

## **Term Information**

Effective Term Autumn 2018

## **General Information**

Course Bulletin Listing/Subject Area Philosophy  
Fiscal Unit/Academic Org Philosophy - D0575  
College/Academic Group Arts and Sciences  
Level/Career Undergraduate  
Course Number/Catalog 2680  
Course Title Scientific Controversies  
Transcript Abbreviation Controversies  
Course Description Modern science raises many difficult questions about the nature of the universe and our place in it. This class considers several controversies that arise within science and investigates their broader philosophical significance. How does science work in different domains and at different times, and what can science tell us about ourselves and the nature of the world?  
Semester Credit Hours/Units Fixed: 3

## **Offering Information**

Length Of Course 14 Week, 12 Week, 8 Week, 7 Week, 6 Week, 4 Week  
Flexibly Scheduled Course Never  
Does any section of this course have a distance education component? No  
Grading Basis Letter Grade  
Repeatable No  
Course Components Recitation, Lecture  
Grade Roster Component Lecture  
Credit Available by Exam No  
Admission Condition Course No  
Off Campus Never  
Campus of Offering Columbus

## **Prerequisites and Exclusions**

Prerequisites/Corequisites  
Exclusions  
Electronically Enforced Yes

## **Cross-Listings**

Cross-Listings

## **Subject/CIP Code**

Subject/CIP Code 38.0101  
Subsidy Level General Studies Course  
Intended Rank Freshman, Sophomore, Junior

## Requirement/Elective Designation

General Education course:  
Culture and Ideas

## Course Details

### **Course goals or learning objectives/outcomes**

- Students analyze and interpret major forms of human thought, culture, and expression.
- Students evaluate how ideas influence the character of human beliefs, the perception of reality and the norms which guide human behavior.

### **Content Topic List**

- What is gravity?
- Does the universe have a beginning?
- What is life?
- Can computers think?
- Are there human races?

### **Sought Concurrence**

No

## Attachments

- Philosophy 2670 GE Rationale Cultures and Ideas.docx: GE Rationale  
*(Other Supporting Documentation. Owner: Brown, Michelle E.)*
- Philosophy 2670 concurrence from CSE.docx: Concurrence from CSE  
*(Concurrence. Owner: Brown, Michelle E.)*
- Phil 2670 Concurrence Comp Studies.pdf: Concurrence from Comp Studies  
*(Concurrence. Owner: Brown, Michelle E.)*
- Phil 2670 Concurrence NMS and SBS.pdf: Concurrence from NMS, SBS  
*(Concurrence. Owner: Brown, Michelle E.)*
- Phil 2680 Syllabus dec 2017 revision.docx: Syllabus revision  
*(Syllabus. Owner: Brown, Michelle E.)*
- Philosophy Undergraduate Curriculum Map.docx: Curriculum map  
*(Other Supporting Documentation. Owner: Brown, Michelle E.)*
- 2680 revisions cover letter.pdf: Revision cover letter  
*(Other Supporting Documentation. Owner: Brown, Michelle E.)*
- 2680 GE Assessment Plan with Appendix dec 2017 revision.docx: GE Assessment/Appendix  
*(GEC Course Assessment Plan. Owner: Brown, Michelle E.)*

**Comments**

- The revisions requested have been made. An updated GE Assessment Plan, appendix, syllabus, and cover letter has been added. *(by Brown,Michelle E. on 12/06/2017 10:39 AM)*
- See 11-28-17 e-mail to N Tennant. *(by Vankeerbergen,Bernadette Chantal on 11/28/2017 03:01 PM)*
- Please note that we have changed the number for this course request. We are now numbering it 2680. The reason for this change is to coordinate our course numbering of a different course as 2670 with Comp. Studies with whom we cross list it. That will be a separate request. *(by D'Arms,Edward Justin on 11/13/2017 03:57 PM)*
- Concurrences should be sought from NMS/SBS through Assistant Dean Deborah Haddad; Comparative Studies, and Computer Science (Engineering). *(by Heysel,Garett Robert on 10/30/2017 11:17 PM)*

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Brown,Michelle E.	10/27/2017 04:48 PM	Submitted for Approval
Approved	Tennant,Neil Wellesley	10/28/2017 08:01 AM	Unit Approval
Revision Requested	Heysel,Garett Robert	10/30/2017 11:17 PM	College Approval
Submitted	Brown,Michelle E.	11/13/2017 03:40 PM	Submitted for Approval
Approved	D'Arms,Edward Justin	11/13/2017 03:57 PM	Unit Approval
Approved	Heysel,Garett Robert	11/15/2017 08:01 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	11/28/2017 03:01 PM	ASCCAO Approval
Submitted	Brown,Michelle E.	12/06/2017 10:41 AM	Submitted for Approval
Approved	D'Arms,Edward Justin	12/06/2017 01:40 PM	Unit Approval
Approved	Heysel,Garett Robert	12/06/2017 04:32 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Oldroyd,Shelby Quinn Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	12/06/2017 04:32 PM	ASCCAO Approval



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December 5, 2017

To the ASC Curriculum Committee:

Please find attached the revision of my proposed course Philosophy 2680: Scientific Controversies, with a GE Cultures and Ideas.

I welcome the opportunity to improve both the original syllabus and the GE aspects of my proposal. I have endeavored to address all of the committee's concerns. First, I have added a specific discussion of how many points will be lost by a student who is absent from class. Second, I have thoroughly revised the GE assessment plan to address the committee's concerns. This is my first attempt to create a course, and I think I was not clear on what a GE Assessment plan is meant to accomplish. But I believe that the plan is now a good one. In particular, I have added in language that relates the components of the assessment directly back to the ELOs of the GE. For ease of review, I have indicated all changes in bold type.

Thank you for reviewing this submission.

Sincerely,

Christopher Pincock  
Professor  
pincock.1@osu.edu

Philosophy 2680: Scientific Controversies  
Sample Syllabus

1. Instructor's contact information

Professor Christopher Pincock, 376 University Hall. Email: [pincock.1@osu.edu](mailto:pincock.1@osu.edu)

Office hours: TBD

2. Course coordinator

Not applicable

3. Meeting days and times, classroom location

TBD

4. Course number and title

Philosophy 2680: Scientific Controversies

5. Format of instruction and number of contact hours

Lecture, 3 hours per week

6. GE information

i. Cultures and Ideas

Students evaluate significant cultural phenomena and ideas in order to develop capacities for aesthetic and historical response and judgment; and interpretation and evaluation.

ii. GE Expected Learning Outcomes

1. Students analyze and interpret major forms of human thought, culture, and expression.
2. Students evaluate how ideas influence the character of human beliefs, the perception of reality and the norms which guide human behavior.

iii. How the course will satisfy these learning outcomes

This course investigates various aspects of science from the scientific revolution of the 17<sup>th</sup> century up until the present. Scientific activities constitute some of the most significant cultural and intellectual developments during this time. The course provides a valuable perspective on these developments through a consideration of the disputes that continually arise within science. These controversies concern urgent questions about the nature of reality and the place of humans in that reality. By considering these debates from a critical, historical perspective, students will learn how to understand and evaluate a range of scientific claims. The historical aspects of the course address the first expected learning outcome: scientific thought is not set in stone, but arises from ongoing debates and negotiations. The critical elements of the course address the second expected learning outcome: to evaluate proposed scientific claims, one should consider the evidence for and against the claims, and also the unargued presuppositions that motivate many scientific innovations.

7. Description of course

Modern science raises many difficult questions about the nature of the universe and our place in it. This class considers several controversies that arise within science and investigates their

broader philosophical significance. How does science work in different domains and at different times, and what can science tell us about ourselves and the nature of the world? Potential controversies that may be considered include: What is gravity? Does the universe have a beginning? What is life? Can computers think? Are there human races? Readings will be drawn from the sciences and the philosophy of science.

#### 8. Required texts and other course materials, availability

All readings will be distributed by the instructor in electronic form as PDFs, through Carmen/Canvas.

#### 9. Length and format of all assignments, examinations

2 essays, 3 double-spaced pages each

Midterm exam: an in-class exam

Final exam: a 2-hour exam administered during the final exam period

12 short quizzes: 5 minute quizzes relating to the readings for that day

#### 10. Grading information

2 essays (3 pages each), 150 points each

Midterm exam, 200 points

Final exam, 300 points

12 short in-class quizzes, 10 points each (the lowest two quiz grades will be dropped)

Class participation, 100 points: these points will be awarded for attendance, raising questions in class, and answering questions in class.

#### 11. Grading scale

Each assignment will be returned to you with a grade (a certain number of points). Your final grade for the class will be calculated by adding up the points from each assignment as outlined under the "Grading information" above. This sum will be converted to a letter grade using the standard Ohio State scheme:

930 - 1000 (A), 900 - 929 (A-), 870 - 899 (B+), 830 - 869 (B), 800 - 829 (B-), 770 - 799 (C+), 730 - 769 (C), 700 - 729 (C-), 670 - 699 (D+), 600 - 669 (D), Below 600 (E).

#### 12. Scheduling of exams and due dates for assignments

First essay: assigned week 3, due week 5

Midterm exam: week 7

Second essay: assigned week 11, due week 13

Final exam: in exam period, study questions distributed during week 15

#### 13. Class attendance policy

Class attendance is required. On certain days, attendance will be taken, and this will form **50%** of the class participation grade. **[added, Dec. 2017] Note:** every missed class will reduce your class participation grade by 5 points.

#### 14. A weekly topical outline of course meetings, topics to be covered, readings, homework

Week 1: Introduction

Dear, The Intelligibility of Nature (2006), ch. 1: Science as Natural Philosophy  
Descartes, Discourse on Method I, V (1637)

Week 2: What is gravity?

Dear, The Intelligibility of Nature (2006), ch. 2: The Mechanical Universe

Descartes, Principles of Philosophy (1644), III, IV (selections)

Newton, Principia, Second edition (1713), General Scholium

Cotes, Preface to Second edition of Newton's Principia (1713) (selections)

Week 3: What is gravity? (cont.)

Maxwell, "Action at a Distance" (1873)

Einstein, Relativity (1917) (selections)

*First essay assigned*

Week 4: Does the universe have a beginning?

Aristotle, Physics (around 350 BC), I, VIII (selections)

Laplace, System of the World, 6<sup>th</sup> edition (1835), Bk. V, ch. VI, "The future progress of astronomy"

Agnes Clerk, Shape of the Stars (1890) (selection)

Week 5: Does the universe have a beginning? (cont.)

Eddington, "The end of the world" (1931)

B. Ellis, "Has the universe a beginning in time?" (1955)

Hoyle, "The steady-state universe" (1956)

*First essay due*

Week 6: Does the universe have a beginning? (cont.)

Lemaitre, "The expanding universe" (1931)

Gamow, "Modern cosmology" (1954), "The evolutionary universe" (1956)

McMullin, "How should cosmology relate to theology?" (1981)

Week 7: What is life?

Haeckel, The Riddle of the Universe (1890) (selections)

Driesch, History and Theory of Vitalism (1914) (selections)

Haldane, What is Life? (1947) (selections)

*Midterm exam (for weeks 1 through 6)*

Week 8: What is life? (cont.)

Schrödinger, What is Life? (1944) (selections)

Week 9: What is life? (cont.)

Stephen Jay Gould, "What is life? A Problem of History" (1995)

Stuart A. Kauffman, "What is life? Was Schrödinger right?" (1995)

Week 10: Can computers think?

Turing, "Computing Machinery and Intelligence" (1950)

Minsky, "Why People Think Computers Can't Think" (1982)

Week 11: Can computers think? (cont.)

Searle, "Is the Brain's Mind a Computer Program?" (1990)

Patricia Churchland and Paul Churchland, "Could a Machine Think?" (1990)

Bostrum, *Superintelligence: Paths, Dangers, Strategies* (2014) (selections)

*Second essay assigned*

Week 12: Are there human races?

Du Bois, "The Conservation of Races" (1897)

Appiah, "The Uncompleted Argument: Du Bois and the Illusion of Race" (1985)

Outlaw, "'Conserve' Races? In Defense of W. E. B. Du Bois" (1996)

Week 13: Are there human races? (cont.)

Lewontin, "The Apportionment of Human Diversity" (1972)

Templeton, "Human Races: A Genetic and Evolutionary Perspective" (1999)

Rosenberg et al., "Genetic Structure of Human Populations" (2002)

*Second essay due*

Week 14: Are there human races? (cont.)

Sally Haslanger, "A Social Constructionist Analysis of Race" (2008)

Yudell et al., "Taking Race Out of Human Genetics" (2016)

Week 15: Review: Learning from scientific controversies

Does science make progress?

*Final exam study questions distributed*

## 15. Academic misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>

## 16. Student Life Disability Services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical



conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.

#### 17. Title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

#### 18. Diversity

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Philosophy 2670: Scientific Controversies  
GE Rationale: Cultures and Ideas

Expected Learning Outcomes

“Discuss each separately, show how each ELO met by most or all of (a) course objectives, (b) readings, (c) topics, (d) written assignments, (e) other course components.”

*1. Students analyze and interpret major forms of human thought, culture, and expression.*

(a) The rise of scientific modes of thinking is one of the distinctive features of the transition to the modern era. Students often suppose that the authority of science over their lives is easily justified, but a historical and sociological investigation of how science actually works should lead one to question this supposition. One objective of this course is to enable students to appreciate the complexity of science as a human practice. Modern science has changed in many ways since its inception in the seventeenth century, and as science has changed, so too has our conception of the world and our place in it. The way that this course achieves this objective is through the careful consideration of a series of scientific controversies. Each controversy highlights a contested element in a scientific innovation, and for each case a student will come to see how much more than experimental findings is needed to resolve a scientific controversy.

(b) The course readings combine proposals by working scientists with criticisms by their scientific peers and philosophical reflections on the controversy. In this way a student will learn how to approach a scientific controversy: what positions do the various sides take, how are the elements of the controversy related and what, in the end, is the most fundamental aspect of the dispute? Answering these questions requires considerable analytic and interpretive skill as it often happens that the participants themselves are not clear on, or explicit about, the most important elements of their disagreement. One example of this is the first proposed unit of the class on the question “What is gravity?” Descartes and his followers insisted that a genuine scientific explanation of gravity must be a mechanical explanation that reduced gravitational interactions to contact between small material or fluid particles. This standard of intelligibility was ultimately based on Descartes’ theological conception of God’s relationship to nature and his human subjects. As a result, when Newton and his followers proposed a theory of universal gravitation that bypassed mechanical explanation in terms of immediate “action at a distance”, there was a vigorous and extended scientific controversy about the legitimacy of this innovation. In this unit students will thus trace an apparently ordinary scientific disagreement to its roots in theology and even morality. Students can see how scientific thought operates in the context of broader cultural and social presuppositions.

(c) The topics for the course will range over a number of historical periods and areas of science. In the sample syllabus, for example, there are topics tied to physics (What is gravity?, Does the universe have a beginning?), biology (What is life?, Are there human races?) and psychology (Can computers think?). In each case, a scientific controversy turns out to have much wider implications concerning either the place of humans in nature or the nature of humans themselves. This is especially clear for the final unit of the sample syllabus, “Are there human

racism?” The scientific investigation of different human subpopulations has a long and disturbing history that many students may not be aware of. This history has motivated some biologists and philosophers to argue that “race” is not a viable scientific concept and that we should reform our categories to reflect this change. However, the judgment that a scientific concept is illegitimate is not easily justified through ordinary scientific investigation. A number of biologists and philosophers have responded that the concept of race is indeed worth saving, precisely because it can still do scientific work. Here again is another clear case where the context in which some scientific work is done is central to the value of the scientific proposal. A racist scientific theory that privileges one race should be challenged and criticized. Through the investigation of this highly charged controversy, students will learn how to interpret this kind of difficult question.

(d) Students will be asked to complete two written assignments throughout the semester in the form of 3-page essays. Each essay will have both an analytical and an evaluative component (see #2 (d) below). Students will be provided with a series of prompts or topics that they can choose to address in their essay. Each topic will focus on one aspect of the controversies that have been discussed in class. For example, for the case of Descartes on gravity, a topic may ask a student to present Descartes’ argument for the mechanical intelligibility of material interactions. What are the assumptions that Descartes makes, and how do these assumptions justify his conclusion? Each assignment, then, will require the student to exercise the analytical and interpretive skills that have been developed through the course readings and class discussions.

(e) Other elements of the class will ensure that students satisfy the first expected learning outcome. These elements include points for class participation, frequent in-class quizzes, a midterm exam and a final exam. Class discussion requires that students do the readings for a topic in advance and come to class with issues that they are eager to address. In-class quizzes are one way to encourage this sort of active engagement with the class material. The classes themselves will focus on the clarification of the central aspects of the readings through discussion, lecture slides and short videos, when appropriate. We will consider the biography and broader context of the scientists whose work we are discussing. Again, the result will be that students learn how to sift through a difficult text to find the arguments presented there. In addition, students will see how to go beyond what is explicitly written in a text, and to use the broader situation to understand a thinker’s motivations and presuppositions.

*2. Students evaluate how ideas influence the character of human beliefs, the perception of reality, and the norms which guide human behavior.*

(a) One course objective (discussed above) is for students to learn about the history of science and contemporary science through the investigation of several scientific controversies. However, an equally important second objective is that students learn how to take up a critical and evaluative attitude towards scientific innovations. We are constantly told that “Science has discovered X”, even when the supposed discovery is quite revolutionary and disruptive of our conception of the world and our place in it. Through the consideration of episodes of scientific

change, students will become better equipped to question and evaluate novel scientific discoveries. One route to this critical attitude is that a student will see that scientific controversies typically involve implicit or hidden background assumptions. An evaluation of a scientific argument must then uncover these assumptions and subject them to critical scrutiny. Another route to this critical attitude is the lack of cumulative development in the history of science. Many ideas that we now embrace were anticipated in earlier stages of scientific reflection, such as Darwin's theory of evolution by natural selection, which was considered in one form or another as early as ancient Greece. Students will thus learn to consider what kind of scientific progress has occurred, and what sort of scientific progress we should expect in the future.

(b) The course readings on the sample syllabus aim to instill this critical and evaluative attitude to scientific developments through the careful consideration of selected debates between scientists. As scientists themselves are often unsure how to resolve these debates, it is clear that consumers of scientific knowledge production should be attuned to these debates and how they are related to non-specialists. One instance of this kind of debate is the question "Can computers think?" In the 1950s and 1960s many optimistic claims were made about the prospects for artificial intelligence, but many of these claims turned out to be premature. In our own time, there is again much discussion about "superintelligent" machines, and the prospect that they might "turn against" their human creators. At the heart of this worry is a certain conception of thinking and intelligence that calls out for critical reflection and even skepticism. By engaging in this debate, students will learn how to evaluate the arguments for worries about superintelligence, and indeed to question the coherence of the associated models of thinking and intelligence. While these evaluations are not meant to provide a simple resolution to these debates, students in the course will acquire a healthy skepticism and confidence in their own critical abilities.

(c) The topics on the sample syllabus include questions that drive scientific research and yet are very difficult to answer. By gaining an appreciation of these difficulties, a student will be put in a position to evaluate other scientific debates and controversies. One example of such a topic that has not yet been discussed here is the question "What is life?" This is a question that can be used to demarcate biology from other sciences, and yet it has proven remarkably difficult to address. This is not simply because of some borderline entities such as viruses. The more pressing question is whether it is advisable to formulate a theory of living things that can be used to answer questions concerning the origin of life on Earth or the prospects for life on other planets. While some "exo-biologists" are enthusiastic about such theories, others question their scientific status. So, as with other topics, there is a question for scientists that students can consider and use to develop their own critical attitude towards science. In this case it is not clear what research problems are appropriate or where science should deploy its limited resources.

(d) As noted above at #1 (d), students will be asked to complete two written assignments throughout the semester in the form of 3-page essays. Each essay will have both an analytical and an evaluative component. The evaluative component of the essay topic will bear directly on

the second expected learning outcome of the course. To continue the example from the previous section, a student will be asked not only to summarize and clarify Descartes' argument for the intelligibility of mechanical interactions. In addition, they will be asked to raise an objection to one or more of the assumptions that Descartes makes. Is Descartes right, for example, that the operation of machine is so clear that we cannot doubt what will happen when some lever is pressed? Newtonians insisted that their own scientific proposals were just as clear and "evident" as the proposals of the Cartesians. Each written assignment will thus encourage a student to critically reflect on the assumptions that a scientist or philosopher is making. They will be asked to present and justify their own opinion about the cogency of one side of this dispute.

(e) The remaining course components are points for class participation, frequent in-class quizzes, a midterm exam and a final exam. Some of these components are meant to foster an engaged in-class experience through class discussion and questions for the instructor. These activities are essential for the course to foster and sustain an evaluative attitude towards the history of science and contemporary science. The class aspires to develop informed and engaged consumers of scientific findings so that new proposals are considered in light of the actual evidence available. As a result, students who take this class will take away both a profound respect for the achievements of modern science, but also a deeper awareness of the open-endedness of scientific research and the potential for errors and confusions.

Philosophy 2680: Scientific Controversies  
 GE Assessment Plan: Culture and Ideas

GE Expected Learning Outcomes	Methods of Assessment (Direct required, indirect encouraged)	Level of student achievement expected (e.g. percentage of students achieving a given level on rubric)	Process to review data and change or improve course re: GE ELOs?
<p>ELO 1: Students analyze and interpret major forms of human thought, culture, and expression.</p>	<p><u>Direct:</u> (i) an initial questionnaire along with a follow-up questionnaire towards the end of the class. (ii) evaluation of responses to a designated final exam question.  <u>Indirect:</u> a student survey conducted prior to the final exam.</p>	<p><u>Direct:</u> we expect “excellent” or “good” levels of achievement in the follow-up questionnaire and final exam questions for more than 80% of enrolled students.  <u>Indirect:</u> we expect 80% of students to “strongly agree” or “agree” with the survey question for ELO 1.</p>	<p>The results of the direct and indirect assessment will be tabulated each year, and discussed with the Curriculum and Assessment Committee of the Dept. of Philosophy. If the stated levels of achievement are not met, then the instructor will consider the following revisions to the course:</p>
<p>ELO 2: Students evaluate how ideas influence the character of human beliefs, the perception of reality, and the norms which guide human behavior</p>	<p><u>Direct:</u> (i) an initial questionnaire along with a follow-up questionnaire towards the end of the class. (ii) evaluation of responses to a designated final exam question.  <u>Indirect:</u> a student survey conducted prior to the final exam.</p>	<p><u>Direct:</u> we expect “excellent” or “good” levels of achievement in the follow-up questionnaire and final exam questions for more than 80% of enrolled students.  <u>Indirect:</u> we expect 80% of students to “strongly agree” or “agree” with the survey question for ELO 2.</p>	<p>(a) a change in readings to better reflect the ELOs and their connection to specific scientific controversies.          (b) a change in assignments to engage students more directly with the course ELOs.          (c) additional in-class components such as group presentations, debates, and interactive surveys to better connect students to the course ELOs.</p>

## Appendix

### **Request for clarification from the Curriculum Committee [added in Dec. 2017]**

GE assessment plan: The questionnaire should have a separate question for each Expected Learning Outcome (ELO) of the requested GE category. It is not clear how assessment differs for each ELO in the questionnaire.

As for the final exam, the questions do not reflect or measure success in the ELOs.

### **Response**

Please see below for changes made in response to these request for clarification. These changes have been made **in bold**.

### Examples of Direct Measures

#### (i) Comparing questionnaires

##### *Initial questionnaire*

During the first week of class a questionnaire will be given to students that will include questions tied to their satisfaction of ELO1 and ELO2. Potential questions are:

1. Discuss one scientific controversy that you are familiar with. How was this controversy resolved? **[This addresses ELO1.]**
2. For the controversy you discussed in question #1, do you think the solution to the controversy involved a genuine advance in scientific knowledge? Justify your answer. **[This addresses ELO2.]**

##### *Follow-up questionnaire*

During the last week of class a follow-up questionnaire will be given to students that will include questions tied to their satisfaction of ELO1 and ELO2, and that will build on the questions asked in the initial questionnaire. Potential questions are:

1. Discuss one scientific controversy **that you are familiar with**. How was this controversy resolved? **[This addresses ELO1.]**
2. For the controversy you discussed in question #1, do you think the solution to the controversy involved a genuine advance in scientific knowledge? Justify your answer. **[This addresses ELO2.]**

### ***Rubric for the purposes of GE Assessment***

ELO 1: Compare a student's answer to #1 on the initial questionnaire to their answer to #1 on the follow-up questionnaire.

Excellent: the student's answer on the follow-up questionnaire displays a much deeper understanding of the scientific controversy they chose to discuss.

Good: the student's answer on the follow-up questionnaire displays a deeper understanding of the scientific controversy they chose to discuss.

Satisfactory: the student's answer on the follow-up questionnaire displays an improved understanding of the scientific controversy they chose to discuss.

Poor: the student's answer on the follow-up questionnaire shows no improved understanding of the scientific controversy they chose to discuss.

ELO 2: Compare a student's answer to #2 on the initial questionnaire to their answer to #2 on the follow-up questionnaire.

Excellent: the student's answer on the follow-up questionnaire displays a much deeper understanding of **the normative significance of** the scientific controversy they chose to discuss.

Good: the student's answer on the follow-up questionnaire displays a deeper understanding of **the normative significance of** the scientific controversy they chose to discuss.

Satisfactory: the student's answer on the follow-up questionnaire displays an improved understanding of **the normative significance of** the scientific controversy they chose to discuss.

Poor: the student's answer on the follow-up questionnaire shows no improved understanding of **the normative significance of** the scientific controversy they chose to discuss.

**Clarification [added in Dec. 2017]:** I have tried to indicate how each question on the questionnaire bears on the ELOs. ELO 1 is "Students analyze and interpret major forms of human thought, culture, and expression." This is addressed by the first question on the questionnaire as it asks students to discuss a scientific controversy and its resolution. This is an instance of analysis and interpretation. The form of human thought that this course considers is scientific controversies. ELO 2 is "Students evaluate how ideas influence the character of human beliefs, the perception of reality, and the norms which guide human behavior." This is addressed by the second question on the questionnaire as it asks students to evaluate the resolution of the scientific controversy that they discussed for question 1. There is a normative question about how scientific controversies are resolved and whether these forms of resolution contribute to scientific progress. This is the way that ELO 2 is implemented in this course.

(ii) Final exam question

For each ELO, a question on the final exam will be designated as corresponding to the achievement of that ELO. Potential examples include:

ELO 1: How did Einstein's account of gravity address the debate between Cartesians and Newtonians about action at a distance?

ELO 2: Does Searle's "Chinese Room" argument show that computers cannot think? Justify your answer.

### ***Rubric for the purposes of GE Assessment***

Evaluate the student's answer to final exam question.

#### **ELO 1**

Excellent: 10-9 points: The answer displays a clear and thorough **analysis and interpretation of the scientific controversy at issue.**

Good: 8-7 points: The answer displays a mostly clear and accurate **analysis and interpretation of the scientific controversy at issue.**

Satisfactory: 6-5 points: The answer is accurate in major respects, although it may fail to provide a deep **analysis and interpretation of the scientific controversy at issue.**

Poor: 4-0 points: The answer is inaccurate or fails to develop an adequate **analysis and interpretation of the scientific controversy at issue.**

#### **ELO 2**



Excellent: 10-9 points: The answer provides a **clear and accurate normative evaluation of the scientific controversy at issue.**

Good: 8-7 points: The answer displays a **mostly clear and accurate normative evaluation of the scientific controversy at issue.**

Satisfactory: 6-5 points: The answer is accurate in major respects, although it may fail to provide a thorough **normative evaluation of the scientific controversy at issue.**

Poor: 4-0 points: The answer is inaccurate or fails to develop an adequate **analysis and interpretation of the scientific controversy at issue.**

#### Example of Indirect Measure

Students will be asked to complete a survey prior to the final exam, but after the last week of class. Potential questions for this survey are:

1. This course improved my ability to analyze and interpret major forms of human thought, culture, and expression.

Circle one:

Strongly agree – Somewhat agree – Neutral – Somewhat disagree – Strongly disagree

2. This course helped me to better evaluate how ideas influence the character of human beliefs, the perception of reality, and the norms which guide human behavior.

Circle one:

Strongly agree – Somewhat agree – Neutral – Somewhat disagree – Strongly disagree

**From:** D'Arms, Justin  
**Sent:** Tuesday, October 31, 2017 6:59 PM  
**To:** O'Keeffe, Sue <[okeeffe.10@osu.edu](mailto:okeeffe.10@osu.edu)>  
**Subject:** Fwd: concurrence sought

Here is one concurrence.  
Begin forwarded message:

**From:** "Soundarajan, Neelam" <[neelam@cse.ohio-state.edu](mailto:neelam@cse.ohio-state.edu)>  
**Subject:** RE: concurrence sought  
**Date:** October 31, 2017 at 4:52:33 PM EDT  
**To:** "D'Arms, Justin" <[darms.1@osu.edu](mailto:darms.1@osu.edu)>, "Zhang, Xiaodong" <[zhang@cse.ohio-state.edu](mailto:zhang@cse.ohio-state.edu)>  
**Cc:** "Sivilotti, Paul" <[paolo@cse.ohio-state.edu](mailto:paolo@cse.ohio-state.edu)>, "Soundarajan, Neelam" <[neelam@cse.ohio-state.edu](mailto:neelam@cse.ohio-state.edu)>

Justin,

Paul Sivilotti and I discussed your course. And, as Paul said, it looks like a very interesting course! Paul also said that, given that there is no overlap with any CSE course, there is no need for our Curriculum Comm. to discuss it and we can just provide our approval. Do you want a formal letter from us or is this email sufficient?

By the way, I did have one question/suggestion: I think this would be an excellent second-writing course. Did you consider that possibility? I very much feel that \*many\* OSU students will benefit from such courses.

Best,

--Neelam

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From: Soundarajan, Neelam  
Sent: Tuesday, October 31, 2017 2:08 PM  
To: D'Arms, Justin; Zhang, Xiaodong  
Subject: RE: concurrence sought

Justin,

Paul Sivilotti is our Curriculum Comm. chair. It is that comm. that would take a look at your course. I will forward your message to him.

Best,

--Neelam

---

From: D'Arms, Justin  
Sent: Tuesday, October 31, 2017 9:48 AM  
To: Zhang, Xiaodong; Soundarajan, Neelam  
Subject: concurrence sought

Dear Professors Zhang and Soundjaran,

I am not sure to whom to address this request. Philosophy seeks concurrence from CSE for a new course taught by colleague Chris Pincock: Phil 2670 Scientific Controversies. The syllabus is attached. Could you take a look at this or pass it on to the right person, and let me know your department's thoughts in the next couple of weeks, please? (In order to keep things moving, we will assume that CSE has no objections if we do not hear back in that timeframe.)

Thanks,

Justin

Justin D'Arms  
Professor and Chair  
Department of Philosophy  
Ohio State University  
350 University Hall  
230 North Oval Mall  
Columbus, OH 43201  
Phone (614) 292-7914  
Fax (614) 292-7502

## Brown, Michelle

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**From:** D'Arms, Justin  
**Sent:** Wednesday, November 8, 2017 1:33 PM  
**To:** Brown, Michelle  
**Subject:** Fwd: Philosophy 2670

Justin D'Arms  
Professor and Chair  
Department of Philosophy  
Ohio State University  
350 University Hall  
230 North Oval Mall  
Columbus, OH 43201  
Phone (614) 292-7914  
Fax (614) 292-7502

Begin forwarded message:

**From:** "Horn, David" <[horn.5@osu.edu](mailto:horn.5@osu.edu)>  
**Subject: Re: Philosophy 2670**  
**Date:** November 8, 2017 at 12:32:12 PM EST  
**To:** "D'Arms, Justin" <[darms.1@osu.edu](mailto:darms.1@osu.edu)>  
**Cc:** "Shank, Barry" <[shank.46@osu.edu](mailto:shank.46@osu.edu)>

Justin,

Our UG committee has no objections to the new course. In fact, when it is up and running (and the numbering is sorted out) we'd like to include it in the STS major and minor.

Let me know if you need anything else at this point.

David

Sent from my iPhone

On Nov 2, 2017, at 10:34 AM, D'Arms, Justin <[darms.1@osu.edu](mailto:darms.1@osu.edu)> wrote:

Hi David. Yes, I agree that is not a good numbering situation. We do plan to keep both courses. I will talk to the relevant parties, but I expect that we can renumber them to coordinate better with your course number, and that probably makes sense.

Justin

On Nov 1, 2017, at 3:01 PM, Horn, David <[horn.5@osu.edu](mailto:horn.5@osu.edu)>  
wrote:

Hi Justin,

Our UG committee is looking over the proposal for the new course on scientific controversies. We noticed that 2670 is the number we use for cross-listing Science and Religion (and we thought you did, too). Is there a reason you use 2860 instead? If you plan to keep both courses, we should probably try to eliminate any confusion and get the cross-listed course aligned.

David

## Brown, Michelle

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**From:** D'Arms, Justin  
**Sent:** Friday, November 10, 2017 7:55 AM  
**To:** Haddad, Deborah  
**Cc:** Brown, Michelle  
**Subject:** Re: Concurrence Needed for Philos 2670

Super! Thanks Deborah.

Sent from my iPhone

On Nov 9, 2017, at 8:09 PM, Haddad, Deborah <[haddad.2@osu.edu](mailto:haddad.2@osu.edu)> wrote:

Good evening, Justin,

I am happy to report that, on behalf of the NMS and SBS divisions of ASC, I concur with the approval and offering of the proposed course, Philosophy 2670.

Deborah

<image004.png>

**Deborah Haddad, PhD**

Assistant Dean, Curriculum, Undergrad Affairs

Social and Behavioral Sciences

Natural and Mathematical Sciences

ASC Data and Analysis

College of Arts and Sciences

114 University Hall, 230 North Oval Mall, Columbus, OH 43210

614.292.4435 Office / 614.247.7498 Fax

[Haddad.2@osu.edu](mailto:Haddad.2@osu.edu) [asc.osu.edu](http://asc.osu.edu)

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**From:** Haddad, Deborah  
**Sent:** Saturday, November 04, 2017 9:48 AM  
**To:** D'Arms, Justin <[darms.1@osu.edu](mailto:darms.1@osu.edu)>  
**Cc:** Brown, Michelle <[brown.930@osu.edu](mailto:brown.930@osu.edu)>  
**Subject:** RE: Concurrence Needed for Philos 2670

Justin,

I will survey the relevant departments and try to have an answer for you by the end of next week, if not before.

Deborah

<image003.png>

**Deborah Haddad, PhD**

Assistant Dean, Curriculum, Undergrad Affairs

Social and Behavioral Sciences

Natural and Mathematical Sciences

ASC Data and Analysis

College of Arts and Sciences

114 University Hall, 230 North Oval Mall, Columbus, OH 43210  
614.292.4435 Office / 614.247.7498 Fax  
[Haddad.2@osu.edu](mailto:Haddad.2@osu.edu) [asc.osu.edu](http://asc.osu.edu)

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**From:** D'Arms, Justin  
**Sent:** Friday, November 03, 2017 3:28 PM  
**To:** Haddad, Deborah <[haddad.2@osu.edu](mailto:haddad.2@osu.edu)>  
**Cc:** Brown, Michelle <[brown.930@osu.edu](mailto:brown.930@osu.edu)>  
**Subject:** Fwd: Concurrence Needed for Philos 2670

Dear Deborah,

Philosophy seeks concurrence from NMS and SBS for a new course taught by my colleague Chris Pincock: Phil 2670 Scientific Controversies. The syllabus is attached. Could you seek concurrence from whomever you think may need to review this in those division, please? (In order to keep things moving, we will assume that no objections if we do not hear back in the next couple of weeks.)

Thanks,

Justin

Justin D'Arms  
Professor and Chair  
Department of Philosophy  
Ohio State University  
350 University Hall  
230 North Oval Mall  
Columbus, OH 43201  
Phone (614) 292-7914  
Fax (614) 292-7502

## Philosophy Undergraduate Major Curriculum Map and List of Semester Courses for Major

Required Courses	Course Number	Course Title	Students Develop Critical Thinking about Philosophy	Students Read, Think about, and Write about the History of Philosophy	Students Read, Think, and Write about Topics in Contemporary Philosophy	Students Learn Formal Methods in Logic
(prerequisite)	2500	Symbolic Logic	B			B
	3000	Gateway Seminar	B			
(two of these required)	3210	History of Ancient Philosophy		I		
	3220	History of Medieval Philosophy		I		
	3230	History of 17 <sup>th</sup> Century Philosophy		I		
	3240	History of 18 <sup>th</sup> Century Philosophy		I		
	3250	History of 19 <sup>th</sup> Century Philosophy		I		
	3261	Fundamental Concepts of Existentialism		I		
(two of these required)	3300	Moral Philosophy	I	I	I	
	3530	Philosophy of Logic	I		I	I
	3600	Introduction to Philosophy of Language	I		I	
	3650	Philosophy of Science	I		I	
	3700	Introduction to Metaphysics	I		I	
	3750	Introduction to Theory of Knowledge	I		I	
	3800	Introduction to Philosophy of Mind	I		I	
	3810	Philosophy of Action	I		I	
(two of these required)	5193	Individual Studies	A	A	A	A
	5194	Group Studies	A	A	A	A
	5210	Studies in Ancient Philosophy	A	A		
	5211	Plato	A	A		
	5212	Aristotle	A	A		
	5220	Studies in Medieval Philosophy	A	A		
	5230	Studies in 17 <sup>th</sup> Century Philosophy	A	A		
	5240	Studies in 18 <sup>th</sup> Century Philosophy	A	A		
	5241	Kant	A	A		
	5250	Studies in 19 <sup>th</sup> Century Philosophy	A	A		
	5260	Studies in 20 <sup>th</sup> Century Philosophy	A	A		
	5261	Existentialism and Phenomenology	A	A		



	5263	American Philosophy	A	A		
	5300	Advanced Moral Philosophy	A		A	
	5310	Metaethics	A		A	
	5400	Advanced Political and Social Philosophy	A		A	
	5410	Advanced Philosophy of Law	A		A	
	5420	Philosophical Topics in Feminist Theory	A		A	
	5450	Advanced Aesthetic Theory	A		A	
	5460	Philosophy in Literature	A	A	A	
	5500	Advanced Symbolic Logic	A			A
	5510	Advanced Logical Theory	A			A
	5520	Inductive Logic and Probability Theory	A			A
	5530	Philosophy of Logic and Mathematics	A		A	
	5540	Theory of Rational Choice	A		A	A
	5550	Nonclassical Logic	A			A
	5600	Advanced Philosophy of Language	A		A	A
	5610	Natural Language Metaphysics	A		A	B
	5650	Advanced Philosophy of Science	A		A	
	5700	Advanced Metaphysics	A		A	
	5750	Advanced Theory of Knowledge	A		A	
	5797	Study at a Foreign Institution	A	A	A	A
	5800	Advanced Philosophy of Mind	A		A	
	5830	Advanced Philosophy of Cognitive Science	A		A	
	5840	Introduction to Cognitive Science	A		A	
	5850	Philosophy of Religion	A		A	
	5870	Topics in Jewish Philosophy	A	A	A	
	5891	Proseminar in Cognitive Science	A		A	
Elective Courses: Honors Program	Course Number	Course Title	Students Develop Critical Thinking about Philosophy	Students Read, Think, and Write about the History of Philosophy	Students Read, Think, and Write about Topics in Contemporary Philosophy	Students Learn Formal Methods in Logic
	2450H	Honors Philosophical Problems in the Arts	I		I	
	2470H	Honors Philosophy of Film	I		I	
	2900H	Freshman-Sophomore Proseminar	I	I	I	
	3341H	Ethical Conflicts in Health Care Research, Policy, and Practice	I	I	I	

	4900H	Junior-Senior Proseminar	A	A	A	
Elective Courses: General	Course Number	Course Title	Students Develop Critical Thinking about Philosophy	Students Read, Think, and Write about the History of Philosophy	Students Read, Think, and Write about Topics in Contemporary Philosophy	Students Learn Formal Methods in Logic
	2120	Asian Philosophies				
	2194	Group Studies				
	2340	The Future of Humanity				
	2342	Environmental Ethics				
	2400	Political and Social Philosophy				
	2450	Philosophical Problems in the Arts				
	2455	Philosophy Video Games				
	2465	Death and the Meaning of Life				
	2500	Symbolic Logic				
	2650	Introduction to the Philosophy of Science				
	2660	Metaphysics, Religion, and Magic in the Scientific Revolution				
	2680	Scientific Controversies				
	2850	Introduction to Philosophy of Religion				
	2860	Science and Religion				
	3111	Introduction to Jewish Philosophy				
	3120	Engaging Time: Philosophical and Rabbinic Dimensions of Temporality				
	3260	Movements in 20 <sup>th</sup> Century Philosophy				
	3262	Contemporary Continental Thought				
	3310	Morality and the Mind				
	3351	Judaism and Ethics				
	3410	Philosophical Problems in the Law				
	3420	Philosophical Perspectives on Issues of Gender				
	3430	The Philosophy of Sex and Love				
	3440	Theorizing Race				
	3680	Sex and Death: Introduction to the Philosophy of Biology				
	3820	Philosophy of Perception				
	3830	Consciousness				
	3870	Jewish Mysticism				
	5010S	Teaching Philosophy	A		A	

Total Required Hours: 30

Phil 2500; gateway seminar; two 3xxx history courses; two 3xxx systematic courses; two 5xxx courses, one additional course at or above the 2xxx level; and two additional courses at or above the 3xxx level.

B = Beginner Level

I = Intermediate Level

A = Advanced Level

Note that, when a course is permitted to have a range of contents (at the discretion of the instructor), the course has been marked as apt to satisfy the full permitted range of undergraduate educational goals.