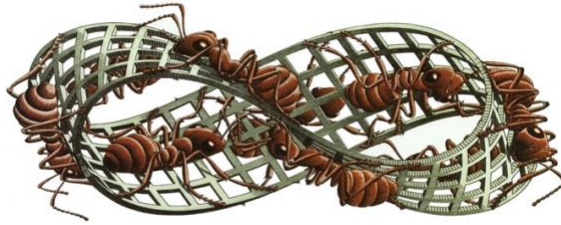


PHL480:
**Philosophy
of Science**



Dr. Catherine Kendig
Department of Philosophy
503 S. Kedzie Hall
East Lansing MI 48824-1032
email: kendig@msu.edu

Office hours: 10:00 - 11:00am TU/TH or by appointment
Class time: 12:40 - 2:30pm TU: Asynchronous and
12:40 - 2:30pm TH: Synchronous
Location: Online

AIMS OF THE COURSE

This course addresses fundamental questions concerning the nature and development of scientific knowledge and understanding. Part I focuses on the nature of scientific understanding and how scientific knowledge can be known. In Part II we focus on historical and philosophical problems and approaches to science. Is science best understood in terms of a reductionist or antireductionist framework? Is 'innateness' a scientific category?; is a theory-first or practice-first approach better for understanding scientific knowledge production? And, what is the role of replication in experimental methodology? Part III centers on how these and other concepts and approaches facilitate—and in some cases thwart—the search for knowledge in specific scientific disciplines. We investigate the distinct categories, underlying assumptions, and structural frameworks that are revealed through studies in philosophy of biology, chemistry, anthropology, cognitive science, and neuroscience.

INTENDED LEARNING OUTCOMES

Upon completion of the course, a student will be able to:

1. Demonstrate a systematic understanding of key philosophical ideas, a critical awareness of current problems and new insights in philosophy of science, much of which is at, or informed by, the forefront of the field of study;
2. Demonstrate a comprehensive understanding of some techniques applicable to research in philosophy of science and the special sciences;
3. Demonstrate originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline;
4. Demonstrate a conceptual understanding that enables the student to evaluate critically current research and advanced scholarship in the discipline, to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses.

ASSESSMENT

Assessment is by six concept papers (10%), one midterm essay (30%), one group seminar presentation (20%), one final essay (30%), and class participation (10%).

1. Concept papers are 1-page essays focusing on the Seminar required readings. There are 14 options for concept papers. You will see the phrase “Concept paper option #” under each Seminar reading listed in the syllabus. You must complete at least 6 concept papers, but it is your choice which of the 14 options you decide to complete. Concept papers are graded Pass/Fail.
2. The midterm essay should be 1200-1500 words (excluding bibliography). It should be submitted through D2L. More information on the midterm essay will follow.
3. Student seminar presentations. Students will sign up for the seminar presentations at the beginning of the semester.
4. The final essay should be 1700-2000 words (excluding bibliography). It should be submitted through D2L. More information on the final essay will follow.
5. Class participation requires students to contribute to seminar discussions having read the required texts and actively engage in the seminar discussions.

READING MATERIALS

MAIN TEXTS

There are two required textbooks for this course, in which you can find all of the required readings and some of the recommended further readings, these are

- Martin Curd and J. A. Cover, ed., *Philosophy of Science: The Central Issues* (New York and London: W. W. Norton & Company). This is an anthology of classic readings, with some helpful introductions, notes and commentary by the editors. NB: you may use either the 2nd edition (2013) or the 1st edition (1998).
- A. F. Chalmers, *What Is This Thing Called Science?* (Indianapolis: Hackett Publishing Co). NB: you may use either the 4th edition (2013) or the 3rd edition (1999).
- The remainder of the readings are available online through D2L.

Books are available for purchase at the MSU Bookstore as well as online. (In the schedule of readings below, these sources will be indicated simply as “Curd and Cover” and “Chalmers”.)

SESSION STRUCTURE

Each week there will be one pre-recorded lecture which you may view asynchronously and one synchronous discussion seminar which will be on Thursday from 12:40 PM - 2:30 PM EST.

- **Lecture (asynchronous):** The PowerPoints and lecture will be online and uploaded to D2L on Tuesdays. You may watch it anytime once it is available. This lecture will introduce the philosophical theories to be discussed that week, scientific case studies that we will explore, and provide other relevant background you may need.
- **Discussion seminar (Thursdays synchronous):** We will meet synchronously on Thursday from 12:40 PM - 2:30 PM EST for our discussion seminar. I will post the Zoom links the night before on D2L. The seminars will begin with a student presentation. All students should ensure that they arrive (on Zoom) at the seminars having read and reflected on relevant sections of the required readings and are prepared to actively participate in the seminar discussions. Remember that class participation contributes to your grade.

SCHEDULE OF LECTURES AND READINGS

PART I. HOW CAN SCIENCE BE OBJECTIVE?

INTRODUCTION TO SCIENTIFIC REASONING

Welcome and Introduction (Thursday, 3 September) SYNCHRONOUS

Required reading:

- Chalmers, pp. xix-xxii, 1-18 “Introduction”, Ch. 1, “Science as knowledge derived from the facts of experience”

UNIT 1. OBJECTIVITY AND EVIDENCE

Lecture (Tuesday, 8 September) AVAILABLE ON D2L

Required reading:

- Chalmers, pp. 41-58 (Ch. 4), “Deriving theories from the facts: induction”

Seminar discussion (Thursday, 10 September) SYNCHRONOUS

Required reading for seminar:

- Helen Longino, “Values and Objectivity” in Curd and Cover, pp. 144-164.

**Concept paper option #1*

PART II. HISTORICAL AND PHILOSOPHICAL PROBLEMS AND APPROACHES TO NATURAL SCIENCE:

UNIT 2. REDUCTIONISM AND ANTIREDUCTIONISM

Lecture (Tuesday, 15 September) AVAILABLE ON D2L

Seminar discussion (Thursday, 17 September) SYNCHRONOUS

Required reading for seminar:

- Jerry Fodor, “Special sciences” in Curd & Cover.

**Concept paper option #2*

***Midterm Essay advice will be distributed**

UNIT 3. WHAT IS INNATENESS AND HOW IS IT USED IN COGNITIVE SCIENCE?

Lecture (Tuesday, 22 September) AVAILABLE ON D2L

Seminar discussion (Thursday, 24 September) SYNCHRONOUS

Required reading for seminar:

- Griffiths, P. (2002) What is Innateness? The Monist, 85(1): 70-85. Available on D2L.

**Concept paper option #3*

- Samuels, R. (2004) Innateness in cognitive science. TRENDS in Cognitive Sciences 8 (3): 136-141. Available on D2L.

**Concept paper option #4*

UNIT 4. REPLICATION OF EXPERIMENTS AND THE VALUE OF HISTORICALLY INFORMED METHODOLOGY (AND VIPER VENOM EXPERIMENTS)

Lecture (Tuesday, 29 September) AVAILABLE ON D2L

Recommended reading:

- Feest, U. (2011) “Remembering (Short-Term) Memory: Oscillations of an Epistemic Thing” Erkenntnis 75(3): 391-411.

**Concept paper option #5*

Seminar discussion (Thursday, 1 October) SYNCHRONOUS

Required reading for seminar:

- Schickore, J. (2011) “The Significance of Re-Doing Experiments: A Contribution to Historically Informed Methodology. *Erkenntnis* 75(3): 325-347. Available on D2L.

**Concept paper option #6*

***** MIDTERM ESSAY DUE—TUESDAY, 6 OCTOBER*****

***** UPLOAD TO D2L: 11:30pm*****

UNIT 5. HOW TO DO PHILOSOPHY OF SCIENCE IN PRACTICE: KNOWING BY INTERVENING

Lecture (Tuesday, 6 October) AVAILABLE ON D2L

Seminar discussion (Thursday, 8 October) SYNCHRONOUS

Required reading for seminar:

- Chang, H. (2011) “The Philosophical Grammar of Scientific Practice”. *International Studies in the Philosophy of Science* 25(3): 205-221. Available on D2L.

**Concept paper option #7*

Also recommended:

Kendig, C. (2016) “Activities of kinding in scientific practice” In C. Kendig (ed.) *Natural Kinds and Classification in Scientific Practice*. Abingdon and New York: Routledge, 1-13. On D2L.

PART III. PHILOSOPHY OF THE SPECIAL SCIENCES: PHILOSOPHIES OF BIOLOGY, CHEMISTRY, NEUROSCIENCE, ANTHROPOLOGY, AND COGNITIVE SCIENCE

UNIT 6. HOW TO DECIDE WHERE ONE ORGANISM ENDS AND ANOTHER BEGINS, AND HOW TO COUNT BIOLOGICAL INDIVIDUALS AND ORGANISMS

Lecture (Tuesday, 13 October) AVAILABLE ON D2L

Seminar discussion (Thursday, 15 October) SYNCHRONOUS

Required reading for seminar:

- Clarke, E. (2010). The Problem of Biological Individuality. *Biological Theory* 5(4): 312-325. Available on D2L.

**Concept paper option #8*

Recommended reading:

Clarke, E. (2013) The multiple realizability of biological individuals. *Journal of Philosophy* 110: 413-435. Available on D2L.

UNIT 7. CHEMICAL CLASSIFICATION AND UNDERSTANDING THROUGH EPISTEMIC ITERATION

Lecture (Tuesday, 20 October) AVAILABLE ON D2L

Seminar discussion (Thursday, 22 October) SYNCHRONOUS

Required reading for seminar:

- Chang, H. (2015) The rising of chemical natural kinds through epistemic iteration. In Kendig, C. (ed) *Natural Kinds and Classification in Scientific Practice*. Abingdon and New York: Routledge. Available on D2L.

**Concept paper option #9*

Dr. Kendig, PHL480

Also recommended:

Chang, H. *Inventing Temperature: measurement and scientific progress*. Oxford University Press, 2004. Read the Introduction and Chapter 1 (p. 3-53).

UNIT 8. PERSPECTIVISM IN VISION SCIENCE AND METAPHORS OF UNDERSTANDING

Lecture (Tuesday, 27 October) AVAILABLE ON D2L

Seminar discussion (Thursday, 29 October) SYNCHRONOUS

Required reading for seminar:

• Chirimuuta, M. (2016) Vision, perspectivism, and haptic realism. *Philosophy of Science* 83: 746-756. Available on D2L.

**Concept paper option #10*

***Final Essay advice will be distributed**

UNIT 9. 'NATURE' AND 'CULTURE' IN ANTHROPOLOGY: AN AMERINDIAN PERSPECTIVISM

Lecture (Tuesday, 3 November) AVAILABLE ON D2L

Seminar discussion (Thursday, 5 November) SYNCHRONOUS

Required reading for seminar:

• Eduardo Viveiros de Castro. (1998) Cosmological Deixis and Amerindian Perspectivism. *The Journal of the Royal Anthropological Institute*, Vol. 4, No. 3 (Sep., 1998), pp. 469-488.

**Concept paper option #11*

Also recommended:

• Mark Risjord (2020) Anthropology without Belief: An Anti-representationalist Ontological Turn. *Philosophy of the Social Sciences* 1-24. DOI: 10.1177/0048393120917967

**Concept paper option #12*

UNIT 10. COGNITIVE SCIENCE AND THE EXTENDED MIND

Lecture (Tuesday, 10 November) AVAILABLE ON D2L

Seminar discussion (Thursday, 12 November) SYNCHRONOUS

Required reading for seminar:

• Clark, A. and Chalmers, D. (1998) "The Extended Mind", *Analysis* 58: 7-19. Reprinted in Grim, P. (ed) (2000) *The Philosopher's Annual* vol XXI-1998, 59-74. Also available on D2L.

**Concept paper option #13*

• Clark, A. (1995) "I am John's Brain", *Journal of Consciousness Studies* 2(2): 144-148. Available on D2L.

**Concept paper option #14*

*****FINAL ESSAY DUE THURSDAY, 3RD DECEMBER*****
***** UPLOAD TO D2L: 11:30pm*****

*****REMINDER: YOUR 6 CONCEPT PAPERS ARE ALSO DUE THURSDAY 3RD DECEMBER*****
*****UPLOAD TO D2L BY 11:30pm*****

Attendance

Your participation in class discussions contributes significantly to your learning and to your overall grade. Obviously, you can only participate in class discussions if you regularly attend class. Therefore, I urge you not to miss more than 6 absences this semester as it will be detrimental to your learning and performance.

Submission of Coursework

Essay papers must be submitted on time. There will be no extensions given. In order to pass this course all coursework must be completed. Failure to complete all assignments will result in a "0.0".

General Evaluation Criteria*

Midterm and Final Essays will be evaluated on the basis of the following criteria.

- a) *Clarity and precision* The central claims of the paper should be stated precisely and presented in a manner that another student who was interested in the topic, but not enrolled in the course, could understand. Frequent spelling and grammatical errors are distracting, and will lower your grade. Clear and concise prose is of the utmost importance. The more people that read your work and think that it makes sense, the more likely it does make sense. Remember: I am reading what you write very closely and with a critical eye. Say what you mean and mean what you say. Be careful!
- b) *Depth and Persuasiveness* I ask: How deep (i.e., how insightful) are the central claims of the paper, and how persuasive are the arguments given in support of them? Your arguments should at the very least provide plausible support for their conclusions. Also, the arguments should be consistent with one another. Important concepts and terms should be clarified. Generally, the deeper the paper's central claims, and the stronger their support, the better the paper.
- c) *Breadth of knowledge* Have you made good use of the relevant concepts, distinctions, and arguments **that have been included in the assigned readings or that were brought out in classroom discussion?** For example, where one of your central claims clearly contradicts a thesis in one of the reading assignments you should explain what is wrong with the opposing position. (*adopted from M. McKeon, Spring 2009)

4 Point Scale to Percentage Conversion Key.

Your final grade will be converted to 4-point scale as follows:

- 4.0 = 92–100%
- 3.5 = 87–91%
- 3.0 = 80–86%
- 2.5 = 75–79%
- 2.0 = 70–74%
- 1.5 = 65–69%
- 1.0 = 50–64%
- 0.0 = 0–49%

The Meaning of Grades**

4.0 =excellent work

“4.0” assignments are of exceptionally high quality. They are innovative, adding something to the topic. They are accurate, clear, organized, use compelling reasoning, and possess a spark of innovation/creativity. They show depth of thought and the writing is polished.

3.0= good work

“3.0” assignments meet the expectations of the assignment and are accurate, clear and organized. They contain good reasoning and although they do not have any significant problems, they do not add anything to the topic.

2.0= acceptable work that has significant problems

“2.0” assignments contain inaccuracies or significant problems with reasoning, organization, or quality of writing.

1.0 work has serious problems and is unacceptable as college-level work.

0.0 is normally reserved for work that is not turned in, is borderline unintelligible, or has little or no relevance to the assignment. (**adopted from Hedrick 2010)

Classroom Courtesy

Be nice. Respect yourself and each other. I want you to be bold, argumentative, and challenging—but in an open-minded and thoughtful way. You will disagree with each other. Being respectful doesn’t mean you have to agree with each other, it just means you are willing to listen to each other.

Please arrive to class on time. All mobile phones must be turned off during class time (this includes discussion sessions unless explicitly allowed by me). Do not text, use your phones, iPods or MP3 players in class. If you do so you will be asked to leave.

Zoom

We will be relying on Zoom for all synchronous meetings. Please log in on time. Because we have a small class (around 20) we will try to keep our videos on unless bandwidth makes this difficult.

MSU Email Communication

All communication will be through your MSU email. Please refer to Student Rights and Responsibility (<https://www.msu.edu/~ombud/index.html>) .

Course Management System: *Desire to Learn*

Syllabus, reading materials, PowerPoints, and announcements are available on Desire to Learn. All essays completed for the course will be uploaded to *Desire to Learn* site for this class. It is your responsibility to understand how to use *Desire to Learn*. Help is available at: http://learndat.tech.msu.edu/communicate_guide/ and instructions for technical assistance for *Desire to Learn* at: <https://d2l.msu.edu> or 355.2345 or 1-800-500-1554

Academic Honesty

Do not cheat. Do not plagiarize.

Submitting another’s work as your own—either in part or in whole. Penalty for plagiarism is a zero on the assignment and the student will receive an F for the course.

Dr. Kendig, PHL480

Turnitin Statement from MSU

“Consistent with MSU’s efforts to enhance student learning, foster honesty, and maintain integrity in our academic processes, instructors may use a tool called Turnitin to compare a student’s work with multiple sources. The tool compares each student’s work with an extensive database of prior publications and papers, providing links to possible matches and a “similarity score.” The tool does not determine whether plagiarism has occurred or not. Instead, the instructor must make a complete assessment and judge the originality of the student’s work. All submissions to this course may be checked using this tool. Students should submit papers to Turnitin Dropboxes without identifying information included in the paper (e.g., name or student number), the system will automatically show this information to faculty in your course when viewing the submission, but the information will not be retained by Turnitin.”

Reminders of Relevant University Policies

Please be aware that MSU prohibits the commercialization of course notes and materials. MSU prohibits students from commercializing their notes of lectures and University-provided class materials without the written consent of the instructor.

Disability Accommodation Requests

Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a verified individual services accommodation (“VISA”) form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc). Requests received after this date will be honored whenever possible.

Notification of Changes, Inclement Weather Policy, and Emergency Procedures

The schedule of reading is the plan for the course. However, changes may need to be made and so it is tentative and subject to change. Any changes or modifications to the course schedule/syllabus will be announce ahead of time in class. Emergency Procedures: If there is an emergency or there is inclement weather, or other related cancellations, we will follow University policy. Any additional necessary changes to will be posted to D2L.

Related Student Organizations or Clubs, if Applicable	http://studentlife.msu.edu/about-student-life
Learning Resources Center:	355.2363 or http://lrc.msu.edu/
Office of Supportive Services:	353.5210 or http://www.oss.msu.edu
The Writing Center:	http://writing.msu.edu
Libraries:	432.6123 or www.lib.msu.edu/
MSU IT Service Desk:	Help Desk: 432.6200 or www.tech.msu.edu/support/
Office of the Ombudsperson:	353.8830 or www.msu.edu/unit/ombud
Olin Student Health Center:	http://olin.msu.edu/
MSU Counseling Center:	www.counseling.msu.edu

MSU Psychological Clinic:	355.9564
English Language Center:	www.elc.msu.edu
Community Groups (Adult Students, International Students, Persons with Disabilities, LGBT, Family Resource Center, Veterans, The Women’s Resource Center) see <i>Student Handbook and Resource Guide</i> : http://splife.studentlife.msu.edu/information-and-services/services-for-community-groups	

A Note on Sexual Misconduct

Michigan State University is committed to fostering a safe, productive learning environment. Title IX and our school policy prohibits discrimination on the basis of sex. Sexual misconduct – including harassment, domestic and dating violence, sexual assault, and stalking – is also prohibited at our school. MSU encourages anyone experiencing sexual misconduct to talk to someone about what happened, so they can get the support they need and our school can respond appropriately. If you wish to speak confidentially about an incident of sexual misconduct, want more information about filing a report, or have questions about school policies and procedures, please contact our Title IX Coordinator, which can be found on our school’s website. MSU is legally obligated to investigate reports of sexual misconduct, and therefore it cannot guarantee the confidentiality of a report, but it will consider a request for confidentiality and respect it to the extent possible. As a professor at MSU, I am also required by our school to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident.