

Syllabus
PHIL 6200
Experimental Knowledge
Spring 2019

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Office hours: R 11-12, F 1-2
other meeting times available by appointment

1 Required Texts

- Chang, Hasok. *Inventing Temperature: Measurement and Scientific Progress*. New York: Oxford University Press, 2004. (*IT*)
- Ian Hacking. *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*. New York: Cambridge University Press, 1983. (*R and I*)
- Staley, Kent. *An Introduction to the Philosophy of Science*. New York: Cambridge University Press, 2014. (*IPS*)

Additional readings posted on Blackboard.

2 Overview of the course

Until the early 1980s, philosophers of science (with a handful of notable exceptions) had not paid very much serious attention to experimental practice. The philosophical appreciation of experiment relegated it largely to an uninteresting supporting role insofar as it generated observation reports that could subsequently serve as inputs to reasoning and decision-making about scientific theories. The work of the “New Experimentalists” changed that – but to what extent and to what end? The promise of experiment lies in the fact that experimental practice highlights the role of the inquirer as a *material* and *active* participant in the world, as well as adding a number of interesting dimensions to traditional conceptions of the relationship between theory and evidence. We will explore the extent to which philosophers of science have made good on this promise as they have explored a variety of philosophical issues.

3 Learning outcomes

Students completing this course should be able to:

- discuss in an informed manner different conceptions of scientific experiment emphasizing formal, material, epistemological, or pragmatic aspects
- critically evaluate the relevance of scientific experimentation to a variety of established debates in the philosophy of science literature (e.g., realism/anti-realism, theory-ladenness of observation, scientific progress, incommensurability)
- identify and explain the epistemological significance of important experimental strategies and practices used in the sciences
- discuss the various roles played by models as they relate to scientific experimentation
- critically evaluate the relative importance of experimentation as a means of promoting theoretical knowledge and as a means of acquiring knowledge independently of theoretical interests

4 Coursework

4.1 Preparedness/Participation

Class meetings will focus on discussion of the assigned readings rather than lecture. Students are expected to come to class having read assigned material carefully and with questions prepared for class discussion.

4.2 Presentation

Each student is expected to make a 30 minute presentation on a topic related to the course materials. The 30 minute limit will be strictly enforced, and presentations must be prepared sufficiently in advance to be previewed by the instructor.

4.3 Papers

Each student will write a seminar paper, about 7500–8000 words in length. A draft of the paper will be due by 5:00pm on Friday, April 14. This draft should be treated not as a “rough” draft, but as the *best* draft you are able to produce prior to feedback (analogous to the version of a paper that you first submit to a journal, before responding to referee reports). Drafts will receive detailed comments. The final paper must be accompanied by an explanation of how the final draft responds to comments on the draft version.

5 Grades

Grades will be based on a point system, with points divided among the following three categories:

Participation	100
Presentation	200
Seminar Paper draft	100
Seminar paper final	600

Course grades will be based on total accumulated points as follows:

940–1000	A
900–939	A-
865–899	B+
835–864	B
800–834	B-
700–799	C
<700	F

6 University-requested statements

This section comprises statements from the Office of Academic Affairs regarding several topics. See the electronic version of this document (available on Blackboard) for embedded links.

6.1 Disability Services and Academic Accommodations

Students with a documented disability who wish to request academic accommodations must contact Disability Services to discuss accommodation requests and eligibility requirements. Once successfully registered, the student also must notify the course instructor that they wish to access accommodations in the course.

Please contact Disability Services, located within the Student Success Center, at Disability_services@slu.edu or 314.977.3484 to schedule an appointment. Confidentiality will be observed in all inquiries. Once approved, information about the students eligibility for academic accommodations will be shared with course instructors via email from Disability Services and viewed within Banner via the instructors course roster.

Note: Students who do not have a documented disability but who think they may have one are encouraged to contact Disability Services.

6.2 Title IX

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU's Title IX coordinator, Anna R. Kratky (DuBourg Hall, room 36; anna.kratky@slu.edu; 314-977-3886) and share the basic facts of your experience with her. The Title IX coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK. View SLU's [sexual misconduct policy] and [resources].

6.3 Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care, and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy was adopted in Spring 2015, and can be accessed on the Provost's Office website [link].

Additionally, each SLU College, School, and Center has adopted its own academic integrity policies, available on their respective websites. All SLU students are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions, and appeals. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program, or the Dean/Director of the College, School or Center in which your program is housed.

Specific College of Arts and Sciences Academic Honesty Policies and Procedures may be found here [link].

6.4 Student success center

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. The Student Success Center, a one-stop shop, which assists students with academic and career related services, is

located in the Busch Student Center (Suite, 331) and the School of Nursing (Suite, 114). Students who think they might benefit from these resources can find out more about:

- Course-level support (e.g., faculty member, departmental resources, etc.) by asking your course instructor.
- University-level support (e.g., tutoring services, university writing services, disability services, academic coaching, career services, and/or facets of curriculum planning) by visiting the Student Success Center.

7 Life is full of surprises

Sometimes the need arises to change one's approach to doing things. Learning is no exception. Consequently, the information given in this syllabus is subject to change on short notice (but not without reason). Such changes, should they arise, will be announced in class. You are responsible for keeping track of any changes in course assignments or schedule.

8 Course Schedule

Class will meet Tuesdays from 9:30 to 12:00 in Adorjan 343.

9 Schedule of Readings for Class Meetings

Induction and Underdetermination	
1/15	<i>IPS</i> , chs. 1–3 <i>suggested</i> : Quine, “Two Dogmas of Empiricism” Duhem, <i>The Aim and Structure of Physical Theory</i> , part II, ch. 6
1/22	Howson and Urbach, <i>Scientific Reasoning: The Bayesian Approach</i> , ch. 7, sect. h Mayo, “Duhem’s Problem, the Bayesian Way, and Error Statistics”
Observation and Theory Change	
1/29	<i>R and I</i> , chs. 5–6 <i>IPS</i> , ch. 6 Kuhn, “The Nature and Necessity of Scientific Revolutions”
1/29	<i>R and I</i> , chs. 9–11 Franklin, “The Epistemology of Experiment” Franklin, Introduction to <i>Selectivity and Discord</i>
Data and Phenomena	
2/5	Bogen and Woodward, “Saving the Phenomena” <i>R and I</i> , ch. 13
2/12	Schindler, “Rehabilitating Theory” McAllister, “Phenomena and Patterns in Data Sets” Woodward, “Data and Phenomena: A Restatement and Defense”
Exploration	
2/19	Steinle, “Entering New Fields: Exploratory Uses of Experimentation” Burian, “Exploratory Experimentation and the Role of Histochemical Techniques in the Work of Jean Brachet, 1938–1952” Franklin-Hall, “Exploratory Experiments”
Measurement	
2/26	<i>R and I</i> , ch. 14 Bridgman, “Operational Analysis” <i>suggested</i> : Tal, “Measurement in Science,” Stanford Encyclopedia of Philosophy
3/5	<i>IT</i> , Introduction, chs. 1–2
3/11–15	Spring Break
3/19	<i>IT</i> , chs. 3–4
3/26	<i>IT</i> , chs. 5–6
4/2	Tal, “Making Time: A Study in the Epistemology of Measurement” Tal, “How Does Measuring Generate Evidence? The Problem of Observational Grounding”

Simulation	
4/9	Humphreys, "Computer Simulation" Morgan, "Experiments without Material Intervention: Model Experiments, Virtual Experiments, and Virtually Experiments" Morrison, "Models, Measurement, and Computer Simulation: The Changing Face of Experimentation"
4/16	Parker, "Does Matter Really Matter? Computer Simulations, Experiments, and Materiality" Winsberg, "Simulated Experiments: Methodology for a Virtual World"
Realism	
4/23	<i>IPS</i> , ch. 10 <i>R and I</i> chs. 1, 16 Resnik, "Hacking's Experimental Realism"
4/30	Massimi, "Non-defensible Middle Ground for Experimental Realism: Why We Are Justified to Believe in Colored Quarks" Achinstein, "Is There a Valid Experimental Argument for Scientific Realism?"