

Philosophy 6406: Seminar in Philosophy of [the Special] Sciences

Fall 2024

Mondays 3:00-6:00, FLO 0200

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Tentative Syllabus

Summary:

Philosophy of science often focuses on metaphysical issues—such as unity, reduction, and explanation—in the abstract. In this course, we will rather study these questions as they arise from within the “special sciences”, such as biology, neuroscience, and psychology. In this course, we will review several debates in the special sciences. We will do a small appetizer on a mature debate about *species*, and then settle into the main course of focusing on the concept of *intelligence* in psychometrics and AI, before a little digestif on *episodic memory*. Central questions will involve the following:

- Which disagreements are genuine and which are merely rhetorical or terminological?
- How can we distinguish ontological disagreements from methodological or epistemological ones?
- How can or should such disagreements be resolved?
- Should findings from other sciences be deemed relevant to answering these questions—and if so, in what way?

Note that in this course we will get our hands dirty with details from the sciences. Background readings on basic texts in these areas are available on request.

Course Objectives:

Students who successfully complete this course should be able to:

(1) identify and describe those major developments in philosophy of the first half of the 20th Century in issues in philosophy of language, epistemology, and metaphilosophy that constitute the shared heritage of what is currently understood as “analytic philosophy”;

(2) recognize the strengths and weaknesses of the arguments and positions that played a determining role in the developments mentioned above; and

(3) understand and develop arguments regarding recent ontological debates arising in special sciences like psychology, neuroscience, and artificial intelligence, especially by applying philosophical arguments and positions mentioned above.

Grading:

30% Weekly online commentaries & participation

20% Paper 1 – Due week 12

10% Reviews – Due week 14
40% Final Paper – Due Dec 4

Grading scale (explanation courtesy of Gene Whitmer)

Many faculty use a grade scale based on 100 points—defining an A as a score between (for example) 94 and 100, an A- as 90 to 93, and so on. For various reasons I am convinced this is not a good method for calculating grades in a philosophy class. Instead, all grades in my classes are based on the 4-point scale for letter grade values, where an A is 4 points, an A- is 3.67 points, and so on.

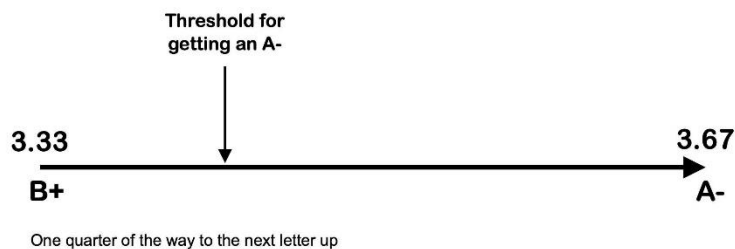
Assigned work is initially assigned a letter grade; they are then entered into the gradebook as numeric values. Going from the grade symbol to the numeric value looks like this:

Letter	Numeric		Letter	Numeric
A	4		C	2
A-	3.67		C-	1.67
B+	3.33		D+	1.33
B	3		D	1
B-	2.67		D-	0.67
C+	2.33		E	0

If you get a B+ on a particular assignment, for example, I record it as 3.33. Each graded element is given a number in this way.

For the course grade, *each element is multiplied by its percentage weight for the course grade and the results summed* for the course grade as a numeric value. The result is a numeric value between 0 and 4. That numeric value then needs to be turned back into a letter grade, and there are various options for how one might do that. For example, suppose someone has a numeric course grade of 3.44. Should that count as a B+ or as an A-? An A- is worth 3.67 (more than 3.44) but a B+ is worth 3.33 (less than 3.44). So where should the threshold be set?

If you imagine a number line starting at 3.33 and going up to 3.67, at what point in the line should the grade cross over from being a B+ to an A-? A very generous option would be to make the threshold right at the lower level, so anything over a 3.33 gets one an A-; another more demanding option would be to make the threshold right at the midpoint, so that one needs at least a 3.5 to get an A-. This latter option is very demanding, though, as it would require, for an A, a final numerical score of 3.835, which seems a bit too much. So one more option is to consider a compromise between those two and make the threshold halfway between the lower bound and the halfway point — in other words, at one quarter of the way towards the next letter value.



This is, I believe, an acceptable compromise between the overly demanding and overly generous scales. On this scale, then, your final numeric course grade (or the percentage equivalent, as Canvas deals with percentages only) is turned into a letter grade according to the following table:

Numeric greater than or equal to	Percentage greater than or equal to	Letter
3.7525	93.81%	A
3.4125	85.31%	A-
3.0825	77.06%	B+
2.7525	68.81%	B
2.4125	60.31%	B-
2.0825	52.06%	C+
1.7525	43.81%	C
1.4125	35.31%	C-
1.0825	27.06%	D+
0.7525	18.81%	D
0.0825	2.06%	D-
0	0.00%	E

Commentaries: Throughout the semester, each students will do two commentaries on course readings. The students will briefly summarize the arguments of a subset of the day’s readings (assigned in discussion with the professor) and offer some substantive critical remarks (roughly 3-5 pages). The commentary will be posted online on a course blog, and all other students in the class will be expected to respond to their commentary. The goal is to bootstrap in-class discussion by outlining major issues and disagreements before coming to the classroom.

Papers and reviews: Students will submit one complete shorter paper (10-12 pages) by Week 12. They will then receive peer reviews from and perform peer reviews for two other students (as well as comments from me) and revise their papers in light of their comments. A final paper taking into account these comments (15-20 pages) will then be due at the end of the course.

Reading list:

Week 1 – Aug 26

General perspectives on interlevel relations: introduction

- Carnap 1938: Logical foundations of the unity of science
- Quine 1948: On what there is
- Quine 1951: Two dogmas of empiricism
- Putnam 1975: The meaning of ‘meaning’

Week 2 – Sept 2 (Labor Day, no Class)

General perspectives on interlevel relations: Autonomy and Reduction

- Quine 1969: Natural Kinds
- Fodor 1974: Special sciences, or the disunity of science as a working hypothesis
- Kim 1992: Multiple realization and the metaphysics of reduction

- Bechtel & Mundale 1999: Multiple realizability revisited
- Fodor 1997: Special sciences, still autonomous after all these years

Week 3 – Sept 9

General perspectives on interlevel relations: HPC, Historical, Functional Kinds

- Boyd 1999: Kinds, complexity, and multiple realization
- Polger 2009: Evaluating evidence for multiple realization
- Millikan 1999: Historical kinds and the "special sciences"
- Craver 2009: Mechanisms and natural kinds

Week 4 – Sept 16

Mechanistic explanation and functional explanation

- Machamer, Darden, & Craver 2000 – Thinking about mechanisms
- Woodward 2002 – What is a mechanism: a counterfactual account
- Craver 2007 – A field guide to levels
- Weiskopf 2011 – The functional unity of special science kinds

Week 5 – Sept 23

Mechanistic abstraction

- Buckner 2015 – Functional kinds: a skeptical look
- Ylikoski & Kuorikoski 2010 – Dissecting explanatory power
- Stinson 2018 – Explanation and Connectionist Models
- Chirimuuta 2017 – Explanation in computational neuroscience: causal and non-causal

Week 6 – Sept 30

Species – Essentialism and anti-essentialism

- Hull 1965: The effect of essentialism on taxonomy: two thousand years of stasis
- Dupré, J. 1981: Natural Kinds and Biological Taxa
- Okasha 2002 – Darwinian metaphysics: species and the question of essentialism
- Sober, E. 1980: Evolution, Population Thinking and Essentialism

Week 7 – Oct 7

Species – HPC and population structure theory

- Boyd 1999: Homeostasis, species, and higher taxa
- Griffiths 1999: Squaring the circle--natural kinds with historical essences
- Ereshefsky & Matthen 2005: Taxonomy, polymorphism, and history—an introduction to population structure theory
- Wilson, Barker, Brigant 2009 – When traditional essentialism fails – biological natural kinds

Week 8 – Oct 14

Connectionism/Classicism

- Buckner & Garson 2018 – Connectionism and post-connectionist models
- Smolensky 1988 – On the proper treatment of connectionism
- McClelland et al. 2010 - Letting Structure Emerge
- Griffiths et al. 2010 – Probabilistic models of cognition

Week 9 – Oct 21

Deep Learning

- LeCun, Bengio, & Hinton 2015 – Deep Learning
- Lake, Ullman, & Tenenbaum 2018 – Building machines that learn and think like people
- Marcus 2018 – Deep learning: A Critical Appraisal
- Buckner– Empiricism without magic: Transformational abstraction in deep-learning neural networks

Week 10 – Oct 28

Intelligence and critiques of psychometrics

- Gould 1996, *The Mismeasure of Man 2nd edition*, Ch6
- Shalizi 2007, “g, a statistical myth” (<http://bactra.org/weblog/523.html>)
- Glymour 1998, “What went wrong? Reflections on the Bell Curve”
- Hood 2013, “Psychological measurement and methodological realism”

Week 11 – Nov 4

Intelligence in AI/Deep Learning

- Turing 1950, “Computing Machinery and Intelligence”
- Dartmouth Summer Research Project 1955: <http://jmc.stanford.edu/articles/dartmouth.html>
- Hernandez-Orallo and Dowe 2010, “Measuring Universal Intelligence: Towards an anytime intelligence test”
- Chollet 2019, “On the measure of intelligence” <https://arxiv.org/abs/1911.01547>
- Mitchell 2021, “Abstraction and analogy-making in artificial intelligence”

Week 12 – Nov 11 (Holiday, no in-person class)

Other approaches to evaluating progress in AI

- A Bazillion Authors, 2023: Beyond the Imitation Game: Quantifying and Extrapolating the capabilities of language models <https://arxiv.org/abs/2206.04615>
- Baier 1993, “Hume, the Reflective Woman’s Epistemologist”
- Voudouris et al. 2022, “Direct Human-AI Comparison in the Animal-AI Environment”
- Buckner 2023, *From Deep Learning to Rational Machines*, Chapter 2: Methodology

Week 13 – Nov 18

Episodic Memory

- Tulving 1972 – Episodic and semantic memory
- McClelland, McNaughton, & O'Reilly 1995 – Why there are complementary learning systems
- Tulving 2001 – Episodic memory from mind to brain
- Clayton & Dickinson 2009 – Are animals stuck in time or are they chronesthetic creatures?

Week 14 – Nov 25 – No class, break

Week 15 – Nov 2

Constructive views

- De Brigard 2014 – Is memory for remembering
- Hassabis & MacGuire 2007 – Deconstructing episodic memory with construction
- Robins 2017 – Confabulation and constructive memory
- Michaelian 2010 – Is memory a natural kind?

Final papers due: Wed Dec 4

Other Background readings in philosophy of science:

Boyd, R., 1988, "How to be a Moral Realist", in G. Sayre-McCord (ed.), *Essays on Moral Realism*, Ithaca, NY: Cornell University Press: 181–228.

Boyd, R., 1991, "Realism, Anti-Foundationalism and the Enthusiasm for Natural Kinds", *Philosophical Studies* 61: 127–148.

Callebaut, 1993. *Taking the Naturalistic Turn: or How Real Philosophy of Science is Done*

Churchland, P. M. 1981. Eliminative Materialism and the Propositional Attitudes *The Journal of Philosophy*.

Goodman, N., 1955, *Fact, Fiction, and Forecast*, Cambridge, MA: Harvard University Press.

Harman, Gilbert, 1965. "The Inference to the Best Explanation," *The Philosophical Review*, 74/1: 88–95.

Hempel, C. and P. Oppenheim., 1948, 'Studies in the Logic of Explanation.', *Philosophy of Science*, 15: 135–175.

Kripke, S., 1980, *Naming and Necessity*. Oxford: Basil Blackwell.

Place, U. T., 1956, "Is Consciousness a Brain Process?", *British Journal of Psychology* 47: 44–50.

Salmon, W., 1989, *Four Decades of Scientific Explanation*, Minneapolis: University of Minnesota Press.

Woodward, J., 2003, *Making Things Happen: A Theory of Causal Explanation*, Oxford: Oxford University Press.

Background readings on the sciences

Species

Darwin, *On the Origin of Species*

Wilkins, J. *Species: A History of the Idea*

Connectionism

McClelland & Rumelhart 1986 – *Parallel Distributed Processing I and II*

Clark 1989 – *Microcognition*

Episodic Memory

Tulving 1983 – *Elements of episodic memory*

Eichenbaum & Cohen 2001 – *From Conditioning to Conscious Recollection: Memory Systems of the Brain*

Deep learning

Bengio, Goodfellow, & Courville: *Deep learning book*. <https://www.deeplearningbook.org/>

Guide to replies on weekly commentaries:

In each class we'll have some members of the class contribute a short reading response paper to a course blog. I will rotate the schedule of reading response papers, so that every student will complete two response papers. These papers will usually involve setting out and evaluating one of the arguments in the reading for that class day. You will post this paper to the class bulletin board. [NOTE: I set a deadline time so that everybody knows when the papers will be up.] Everybody will be responsible for reading the reading response papers before the class meeting and posting a reply to one of the papers, or a reply to one of the replies. The discussions on the course blog are expected to bootstrap in-class discussion.

Attendance:

Requirements for class attendance and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Accommodations:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. See the “Get Started With the DRC” webpage on the Disability Resource Center site: <https://disability.ufl.edu/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Grading policies:

Grading policies are consistent with the UFL guidelines found in the catalog here: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/> .

Evaluation policies:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/> . Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/> . Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/> .

Academic Honesty:

UF students are bound by The Honor Pledge which states “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. See the UF Conduct Code website for more information. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Recordings:

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal education use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and deliver by an instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentation such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless, of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Health and Wellness:

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450

Academic Resources:

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email ask@ufl.libanswers.com for more information.

Teaching Center: 1317 Turlington Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

Writing Studio: Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers.

Academic Complaints: Office of the Ombuds; Visit the Complaint Portal webpage for more information.

Enrollment Management Complaints (Registrar, Financial Aid, Admissions): View the Student Complaint Procedure webpage for more information.