

San José State University
Department of Philosophy
Phil 160: Philosophy of Science, Sec. 2, Fall 2015

Course and Contact Information:

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Office Hours:	Tues/Thurs 1:30 - 2pm, or by appt.
Class Days/Time:	Tuesdays & Thursdays 12:00–1:15pm
Classroom:	Dudley Moorhead Hall (DMH) 149B
Prerequisites:	Completion of core GE requirements, upper division standing, successful completion of WST. 100W is a prerequisite or co-requisite for the course.
GE/SJSU Studies Category:	R (Earth & Environment)

Course Description:

The *Philosophy of Science* as a discipline is an investigation into the nature, purpose, and impact of scientific reasoning and theory. As such, this course will explore what science is, what it does, and how it works. Much of what we believe to be true about the nature of the world in contemporary culture is based on our understanding of science, underlining the significant impact science can have on cultural and personal views. But what do scientific theories really tell us? We will investigate the relationship between scientific theories and reality, the methods of science in connection to “objective” reality, and the role that science and scientific reasoning has on shaping our beliefs and values in the modern world.

Together, as a community of thinkers, the class will examine: 1) the features of scientific methodology which distinguish science from pseudo-science; 2) how theoretical considerations and experiments interact to shape our scientific picture of the world; 3) how scientific theories evolve and how theories from different scientific disciplines are related; and 4) whether science does or should purport to give us a literally true picture of the world. We will consider not only what is peculiar to the culture of science, but also how this scientific culture compares with other societal views.

In this course, students are expected to cultivate a better understanding of the scientific study of the physical universe and its life forms. Furthermore, students will come to understand and appreciate the interrelationship of science to other human endeavors. Through lectures, class discussions, and small group research projects, as well as written assignments and presentations, course content is examined from a philosophical perspective and will be subject to reflection and critical analysis by students, particularly with respect to one’s own values and

interests. A central concern of the course is assessing what constitutes responsible membership in an increasingly technological and interdependent global civilization conditioned more and more by the scientific worldview dominating Western cultures; thus, seeks to address how we can be more critical consumers of scientific theory.

Learning Outcomes and Course Goals:

GE Learning Outcomes (GELOs)

This course fulfills Area R of the SJSU Studies (upper division GE) requirements. The goals of this course are twofold: 1) students will cultivate knowledge of the scientific study of the physical universe and its life forms, and 2) students will understand and appreciate the interrelationship of science and human beings to each other.

Diversity: This course considers a diverse range of perspectives on the philosophy of science, including feminist philosophy of science (Ch. 9 of textbook).

Writing: There are both in-class and out-of-class writing requirements, including in-class mid-term exams, the term paper, and the final research assignment which in total require more than 3000 words of writing in order to satisfy upper-division GE requirements for Area R.

In this course, students are expected to acquire certain upper-division General Education competencies. In particular, they should be able to:

GELO 1: “Demonstrate an understanding of the methods and limits of scientific investigation”: This is the topic of the entire course, and students will demonstrate their understanding of various aspects of the methods and limits of scientific investigation in their writing assignments, exams and research project.

GELO 2: “Distinguish science from pseudo-science”: We address this theme throughout the course, but especially in our discussion of Popper (Ch. 4 of textbook). Students will have the opportunity to demonstrate this particular competency in the "Science or Pseudo-Science?" questions addressed in class, and on midterm exams.

GELO 3: “Apply a scientific approach to answer questions about the earth and environment”: This competency is one of the main themes, and is explored throughout the course. Students will demonstrate their ability to apply a scientific approach to understanding the world through the small-group research project over the course of the semester.

Required Textbook:

The textbook is available at Spartan Book Store and from online book sellers

Peter Godfrey-Smith, *Theory and Reality: An Introduction to the Philosophy of Science*

ISBN-13: 978-0-226-30063-4

ISBN-10: 0-226-30063-3

Course Requirements and Assignments:

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Student Responsibilities:

Students are expected to arrive on time, stay for the entirety of class, and complete the assigned readings prior to attending class. Class participation is mandatory. It is crucial that students come to class prepared to discuss issues, as class participation is a significant component of grading. In addition to developing ideas through in-class debate and in-class exams, students will learn the process of writing a reflective, critically reasoned philosophy paper, as well as complete a small-group research project. This course enables students, in keeping with the general character of philosophy, to reflect on and critically analyze issues concerning scientific theory within the context of human efforts to understand their physical environment and social world.

Course Structure:

This course will be partly lecture, and partly discussion/activity, in an effort to give students the opportunity to demonstrate what they are learning from their readings. Accordingly, all students are expected to contribute to in-class discussions/debates. Each student's participation will be evaluated based on the quantity and quality of his or her contribution to class debates/activities, and how it reflects both an understanding and a critical assessment of the course material. Students will be asked to do various kinds of work for this course (both in and out of class) with the aim of drawing on the different learning styles and strengths among students to make learning and assessment as fair as possible. Students will be given both marks and comments as feedback on their written work; and, once returned, each assignment will be discussed in class. This is designed to give students both a specific assessment of the work they have completed and enable them to do a self-diagnostic assessment of their work in order to further develop skills applicable to future work. All together, writing assignments will total more than 3000 words, fulfilling the advanced GE area R requirement for writing.

Participation:

Participation in the form of in-class discussion/debate is crucial to philosophical inquiry, and therefore crucial to a student's success in this course. Students who do not take class discussion seriously will find it difficult to do well in the course. Students can earn 1 to 5 participation points each day of class. Once that class period is past, however, so is the opportunity to earn those participation points. Students will self-evaluate their participation each day, but the instructor will assess whether a student has accurately assessed their participation each week. Students can earn 3 points per class for showing up and having done the reading. If students are late or leave early, they may only earn 1 or 2 points depending on the amount of time lost. Students engaged in active listening may earn 1 additional point. Those who actively share in the class discussion may earn another point, totaling a maximum of 5 points per class by offering one or more significant contributions to class discussion—e.g., by offering a significant question, a substantial answer, an insight about the reading, a summarization or review of key concepts, and/or by volunteering to read for the class's benefit, etc. The instructor may call on those not volunteering to participate, in order to make sure they are earning at least some participation points. It is best to offer your point of view voluntarily in class. So please speak up! Public speaking is a crucial skill in the job market; and the university experience, if anything, is the best opportunity to become better public speakers. Overall, participation is worth 15% of your total course grade.

Exams:

There will be 2 mid-term exams for this course. The exams are intended to evaluate your grasp of material from assigned readings, lecture, and class discussions. Each exam will include both short-answer questions (e.g., definitions of key terms, etc.) and longer essay questions that will require you to reflect critically on the course material. More details on the format and content of these exams will be distributed later in the term. The mid-term exams will each count for 20% of your total course grade. There will not be a final exam, but rather a culminating experience. Please see research project below.

Term Paper:

Later in the semester there will be a handout explaining expectations for the term paper in more detail. Basically, however, the term paper will be a fuller exploration of your views concerning the questions raised by

scientific inquiry, our justifications for what science is and does, and how scientific explanation plays a role in our understanding of the physical environment and our social interactions. The term paper will count for 30% of your total course grade, as it exemplifies your personal learning from course materials to a greater degree than all other assignments.

Research Project:

In place of a final exam, students will form teams of 4 or 5, and together complete a small-group research project over the course of the semester, culminating in a presentation of the group's findings. This assignment will require the completion of an annotated bibliography, with a presentation of research findings in either an in-person or video format. The purpose of this assignment is to afford students the opportunity to demonstrate what they have learned in their exploration of scientific reasoning and theory in regard to a current topic in science. Specific instructions for this research assignment will be distributed in class. The research assignment (the final write-up plus the in-class presentation) will count for 15% of your total course grade.

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading."

Grading Policy:

Assignments and Grading:

Participation Sheets	15%	December 8th
Mid-Term Exam #1 (750 words)	20%	October 1st
Mid-Term Exam #2 (750 words)	20%	November 5th
Term Paper (1500 words)	30%	December 8th
Research Project	15%	December 11th
Culminating Experience (no final exam)		Friday, Dec. 11th @ 10:00 am - 12:00 noon

Students are strongly encouraged to take courses to satisfy GE Areas R, S, and V from departments other than their major department. Passage of the Writing Skills Test (WST) or ENGL/LLD 100A with a C or better (C not accepted), and completion of Core General Education are prerequisite to all SJSU Studies courses. Completion of, or co--registration in, 100W is strongly recommended. A minimum aggregate GPA of 2.0 in GE Areas R, S, & V shall be required of all students." See [University Policy S14-5](http://www.sjsu.edu/senate/docs/S14-5.pdf) at <http://www.sjsu.edu/senate/docs/S14-5.pdf>.

Note that "All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades." See [University Policy F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

Classroom Protocol/Community Etiquette:

- Be respectful and kind to others.
- Have the courage to speak up.
- No interrupting others while speaking.
- Do the readings before class.
- Be present not only physically, but mentally.
- No web surfing, checking emails, or texting during class.

University Policies:

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU's policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See [University Policy S90-5](http://www.sjsu.edu/senate/docs/S90-5.pdf) at <http://www.sjsu.edu/senate/docs/S90-5.pdf>. More detailed information on a variety of related topics is available in the [SJSU catalog](http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html), at <http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html>. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>. Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at http://www.sjsu.edu/provost/services/academic_calendars/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at <http://www.sjsu.edu/advising/>.

Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor's permission to record the course and the following items to be included in the syllabus:

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
 - It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
 - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](#) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

Accommodation to Students' Religious Holidays

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See [University Policy S14-7](http://www.sjsu.edu/senate/docs/S14-7.pdf) at <http://www.sjsu.edu/senate/docs/S14-7.pdf>.

Student Technology Resources

Computer labs for student use are available in the [Academic Success Center](http://www.sjsu.edu/at/asc/) at <http://www.sjsu.edu/at/asc/> located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

SJSU Peer Connections

Peer Connections, a campus-wide resource for mentoring and tutoring, strives to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. You are encouraged to take advantage of their services which include course-content based tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10th and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit [Peer Connections website](http://peerconnections.sjsu.edu) at <http://peerconnections.sjsu.edu> for more information.

SJSU Writing Center

The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops

every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the [Writing Center website](http://www.sjsu.edu/writingcenter) at <http://www.sjsu.edu/writingcenter>. For additional resources and updated information, follow the Writing Center on Twitter and become a fan of the SJSU Writing Center on Facebook. (Note: You need to have a QR Reader to scan this code.)



SJSU Counseling Services

The SJSU Counseling Services is located on the corner of 7th Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit [Counseling Services website](http://www.sjsu.edu/counseling) at <http://www.sjsu.edu/counseling>.

Phil 160: Philosophy of Science Course Schedule

(Subject to change with fair notice)

Date	Topic	Reading
20 AUG	Review Syllabus & Class Expectations	--
	<i>Background</i>	
25	Ch. 1: Introduction: What is Philosophy of Science?	Text: 1-18
27	What is science? How does it work?	--
1 SEP	Ch. 2: Logic Plus Empiricism	Text: 19-37
3	The Empiricist Tradition	--
8	The Vienna Circle	--
10	Logical Empiricism	--
	<i>Issues Concerning Evidence & Testing</i>	
15	Ch. 3: Induction and Confirmation	Text: 39-56
17	Induction vs. Deduction	--
22	Confirmation & Explanatory Inference	--
24	Ch. 4: Popper -- Conjecture and Refutation	Text: 57-74
29	Popper's Theory of Science	--
1 OCT	Mid-Term Exam #1	--
	<i>Scientific Change and the Social Organization of Science</i>	
6	Ch. 5: Kuhn and Normal Science	Text: 75-86
8	Paradigm Shifts in Science	--
13	Ch. 6: Kuhn and Revolutions	Text: 87-101
15	Revolutions & Their Aftermath	--

20	Ch. 7: Lakatos, Laudan, Feyerabend and Frameworks	Text: 102-121
22	Lakatos and Laudan	--
27	Pluralism and the Ramblings of Madmen	--
29	Ch. 8: The Challenge from Sociology of Science	Text: 122-135
3	NOV Beyond Philosophy? The Rise of the Strong Program	--
5	Mid-Term Exam #2	--
10	Ch. 9: Feminism and Science Studies	Text: 136-148
12	"Science is Political"	--
17	Ch. 10: Naturalistic Philosophy in Theory and Practice	Text: 149-162
19	The Theory-Ladenness of Observations	--
24	Ch. 11: Naturalism and the Social Structure of Science	Text: 163-172
26	<i>Thanksgiving Break!!!</i>	
	<i>Metaphysics of Philosophy of Science</i>	
1	DEC Ch. 12: Scientific Realism	Text: 173-189
3	Challenges from Traditional Empiricism	--
	Term Paper Due December 8th	
8	<i>Last Day of Class: Participation Sheets Due</i>	--
	Research Project Due December 11th	
11	<i>Culminating Experience during Final Exam Time @10am-12noon</i>	--