GST 1990:
Science and Technology Group Directed Study:
Science and Religion

Section 985 (Call # 95238); Section 987 (Call # 98348) 2 credit
Section 986 (Call # 93654); Section 988 (Call # 92098) 4 credit

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Course Description:
This course is a directed study attached to *GST 2420: Atoms and Stars: A Historical Introduction to Astronomy, Physics, and the Process of Scientific Discovery*. You must take and complete *Atoms and Stars* while taking the directed study. We will explore the theme, "Science and Religion," building upon our study of scientific practice and history in *Atoms and Stars*, completing additional readings and assignments.

Important note:
Directed studies courses require you to work on your own continuously throughout the semester. You should already possess good reading, writing, and study skills. You will be required to participate in the online computer conference on Science and Religion. We will meet occasionally as a group after *Atoms and Stars* classes to see how you are doing. In addition, you are strongly encouraged to take advantage of office hours and to maintain frequent contact with me through e-mail or phone. Set aside as many hours for the directed study as you would for a comparable course of the same level and credit hours. The deadlines given below will be strictly enforced.

Requirements:
Students taking the four credit version should read all assigned readings, while those taking the two credit version will read only those readings without an asterisk (*) next to it. Four credit students will write three essays (4-5 pp. each), while two credit students will write two essays (2-3 pp. each: Essays 1 and 3). Confusion will be avoided if you remember that all readings and assignments marked with an asterisk (*) are *additional* assignments; all readings and assignments without an asterisk are common to all students. I will be happy to

look at drafts of essays but require at least a week to provide feedback. Rewrites are possible: please see me first, however. All rewrites must be accompanied by original graded paper.

All students will be required to participate in the online computer conference on Science and Religion. Your participation online will constitute the class participation component of your final grade. You should post at least one or two messages each week, engaging the issues raised by the reading. You should state what aspect of the reading you are questioning, developing, or supporting, how it relates to our theme, and your own arguments regarding the theme. You should generally touch base with all the readings assigned for that week, but your overall discussion should be directed towards exploring these issues with your classmates. Remember that not everyone in the computer conference will have read all the readings, so explain what you are developing from the reading clearly and succinctly enough that they can follow your point. Avoid a complete summary or lengthy commentary. Generally, online posts work best if limited to a couple of "screenfuls" per post. Work on engaging fellow participants in friendly discussion; don't just ask questions for the teacher. I will chime in now and again, but the discussion is yours.

While online, I ask that you pay attention to what rhetoricians call "ethos." Ethos refers to the need to engage your audience where they are and to create a willingness in them to take your arguments seriously. In other words, you should not assume that everyone is Christian, a believer, a nonbeliever, etc. Arguments to those not sharing crucial assumptions you make are harder, require more patience and reasoning intended to reach where they are, and not preaching or flaming. You could certainly appeal to your own experience to illuminate how your own religious tradition relates faith and reason, for example, but stating that you believe something because it is your faith is not itself an argument: it does not reach anyone who does not already agree with you. Moreover, many Americans treat faith as a personal matter and may resent efforts by participants to impose their views on others. Likewise, dismissing all religion as misguided, blind faith ignores important nuances in the way religious traditions relate themselves to science. Anyone seeking a scientific understanding of science/religion will need to avoid dogmatism and bad generalizations. There is no need to make your views public if you are uncomfortable doing so; what matters is that you make your own reasoned arguments and engage those of others fairly. The topic under debate is not what religion (or science) we should follow, but how science and religion have been related and how they could or should be.

As we can see from the reading, it is possible for this issue to be debated without reducing everything to a contest of personal views: Gould, an agnostic, argues that science and religion are compatible, while Barbour, a theologian and physicist, outlines different models for their interaction, even while favoring some over others. Many of the historians we read seek to understand how the society and culture of a given time shaped how science and religion interacted. Since these periods are different from our own, we can get some critical perspective on how science and religion work as institutions and forms of knowledge. We will read some pieces that will seem dogmatic or poorly argued to many. Of course, you are under no obligation to agree with them. As a reader, the point about ethos is inverted: you can ask what audience the author presupposes and how well he or she reaches their audience. Aside from condemning or endorsing these views, we can ask what they tell us about the historical context in which they wrote or how the question of science's relationship with religion has evolved over time. Can you place your self, even if for a

moment, within the author's ethos and imagine why people might believe that? If you can, your understanding of your own time and culture may be enhanced. You will also better be able to engage different views in argument without losing sight of the people behind them.

Grades (*4 credit*):

Participation: 25%
Essay 1: 25%
Essay 2: 25%
Essay 3: 25%

Grades (2 *credit*):

Participation: 1/3
Essay 1: 1/3
Essay 3: 1/3

Important Note:

Any plagiarism or cheating will result in an F for the course and referral to the university for further sanctions. In writing your essays, you should remember to write on the topic *in your own words*. Copying text or closely paraphrasing from another writing or internet source is not allowed. If you use an idea borrowed from another source, you must give a complete citation of the source used. Tests also require you to answer in your own words. Tests are to be taken without use of notes or reading.

*** Note: Asterisk indicates additional requirement for students taking four credits.**

Required Books (available at campus bookstore and Marwill's):

Stephen Jay Gould, Rocks of Ages: Science and Religion in the Fullness of Life (New York: Ballantine, 1999)

Ian G. Barbour, When Science Meets Religion (New York: Harper, 2000)

*David C. Lindberg and Ronald L. Numbers, God and Nature: Historical Essays on the Encounter between Christianity and Science (Berkeley: University of California Press, 1986)

Additional readings to be assigned.

Schedule:

Week 2	**Introduction**
(Sept. 10-14)	Meet after Atoms and Stars to go over syllabus.
	Recommended: Attend David Bowen's seminar on online conferencing, Friday, Sept. 14, 113 Rackham

Week 3 (Sept. 17-21)

Ways of relating science and religion

Gould, Rocks of Ages, ch. 1 (**Note:** chapters have multiple sections, chapter 1 includes pp. 1-45)

Barbour, When Science Meets Religion, preface, introduction, and pp. 1-38

An introduction to the topic by two different authors we will read throughout the semester. Gould, an agnostic, paleontologist, and historian of science, believes the integrity of both religion and science are best preserved when they maintain distinct, non-overlapping areas of expertise. Barbour, a physicist and theologian, details a number of different ways of relating science and religion.

Week 4 (Sept. 24-28)

Are Science and Religion Separate?

Gould, Rocks of Ages, ch. 2 (pp. 47-95)

* David C. Lindberg, "Science and the Early Church" in Lindberg and Numbers, God and Nature, ch. 1.

Gould develops his principle of NOMA (Non-Overlapping Magisteria). Lindberg discusses the early Catholic Church's attitude towards empirical science, often held to have impeded science's development.

Week 5 (Oct. 1-5)

Galileo and the Church

Galileo, "Letter to Madame Christina of Lorraine, Grand Duchess of Tuscany, Concerning the Use of Biblical Quotations in Matters of Science" (1615) in Discoveries and Opinions of Galileo, Stillman Drake, trans. (New York: Doubleday, 1957), 173-216.

Cardinal Bellarmine to Foscarini (12 April 1615), Sentence (22 June 1633), and Galileo's Abjuration (22 June 1633) in Maurice A. Finocchiaro, ed., The Galileo Affair: A Documentary History (Berkeley: University of California Press, 1989), pp. 67-69, 287-93.

*Robert S. Westman, "The Copernicans and the Churches" in Lindberg and Numbers, God and Nature, ch. 3.

Galileo's famous letter argues for the need to reinterpret Catholic Church doctrine in keeping with new scientific knowledge (Copernicanism). Galileo believes this approach is not only good for science but also good for faith. Cardinal Bellarmine outlines the Church's view leading to the 1616 edict rejecting Copernicanism as heretical (for violating church doctrine and conflicting with certain biblical passages) but allowing discussion as a "hypothesis." Following the publication of his Dialogue

Concerning the Two Chief World Systems, Ptolemaic and Copernican (1632),Galileo is tried for heresy, convicted, and sentenced to house arrest. Westman gives a good history of the background of this episode in a Europe fighting over religion (Catholic versus Protestant).

Week 6 (Oct. 8-12)

Astronomy, Cosmology, and Religion

Barbour, When Science Meets Religion, ch. 2

*William R. Shea, "Galileo and the Church" in Lindberg and Numbers, God and Nature, ch. 4

Shea provides a historical treatment of the conflict between Galileo and the Church. Astronomy often impinges upon religious doctrine when it considers cosmology (the study of the universe as a whole). Barbour considers the Big Bang theory and different interpretations with different implications for religious belief.

ESSAY 1 due: Compare Gould's views on the relationship between science and religion with those of Barbour. Where do they agree and where do they disagree? What other possible positions do they consider? Which view best makes sense of the historical case of Copernicanism and Galileo? Where do Galileo and the Church fit into the schemes outlined by Gould and Barbour? How do you think the dispute should have been resolved? Why did the dispute occur as it did? (4-5 pp., 4 credit; 2-3 pp., 2 credit).

Week 7 (Oct. 15-19)

Religion Spurs Science; Science spurns Religion

*Charles Webster, "Puritanism, Separatism, and Science" in Lindberg and Numbers, God and Nature, ch. 7

Richard Olson, "The Religious Implications of Newtonian Science" in *idem*, Science Deified and Science Defied: The Historical Significance of Science in Western Culture, 2 vols. (Berkeley: University of California Press), II, 87-93, 110-39.

Webster in the most historically sophisticated proponent of the thesis that Puritanism advanced (English) science, the "Merton thesis." (Robert Merton borrowed this idea from Max Weber who also connected Puritanism to the emergence of capitalism.) Olson shows how Newton's religiously motivated science ended up contributing, ironically, to the development of deism (a view with only a detached, clockmaker God) and irreligion.

Week 8 (Oct. 22-26)

Warfare between Science and Religion?

*John Hedley Brooke, "Science and Theology in the Enlightenment" in W. Mark Richardson and Wesley J. Wildman, Religion and Science: History, Method, Dialogue (New York: Routledge, 1996), 7-27.

*A. Hunter Dupree, "Christianity and the Scientific Community in the Age of Darwin" in Lindberg and Numbers, God and Nature, ch. 14

Gould, Rocks of Ages, ch. 3 (pp. 97-170)

Brooke provides an up-to-date account of theology in the eighteenth-century enlightenment, when the success of natural science led many to declare that reason would overcome superstition and reform society. Dupree puts the conflict between Darwin and Christianity in the larger context of the nineteenth century scientific community. Gould diagnoses modern creationism as a violation of NOMA.

Week 9 (Oct. 29-Nov. 2)

Evolution and Design

Barbour, When Science Meets Religion, ch. 4

*Ronald L. Numbers, "The Creationists" in Lindberg and Numbers, God and Nature, ch. 16

Numbers gives a history of young-earth creationism in the twentieth century. Even if creationism's strict biblical literalism is rejected, there are other possibilities for proponents of design. Barbour explores these more nuanced, if no less heated, contemporary debates.

Week 10

(Nov. 5-9)

(Social) Science Explains Religion 1: Religion as Ideology or Illusion

Karl Marx, "Theses on Feuerbach" (1845) and Friedrich Engels, "On Morality" (1878) in Robert Tucker, ed., the Marx-Engels Reader, 2nd ed. (New York: W. W. Norton, 1978), pp. 143-45, 725-27

Sigmund Freud, The Future of an Illusion (London: Hogarth Press, 1934), chs. *5-8, 10 (2 credit students read only ch. 10, 4 credit: 5-8, 10)

Two different attempts at a scientific explanation of religion. Marx and Engels see religion and moral doctrines as reflecting the necessities of the ruling class at any particular period in history. Freud sees religion as a compensation for helplessness learned as a child. While Marxism and psychoanalysis still have many followers, these fields are highly controversial, leading many to withhold the honorific "scientific."

Many critics argue that these fields function more as religions than sciences, further complicating our assessment of these attempts to expose religion as ideology or illusion.

***ESSAY II: TBA**

Week 11 (Nov. 12-16)

Social Science Explains Religion 2: Modernity, Disenchantment, and Postmodernity

Max Weber, "The Origins of Industrial Capitalism in Europe" (1922) in W. G. Runciman, ed., Weber: Selections in Translation (Cambridge: Cambridge University Press, 1978), pp. 331-40

*Vincent Descombes, "The Demystification of the World" in *idem*, The Barometer of Modern Reason: On the Philosophies of Current Events (New York: Oxford University Press, 1993)

Weber argues that all aspects of culture in the modern West are increasingly subject to rationalization, calculation, and bureaucratization. While this transformation was launched in part by religious ideas, nature is in turn "disenchanted" as religious explanation of personal fortune is displaced by rational science. Descombes is a contemporary philosopher who introduces a "postmodern" challenge to Weber's influential ideas. He asks what it means to describe other culture's beliefs as rational or irrational. Is the modern world really more rational and less mythical than all other societies? Or is this view our society's founding myth? His is a dense, analytical style that requires close reading, though it is leavened by illustrative examples. He develops Lyotard's concept of a differend*: an undecidable conflict where each side sees the other as completely wrong: embrace revolution or suffer reactionary superstition, preserve tradition or be trampled by despots speaking in the name of reason. Is the modern world closer to Weber's world, where a cold reason will prevail, or to Descombes', where we must learn to get along without agreeing and the biggest despots speak in the name of reason?*

Week 12 (Nov. 19-21)

Social Science Explains Religion 3: Religion as Social Cement

Emile Durkheim, The Elementary Forms of Religious Life (New York: Free Press, 1995; first published 1912), pp. 418-33.

Durkheim, unlike Marx or Freud, does not consider religion an "illusion" or "ideology" that must be overcome, but the basis of our entire conceptual apparatus. Our way of thinking is rooted in religion, which in turn is a collective representation reflecting our society. Durkheim provides the pattern for all interpretive social science that aims to understand human activity and thought as culturally meaningful. Science itself is created out of religion, as a successor to religion in some but not all matters. Religion itself is expected to evolve, constrained by science but continually responsive to the social needs that gave rise to it. As sensitive as he tries to be, the approach remains controversial. Modern sociologists of science have followed Durkheim by explaining the social needs that condition science's *collective representations. Often, scientists have been as outraged by social explanation of science as the religious have been by explanations of religion.*

Week 13 (Nov. 26-Nov. 30)

Materialism and the Self

Barbour, When Science Meets Religion, ch. 5

*Philip E. Johnson, Objections Sustained: Subversive Essays on Evolution, Law and Culture (Downers Grove, Illinois: InterVarsity Press, 1998), chs. 1, 7

Does science require a commitment to materialism, the idea that the behavior of the material world is sufficient to explain everything, including life and intelligence? Barbour examines how biology increasingly challenges our sense of self. Johnson represents a new breed of creationist who is less concerned with biblical literalism than with restoring design to creation and attacking Darwinian materialism as "a new priesthood." Johnson exploits historical examination of Darwin's motives and disagreements among contemporary Darwinians to make his case.

Week 14 (Dec. 3- 7)

Final Thoughts

Gould, Rocks of Ages, ch. 4 (171-22)

Barbour, When Science Meets Religion, ch. 6

ESSAY 3 due: TBA