensory experience provides. This research takes place at the intersection of epistemology and cognitive science. How is it that we begin to construct models of the external causes of sensory stimulation based only on sensory stimulation itself? Some theorists refer to this as the problem of getting out of "the black box of the mind." Nick is currently examining predictive processing accounts of whole-brain function to see if they provide solutions to the black box problem.

Nick has related research interests in Artificial Intelligence—e.g., in how human beings interface with AIs, in what it means to develop a more human-like AI, and in issues concerning the ethical standing of intelligent machines as they become increasingly integrated in our day-to-day lives.

Hobbies/Interests/Sports

When not involved in research and teaching, Nick likes to go for walks with his wife and daughters, cook lots of great food, watch too much soccer, play soccer, and read anything he can get his hands on.

Family/Children/Travel

Nick is the proud parent of two daughters, Imogen and Poppy, and the husband to Amy Butchart (who is also a philosopher). Professor Ray enjoys travel, especially to Europe—and especially when it isn't for work! His preference is for cities with a rich culinary profile, and, if possible, cities that are not too large. These places must have good coffee and interesting locals.

Materials and Resources

Readings

Course Reserves

All required course readings are available through **Course Reserves**. Course Reserves can be accessed using the **Library Resources** widget on the **Course Home** page.

Resources

- Library services for [Co-op students on work term and students taking online courses](#)

Grade Breakdown

The following table represents the grade breakdown of this course.

Activities and Assignments	Weight
Introduce Yourself	Ungraded
Essay Assignment 1	15%
Midterm Take-home Examination	25%
Essay Assignment 2	30%
Take-home Final Examination	30%

Official Grades

Official Grades and Academic Standings are available through Quest.

Course Policies

This course requires regular access to the Waterloo LEARN course site. Your instructor will use this site for communicating important information concerning course matters, returning graded assignments, etc. A reliable internet connection and regular checking of the course site (at least twice a week) is therefore mandatory.

Late Policy for Essay Assignments

Late submission of essay assignments will be penalized at the rate of 10% of the value for the assignment per day late. This policy will apply without exception unless a documented excuse of sufficient weight (e.g., a medical emergency) is provided to the instructor.

Late Policy for Midterm Take-home Examination

Late submissions will ordinarily not be accepted.

University Policies

Submission Times

Please be aware that the University of Waterloo is located in the **Eastern Time Zone** (GMT or UTC-5 during standard time and UTC-4 during daylight saving time) and, as such, the time that your activities and/or assignments are due is based on this zone. If you are outside the Eastern Time Zone and require assistance with converting your time, please try the Ontario, Canada Time Converter.

Accommodation Due to Illness

If your instructor has provided specific procedures for you to follow if you miss assignment due dates, term tests, or a final examination, adhere to those instructions. Otherwise:

Missed Assignments/Tests/Quizzes

Contact the instructor as soon as you realize there will be a problem, and preferably within 48 hours, but no more than 72 hours, have a medical practitioner complete a Verification of Illness Form.

Email a scanned copy of the Verification of Illness Form to your instructor. In your email to the instructor, provide your name, student ID number, and exactly what course activity you missed.

Further information regarding Management of Requests for Accommodation Due to Illness can be found on the Accommodation due to illness page.

Missed Final Examinations

Contact your instructor as soon as possible if you are unable to fulfill academic requirements due to illness or other extenuating circumstances.

Further information about Examination Accommodations is available in the Undergraduate Calendar.

Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect, and responsibility. **If you have not already completed the online tutorial regarding academic integrity you should do so as soon as possible.** Undergraduate students should see the Academic Integrity Tutorial and graduate students should see the Graduate Students and Academic Integrity website.

Proper citations are part of academic integrity. Citations in CEL course materials usually follow CEL style,

which is based on APA style. Your course may follow a different style. If you are uncertain which style to use for an assignment, please confirm with your instructor or TA.

For further information on academic integrity, please visit the [Office of Academic Integrity](#).

Turnitin

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin® in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit the alternate assignment.

[Turnitin® at Waterloo](#)

Discipline

A student is expected to know what constitutes [academic integrity](#) to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration, should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to [Policy 71 - Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

Appeals

A decision made or penalty imposed under [Policy 70 - Student Petitions and Grievances](#), (other than a petition) or [Policy 71 - Student Discipline](#), may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72 - Student Appeals](#).

Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](#), Section 4. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Final Grades

In accordance with [Policy 46 - Information Management](#), Appendix A - Access to and Release of Student Information, the Centre for Extended Learning does not release final examination grades or final course grades to students. Students must go to [Quest](#) to see all final grades. Any grades posted in Waterloo LEARN are unofficial.

AccessAbility Services

[AccessAbility Services](#), located in Needles Hall, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodation to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term and for each course.

Accessibility Statement

The Centre for Extended Learning strives to meet the needs of all our online learners. Our ongoing efforts to become aligned with the [Accessibility for Ontarians with Disabilities Act (AODA)](#) are guided by University of Waterloo accessibility [Legislation](#) and policy and the [World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines (WCAG) 2.0](#). The majority of our online courses are currently delivered via the Desire2Learn Learning Environment. Learn more about [Desire2Learn's Accessibility Standards Compliance](#).

Use of Computing and Network Resources

Please see the [Guidelines on Use of Waterloo Computing and Network Resources](#).

Copyright Information

UWaterloo's Web Pages

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Other Sources

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If there are any questions about this notice, please contact the University of Waterloo, Centre for Extended Learning, Waterloo, Ontario, Canada, N2L 3G1 or extendedlearning@uwaterloo.ca.