PHIL 251 Modern Physics and
STV 254 Moral Responsibility
TTh 11:00–12:15
DeBartolo 240

Spring 2005

Prof. Don Howard
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Office Hours: TTh 1:00–2:00

Texts: Michael Frayn. *Copenhagen.* New York: Anchor, 2000.
Robert Jungk. *Brighter than a Thousand Suns: A Personal History of Atomic Scientists.* New York: Harcourt Brace, 1970.
Russell McCormmach. *Night Thoughts of a Classical Physicist.* Cambridge, MA: Harvard University Press, 1991.
Sylvan S. Schweber. *In the Shadow of the Bomb: Bethe, Oppenheimer, and the Moral Responsibility of the Scientist.* Princeton, NJ: Princeton University Press, 2000.
C.P. Snow. *The Two Cultures.* Cambridge: Cambridge University Press, 1993.

Requirements: There will be three components in the computation of your final grade for the course:

(1) ***Discussion Papers*** (60 %). Each student will be required to submit four discussion papers, each a minimum of five pages, on topics to be worked out in consultation with the instructor. Each of the four discussion papers will be worth 15 % of the final course grade. Papers will be graded on the basis of both content and mechanics, the latter counting for approximately 20% of the grade on each paper.

(3) ***Journals*** (25 %). You will be required to keep a journal to be used primarily to record your critical reactions to the assigned readings. At a minimum, you should write a one-page (minimum 300 words) critical response to each reading assignment, though you are encouraged to write more, taking advantage of this opportunity to record your thoughts on any topic related to the course and the readings. Journal entries will be collected on a random, unannounced basis eight times over the course of the semester. In addition, the entire journal will be collected at mid-term and at the end of the semester so that I might check to be sure that all required entries are included. To facilitate the collection of journal entries, you will be asked to keep the journal in some kind of loose-leaf or ring binder. Also, you should get in the habit of bringing the journal with you to class every day, so that you will be ready with your journal entry on the days when I collect journal entries. You will be graded rigorously on the extent to which you use your journal, the minimum of one page (300 words) per reading being strictly enforced. But it will be the quality of thinking manifest in your journal that will chiefly determine your grade.

(4) ***Class Participation*** (15 %). The remaining fifteen percent of your final grade will be determined on the basis of the quality and extent of your enthusiastic and constructive participation in class discussion.

One-minute Papers: Every class session will end a few minutes early to permit you to write a so-called "one-minute paper," in which you will write no more than two- or three-sentence answers to two questions: (a) What was the most important point covered in today's class? (b) What issue or question was left most unclear in your mind at the end of today's class? These one-minute papers will be required of every student at the end of every class session and will be collected at the end of class, but they will not be graded.

Attendance: No more than two unexcused absences will be permitted during the semester; for every additional unexcused absence, the student's final course grade will be reduced by one step on a plus/minus basis. Thus, for example, for a student with three unexcused absences, a final grade of B+ becomes a B, and for a student with four unexcused absences, a final grade of B becomes a C+. A student more than fifteen minutes late for class is assumed to be absent. If you must miss a class for any reason, be sure to let me know beforehand, or as soon after the fact as possible, so as to enable me to determine whether or not to excuse the absence. I promise to be generous in allowing excused absences for legitimate purposes.

Schedule:

Date:	**Topic:**	**Readings:**
11 Jan.	Introduction to the Course	
	The Classical World View and the Revolutions in Physics in the Twentieth Century	
13 Jan.	Mechanics, Thermodynamics, and Electrodynamics in the 19th Century	
18 Jan.	"The Town" and "The Study"	McCormmach, 1–50.
20 Jan.	Relativity and Quantum Mechanics in the 20th Century	
25 Jan.	"The Institute" and "The World City"	McCormmach, 51–121.
27 Jan.	"The World" and "The Mountains"	McCormmach, 122–157.
28 Jan.	**(First Discussion Paper Due)**	
	The Atomic Bomb and Its Aftermath	
1 Feb.	Physics between Two Wars	Jungk, pp. 3–28.
3 Feb.	Politics and the Discovery of Fission	Jungk, pp. 29–70.
8 Feb.	The Manhattan Project	Jungk, pp. 71–123.
10 Feb.	J. Robert Oppenheimer	Jungk, pp. 124–155.
15 Feb.	What Did the Germans Know?	Jungk, pp. 156–170.
17 Feb.	Early Opposition	Jungk, pp. 171–190.
22 Feb.	Dropping the Bomb	Jungk, pp. 191–220.
24 Feb.	The Postwar Campaign	Jungk, pp. 221–259.
1 Mar.	The Russian Bomb and the H-Bomb	Jungk, pp. 260–312.
3 Mar.	Oppenheimer and McCarthy	Jungk, pp. 313–341.
4 Mar.	**(Second Discussion Paper Due)**	

Date:	Topic:	Readings:
7-11 Mar.	**Spring Break**	
	The Sciences and the Humanities	
15 Mar.	The Two Cultures	Snow, pp. 1–52.
17 Mar.	A Second Look	Snow, pp. 53–100.
22 Mar.		
24 Mar.	***Copenhagen***	Frayn, pp. 3–94.
29 Mar.	Postscript: Heisenberg and the Bomb	Frayn, pp. 95–132.
31 Mar.		
1 Apr.	**(Third Discussion Paper Due)**	
	The Moral Responsibility of the Scientist	
5 Apr.	What is Englightenment?	Schweber, pp. 3–41.
7 Apr.	J. Robert Oppenheimer	Schweber, pp. 42–75.
12 Apr.	Hans Bethe	Schweber, pp. 76–114.
14 Apr.	The Challenge of McCarthyism	Schweber, pp. 115–148.
19 Apr.	Nuclear Weapons	Schweber, pp. 149–177.
21 Apr.	On Science and Society	Schweber, pp. 178–186.
26 Apr.		
2 May	**(Fourth Discussion Paper Due)**	