

**PHILOSOPHY 155: The Philosophy of Science**

Grossmont College

Spring 2008

Tuesdays and Thursdays, 12:30 – 1:45

Location: Room #581, Section 6889

**INSTRUCTOR:** June Yang, PhD Instructor of Philosophy

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Office Hours: M: 2-3:30, T: 2-3, W: 2-3:30, R 2-3, and by appointment.

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**TEXTBOOKS:**

#1: Required: Theodore Schick, Jr., Readings in the Philosophy of Science: From Positivism to Postmodernism, Mayfield Publishing Co., 2000.

#2: Recommended: Brian Greene. The Fabric of the Cosmos: Space, Time, and the Texture of Reality, Alfred A. Knopf (publisher), 2004.

**BLACKBOARD:** All students are required to check Blackboard regularly. Blackboard is a web site affiliated with our course. Go to <http://bb.gcccd.net/> and sign in. Your user name is firstnamelastname and your password is your birthday (MMDDYY). You will find critical information there that will aid in your success in this course. You must log in and change your email address as soon as possible.

**COURSE DESCRIPTION:**

“Philosophy of science is a branch of epistemology (theory of knowledge) which deals with the truths of science. As a theory of knowledge it asks what it means for a theory to be ‘true’, and how does science yield knowledge? It is an investigation into the nature and methods of scientific reasoning, in order to evaluate the truth claims of science. It also forces us to distinguish between scientific and non-scientific methodology.” (Grossmont College Catalogue 2007-2008 245).

**COURSE OBJECTIVES:**

The course objectives are three-fold: (1) to acquire knowledge of traditional and contemporary approaches of the interpretation of science (2) to consider the demarcation between science and non-science and (3) to consider particularly essential topics in the philosophy of science.

**COURSE CALENDAR (topics and important dates included):**

(Do not be concerned if we fall forward or behind on this schedule. What is important is that everyone understand the concepts involved.)

**Week 1:** Jan 29: Syllabus, Policies, Introductions.

Important Terminology. General Overview of the History of Philosophy of Science in the 20<sup>th</sup> Century.

Recommended: “General Introduction,” Schick.

Jan 31: Science is a Religion.

Required: pp. 315-318, “Science and Myth,” Paul Feyerabend.

**Week 2:** Feb 5: Science is not a Religion.

Required: pp. 318-322, “Is Science a Religion?” Richard Dawkins.

Discussion of Intelligible Design Theory. How do you judge?

Feb 7: Science requires Religion.

Required: pp. 322-336, “When Faith and Reason Clash: Evolution and the Bible,” Alvin Plantinga.

**Week 3:** Feb 12: Science does not need Religion.

Conclude Plantinga,

Required: pp. 337-348. "Theistic Science is not Science" McMullin.

Feb 14: The Limits of Scientific Explanation.

Required: pp. 348-358. Peter Atkins vs. Martin Gardner.

**Week 4:** Feb 19: Catch-Up and Discussion Day.

Feb 21: **Midterm #1.**

**Week 5:** Feb 26: The Classical Conception of Science and Propositions.

Induction vs. Deduction.

Required: pp. 35-37, Schick.

Feb 28: Problems with the Classical Conception.

What are the observable facts?

Required: pp. 166-167, "The Methodological Character of Theoretical Concepts," Rudolf Carnap.

Required: pp. 175-181, "Observation," N.R. Hanson.

**Week 6:** Mar 4: Facts are Socially Constructed.

Required: pp. 201-207, "The Social Construction of Scientific Facts," Latour and Woolgar.

Mar 6: Meaning Depends on Theory.

Vehicles of Truth: Wholes or Sentences? The Underdetermination of Theories.

Required: pp. 53-57, "Physical Theory and Experiment," Pierre Duhem.

**Week 7:** Mar 11: Conclude Consideration of Underdetermination, and consider the Quine-Duhem Thesis.

Required: pp. 167-174, "Is there an Independent Observation Language?"

Mary Hesse.

Mar 13: Continue Hesse.

**Spring Break: March 17-21**

**Week 8:** Mar 25: Conclude Hesse. Catch-Up Day.

Mar 27: Theory Applied: Parapsychology.

Required: pp. 183-190, "The Structure of Scientific Revolutions," Thomas Kuhn.

Recommended: pp. 13-19, "Logic of Discovery or Psychology of Research?" Kuhn.

Required: pp. 387-388, "Parapsychology during the Last Quarter Century," Robert Touless.

**Week 9:** Apr 1: Theory Applied: Parapsychology Continued.

Required: pp. 389-392, "Parapsychology: Pre-Paradigm Science?" Radner & Radner.

Apr 3: **Midterm #2.**

**Week 10:** Apr 8: Begin Laypersons' Considerations of General Relativity.

Review of Classical Physics. The Nature of Light.

Recommended: Preface, pp. 3-64, Greene.

**Essay Topics Distributed.**

Apr 10: Continue Einstein's Revolution.

Recommended: pp. 65-76, 127-142, Greene.

**Week 11:** Apr 15: Conclude Relativity, begin Guest Lectures on Quantum Mechanics.

Recommended: pp. 77-123, Greene.

Apr 17: Continue Guest Lectures. Consider Philosophical Implications.

Recommended: pp. 177-216, Greene.

**Week 12:** Apr 22: Philosophy of Physics: Do the Terms Refer?

Required: pp. 362-365, "Bell's Theorem and Psychic Phenomena," Guy Vandegrift.

Apr 24: Conclude Vandegrift.

**Week 13:** Apr 29: Philosophy of Physics continued.

Required: pp. 366-369, "The Unconscious Quantum," Victor J. Stenger.

May 1: Conclude Stenger. Conclude Philosophy of Physics.

**Week 14:** May 6: **Investigations Day. Visitation to the Creation Science Institute.**

May 8: Open Season Day: What do you Think?

**Week 15:** May 13: The Realism vs. Instrumentalism Debate.

Required: pp. 260-266. "The Ontological Status of Theoretical Entities" Grover Maxwell.

May 15: Do Experiments Reveal Real Things?

Required: pp. 247-260, Ian Hacking's "Experimentation and Scientific Realism."

**Week 16:** May 20: Conclude this Debate.

If time, consider the Natural Ontological Attitude.

May 22: Conclusions.

**Finals Week:** The Final will be administered on Thursday, May 29, from 11:30 AM-1:30 PM.

The Final Exam will be cumulative in a certain sense. As will become clear, the study of philosophy is cumulative, similar to mathematics or languages. **Essays Due.**

#### **STUDENT EVALUATION:**

Grading:	10% Midterm Examination	A: 90-100 %
	15% Midterm Examination	B: 80-89 %
	20% Investigations Essay.	C: 70-79 %
	15% Final Examination	D: 60-69 %
	20% Homework	F: <59 %
	20% Comprehension Exams	

#### **ACADEMIC POLICIES:**

**No late work is accepted. Students may make up exams only in the case of a documentable emergency.**

**Electronic Devices are not allowed in class. They must be turned off and out of sight. This includes cell phones and all text-messaging devices. You will be asked to leave if you use these in class.**

**Student Responsibility to Drop/Withdraw:** It is the student's responsibility to officially add, drop, or withdraw from the course. Failure to do so can result in a failing grade.

**Class Attendance:** A student may be disenrolled from the course after three absences; however, a student will be disenrolled from the course after five absences *without exception*.

**Tardiness/Early Departure:** If a student arrives unreasonably late or leaves early without notifying the instructor before the event, then that student will be considered absent for that class session.

**Professionalism:** It is assumed that students will conduct themselves in a professional manner with a positive attitude. An open mind is one of the most important tools required for success in academia.

**Student Code of Ethics and Conduct:** Students must abide by the Student Code of Conduct published in the *Grossmont College Catalogue 2007-2008*. Students who obstruct the instructor's ability to convey knowledge, or disrupt their fellow students' ability to learn, will be dealt with under the terms delineated in the Grossmont College Student Code of Conduct. Such dealings may include, but are not limited to, verbal and written warnings, written reprimands, disciplinary probations, instructor-initiated suspensions, terminations of financial aid, short or long-term suspensions from campus, and temporary or permanent expulsions. These consequences are serious and can easily be avoided.

Examples of disruptive activities that cannot be tolerated are: repeated cell phone ringing, repeatedly falling asleep in class, excessive talking, passing of notes, entering and leaving class several times during a session, verbal rudeness directed towards the instructor and/or other students, and non-verbal rudeness directed towards the instructor and/or other students.

This instructor is charged with maintaining a positive learning experience for all students in this course, and that responsibility is a serious one. Disruptive behavior will not be tolerated in this course.

Plagiarism will result in the student's being dropped from the course, and the appropriate administrative authorities will be contacted. It is the student's responsibility to know what constitutes plagiarism.

### **TEN TIPS FOR SUCCESS IN THIS COURSE:**

1. Be optimistic about your ability to learn from the textbooks, the instructor, and each other.
2. Attend because this is the only way to attain the quality of work required to succeed in this course.
3. Do all assigned reading, even if you do not understand it.
4. If you find you fall behind in your understanding, contact the instructor.
5. Be prepared to spend at least two hours per hour spent in class in order to master this material. If you do not, you probably will not receive a B or A grade, although you might pass.
6. Have confidence in your ability to do the work.
7. Use all resources at your disposal.
8. Remember that you are gifted with more education than many persons on this planet. If you try, you are sure to get it, or at least most of it!
9. Remember that we are all here to learn. Making mistakes is an important part of learning. **VERY IMPORTANT!**
10. Remember that you are being trained, or acquiring a skill. Studying, like anything else, is a craft, i.e. an activity. No one is born a good student, we must all transform ourselves into excellent students.

### **Tutoring Referral:**

Students are referred to enroll in the following supervised tutoring courses if the service indicated will assist them in achieving or reinforcing the learning objectives of this course:

- IDS 198, Supervised Tutoring to receive tutoring in general computer applications in the Tech Mall;
- English 198W, Supervised Tutoring for assistance in the English Writing Center (Room 70-119); and /or
- IDS 198T, Supervised Tutoring to receive one-on-one tutoring in academic subjects in the Tutoring Center (Room 70-229, 644-7387).

To add any of these courses, students may obtain Add Codes at the Information/Registration Desk in the Tech Mall. All Supervised Tutoring courses are non-credit/non-fee. However, when a student registers for a supervised tutoring course, and has no other classes, the student will be charged the usual health fee.

**Announcement:** Students with disabilities who may need accommodations in this class are encouraged to notify the instructor and contact Disabled Student Services & Programs (DSP&S) early in the semester so

that reasonable accommodations may be implemented as soon as possible. Students may contact DSP&S in person in Room 110 or by phone at (619) 644-7112 or (619) 644-7119 (TTY for Deaf).