PHI 6326:
Nativism and Empiricism in Artificial Intelligence
3 | credits

NOTE: This course complies with all UF academic policies. For information on those policies and for resources for students, please see UF's "Academic Policies and Resources" web page.

I. General Information

Meeting days and times: Thursday 3:00-6:00
Class location: FLO Library

Instructor(s):

Name: Cameron Buckner
Office Building/Number: FLO 330B
Phone: (352) 392-2084
Email: cameron.buckner@ufl.edu
Office Hours: Tuesday 10:30-12:30

Course Description

In this class, we will critically explore the debate around deep learning and its relevance to human intelligence by linking it to the history of theorizing about the mind by empiricist philosophers like Aristotle, Ibn Sina (Avicenna), John Locke, David Hume, Adam Smith, Sophie de Grouchy, and William James. The current engineering debate between GOFAI and deep learning can be mapped to traditional debates between rationalists like Plato, Descartes, and Leibniz on the one hand and these empiricists on the other. The rationalists in both philosophy and engineering tended to be "nativists"—that is, they thought that intelligence or rational cognition requires significant amounts of knowledge to be innate and unlearned. Empiricists, on the other hand, insist that all knowledge must in some way be derived from experience. Something that has been lost in the translation of this dispute to the current debate, however—much to its detriment—is that the historical empiricists were all faculty psychologists, supposing that knowledge was derived from experience by being worked over by active general-purpose cognitive faculties, such as abstraction, memory, imagination, attention, and empathy. In this course, we will explore these topics through a book on the subject written by the instructor.

Prerequisites
None.

General Education Designation: none.

Course Materials

- Buckner 2023*, From Deep Learning to Rational Machines* (OUP) (Course reserves and available through UF libraries through ProQuest Ebook Central)
- Other articles will be posted on the course Canvas site

Materials will be available through the following means:
Through course reserves, library, or Canvas Site
Materials Fee: N/A

II. Course Goals

Course Objectives
In this course we will:

- Identify and describe those major developments in empiricist approaches in early modern philosophy and contemporary cognitive science, especially machine learning and artificial intelligence;
- Develop a basic familiarity with key technical concepts in machine learning research that are relevant to the debate between empiricism and nativism, especially recent deep learning architectures like deep convolutional neural networks, generative adversarial networks, and large language models;
- Recognize the strengths and weaknesses of the arguments and positions that played a determining role in the developments mentioned above, especially in the debate between nativism and empiricism; and

Student Learning Outcomes
A student who successfully completes this course will be able to:

- Understand and develop arguments regarding recent positions in the debate between empiricism and nativism in psychology, neuroscience, and artificial intelligence, especially by applying philosophical arguments and positions mentioned above.
- Be able to compose and defend complex arguments in philosophy of artificial intelligence in written and oral form by drawing upon the history of philosophy and technical details in artificial intelligence
- Analyze and apply those arguments to important epistemological and ethical questions in current AI research and its relevance to understanding human cognition.

III. Graded Work

Graded Components
Paper 1 (10 pages) (20%): A 10 page paper defending a novel position relevant to the course topics

Peer reviews of Paper #1 (10%): Two peer reviews will be completed of other students' paper #1, as if they were being reviewed as a conference submission

Paper #2 (40%): A 20-25 page paper, normally a revision of Paper #1 in light of peer reviews and comments from me

Course Presentations (x2) (20%): 2 course presentations, 30-60 minutes, on 1-2 of the week's readings. The presentation should summarize the reading's arguments and evidence, critically evaluate it, and raise questions about it for group discussion. Visual aids such as a handout or PowerPoint should be provided.

Blog posts and participation on comment threads (10%): Each presentation will be paired with a 1 page post on the course blog; posts will be uploaded on the Tuesday before a presentation day, and all other students should leave a comment in a discussion by the class time on Thursday

TOTAL: 100%

Grading Scale

Letter Grade	Number Grade
A	100-92.5
A-	92.4-89.5
B+	89.4-86.5
B	86.4-82.5
B-	82.4-79.5
C+	79.4-76.5
C	76.4-72.5
C-	72.4-69.5
D+	69.4-66.5
D	66.4-62.5
D-	62.4-59.5
E	59.4-0

Note: A minimum grade of C is required to earn General Education credit.

IV. Calendar

"DL2RM" refers to *From Deep Learning to Rational Machines*

List of discussion/lecture topics

Week 1 – Deep Learning and Empiricism – Jan 15

- Buckner 2020: Deep Learning—A Philosophical Introduction
- Gary Marcus 2018: Innateness, AlphaZero, and Artificial Intelligence
- Karlan 2025—AI Empiricism, the only game in town?

Additional resources:

- Laurence & Margolis 2015 – Concept Nativism and Neural Plasticity
- Play around in the neural network playground: https://playground.tensorflow.org/

Week 2 – Railton Week! – Jan 22

- Railton 2016: The affective dog and its rational tale--Intuition and Attunement
- Railton 2020: Ethical Learning, Natural and Artificial

Week 3 – Criticisms of Deep Learning – Jan 29

- DL2RM Chapter 1
- Margolis & Laurence 2023 – Making sense of domain specificity
- Lake et al. 2017: Building Machines that Learn and Think Like People
- Smolensky 1988: On the Proper Interpretation of Connectionism

Week 4 – Abstraction: Philosophical History – Feb 5

- DL2RM Chapter 2,3
- Excerpts from Christopher Gauker 2011: *Words and Images—An Essay on the Origin of Ideas*
- Laurence & Margolis 2012 – Abstraction and the Origin of General Ideas

Week 5 – Perception: Implementation – Feb 12

- Grace Lindsay 2020 – *Models of the Mind* Chapter 6 Stages of Sight
- Westfall & Green 2025 – Perceptual Abstraction

Week 6 – Memory: History Feb 19

- Mnih et al. 2013 – Playing Atari with Deep Reinforcement Learning
- Deborah Black 1993: Estimation (*Wahm*) in Avicenna: The Logical and Psychological Dimensions
- Kemp & Fletcher 1993: The Medieval Theory of the Inner Senses

Week 7 – Memory: Implementation – Feb 26

- DL2RM Ch 4
- McClelland, McNaughton, & O'Reilly 1995 – Why the brain has complementary learning systems

Week 8 – Imagination: History – Mar 5

- Fodor *Hume Variations* excerpts
- Tamas Demeter 2020 – Fodor's Guide to the Humean Mind

Week 9 – Imagination: Implementation – Mar 12

- DL2RM Ch 5
- Aronowitz & Lombrozo 2020 – Learning through Simulation
- Gershman 2019: The generative adversarial brain https://www.frontiersin.org/articles/10.3389/frai.2019.00018/full

Additional resources:

- GANs – the story so far - https://blog.floydhub.com/gans-story-so-far/
- https://kailashahirwar.medium.com/the-rise-of-generative-adversarial-networks-be52d424e517

Spring Break March 16-20

Week 10 – Attention: History – Mar 26

- William James *Principles of Psychology* Chapter XI
- Prinz 2020, James and Attention: Reactive Spontaneity
- Mole 2021, Attention, *Stanford Encyclopedia of Philosophy*

Paper #1 due April 2

Week 11 – Attention: Implementation – Apr 2

- DL2RM Chapter 6
- Grace Lindsay 2020 – Attention in Psychology, Neuroscience, and Machine Learning
- Jay Alammar – The Illustrated Transformer posts – https://jalammar.github.io/illustrated-transformer/

Peer reviews due April 9

Week 12 – Sympathy: History – Apr 9

- Annette Baier 2000 – Hume: The Reflective Women's Epistemologist
- Sarah Songhorian 2021– Adam Smith's relevance to contemporary moral cognition
- Sophie de Grouchy *Letters on Sympathy*, Letters 1-3

Week 13 – Sympathy: Implementation – Apr 16

- DL2RM Chapter 7
- Millière 2025 – Normative Conflicts and Shallow AI Alignment
- Fiery Cushman 2020 – Rationalization is Rational

Paper #2 Due April 30

V. Procedure for Conflict Resolution

Any classroom issues, disagreements or grade disputes should be discussed first between the instructor and the student. If the problem cannot be resolved, please contact Chris Dorst (cdorst@ufl.edu, (352) 392-2084). Be prepared to provide documentation of the problem, as well as all graded materials for the semester. Issues that cannot be resolved departmentally will be referred to the University Ombuds Office (http://www.ombuds.ufl.edu; 352-392-1308) or the Dean of Students Office (http://www.dso.ufl.edu; 352-392-1261).