COSMOLOGY AND CREATION

Course Number: ISSI 479

Institution: Monmouth College

Instructor: Dr. Rajkumar Ambrose

Course Objective: A major objective of this course is to explore possible answers to the questions, "Where do we come from?", "What is our place in this universe?" and "What is our final destiny?". In the process of so doing, students will be encouraged to consider several theories of the universe - classical models, biblical doctrines and arguments, scientific theories based on compiled data, and a variety of western and eastern concepts. The course will also attempt to acquaint students with scientific methods used to address these weighty issues and balance them with theological considerations and philosophical systems, and see that these modes of inquiry can work **with** and not necessarily **against** each other.

Goals:

i. To gain a clear understanding of Cosmology, including its historical, theological, philosophical and scientific perspectives.

ii. To gain a clear understanding of Creation and Evolution, both in their religious and scientific dimensions.

iii. To explore the relation between science and religion through the study of Cosmology and Creation.

iv. To explore the worldview created by modern Cosmology and see how we can relate to it meaningfully and gain a global perspective in life.

COURSE OUTLINE

Introductory Note: Cosmology is the study of the origin, evolution and structure of the observable physical universe. We cannot deal with the evolution of the universe by simply describing what happens to each part; we must consider the universe as a unique whole. It is rarely clear in cosmological research and discussion just where strictly scientific analysis ends and philosophical or theological reflection begins. It is now accepted that cosmology as a discipline, with its own emerging questions, methods and analyses, has important implications for theology and philosophy. The uniting factor in this course is in our effort to deal with the universe as a whole, and in exploring the place and role of humanity in this vast universe.

Note: Some parts of the following syllabus will be covered through guest lectures and student presentations.

I. Introduction

(a) What is Cosmology?

i. Cosmology as a discipline - its goals - its present status and direction - basic assumptions.

ii. Methods of scientific inquiry and limits of verification in cosmology.

iii. Is cosmology a myth or science?

(b) An overview of the universe based on our current knowledge

(Slides and videos will be used to get a glimpse at our magnificent universe with its planets, stars, galaxies, white dwarfs, red giants, pulsars, quasars etc.)

II. (a) Methods and Theories in Scientific and Religious Enquiry

i. Basic definitions - Realism, Idealism, Rationalism, Empiricism, Reductionism, Inductivism, etc.

ii. Theories, Creeds, Experience

iii. Models, Patterns, Paradigms

(b) Basic Models in Relating Science and Religion

i. Ian Barbour's four conceptual models

ii. The mediating role of philosophy

III. From Babylonian Myth to Modern Science - A Brief History of Cosmology (Mostly in the Western Traditions)

(a) Early developments in cosmology

i. Babylonian mythology - *Enuma Elish*

ii. Ionian and Pythogorean contributions - Emphasis on physical and mathematical concepts - Thales, Anaximander, and Anaximenes

iii. Atomists and the infinite universe - Democritus and Lucretius

(b) Classical period - A geocentric and finite universe

i. Plato - Timaeus - Idealistic and temporal approach

ii. Aristotle - On The Heavens - Realistic and eternal approach

iii. Ptolemy - The Almagest - An Egyptian treatise, accepted in Christian and Islamic traditions for 1400 years

(c) Medieval Cosmology (Early Christian era to the middle ages)

Construction of a Christian world view taking into account Greek and Biblical Cosmology and Patristic teaching. Three Streams:

i. Condemnation of Greek thought, and a literal interpretation of the scriptures - Lactantius

ii. Patristic era - Ambrose, Augustine and Gregory of Nyasa

iii. Thomas Aquinas - Theologically Christian and cosmologically Aristotelian and Ptolemic worldview - Epistemology based on reason and revelation

At the end of this period, Scholasticism achieved an almost perfect synthesis of cosmology and theology - An ordered, hierarchic, organic, geocentric and anthropocentric worldview dominated cosmology for the next three centuries

(d) The Copernican revolution and its aftermath

1.Cosmological Developments:

i. Nicolaus Copernicus and his heliocentric model

ii. Johannes Kepler and the elliptical orbits

iii. Galileo Galilei and the beginning of observational astronomy

iv. Isaac Newton and the mechanistic universe

2. Theological Developments:

Church's reluctance to accept the new cosmology - Condemnation of Galileo - Theology parts ways with Cosmology

3. Philosophical Developments:

i. Rene Descartes - Metaphysical dualism

ii. Immanuel Kant - "The starry heavens above and the moral law within"

iii. Karl Barth - Protestant Neoorthodoxy

iv. Alfred North Whitehead - Process and Reality

(e) Evolutionary and Quantum/Relativistic Cosmology

i. Scientific discoveries radically change the existing worldview:

Charles Darwin - On the Origin of Species

Albert Einstein - General theory of relativity

Planck, Bohr, Schrodinger etc. - Quantum Mechanics

Werner Heisenberg - The uncertainty principle

Louis DeBroglie - Wave nature of matter

Edwin Hubble - Theory of the expanding universe

Fred Hoyle - Steady state theory

Stephen Hawking - Quantum Cosmology

Discovery of the primordial microwave radiation

Particle physicists drive towards the moment of creation

ii. Recent developments:

Discovery of "dark matter" in the universe

Hubble Space Telescope looks deep into space

COBE's discovery of tiny fluctuations in the cosmic microwave background.

Galileo space probe reaches Jupiter

Discovery of planets around nearby stars

IV. Cosmological Contributions of an Eastern Religion - An Alternate Worldview

(a) Hindu Cosmology

i. Early Vedic Cosmology - Pantheistic trends

ii. Upanishadic Cosmology - Advaita, Visishtadvaita and Dvaita concepts

iii. Medieval Puranic Cosmology - Cosmic cycle and the doctrine of transmigration

V. God, Creation and Cosmology

(a) Biblical account of creation in Genesis 1 and 2

i. Interpretation of the creation narratives

ii. The theology of the Priestly and Jahwist accounts

(b) Creation in Prophecy and Psalms

(c) Creation in other religions

(d) Theory of Evolution - Recent successes and challenges

(e) Creation versus Evolution

(f) Cosmology and Creation

i. The concept of evolving universe

ii. What does modern cosmology say about creation?

iii. Do cosmology and creation imply a Creator?

VI. Cosmology, Philosophy and Theology

(a) How should cosmology relate to theology?

i. The moment of creation - the t=0 problem

ii. Concept of time and space

iii. *Creatio ex nihilo* and *creatio continua*

iv. Anthropic principles - Design arguments

v. Chance and necessity

vi. Eschatology

(b) Ethical and Environmental Issues

i. Being created in the "image of God"

ii. How our worldview affects our dealings with our environment

VII. Current Trends in Relating Cosmology and Theology

(a) Scientific trends:

i. Confluence of cosmology and particle physics

ii. Quantum gravity and Grand Unified Theories

(b) Theological trends:

i. Scientist cum theologians build bridges between Cosmology and Theology - Ian Barbour, Ernan McMullin, Arthur Peacocke, John Polkinghorne and Robert Russell

ii. Theological responses to modern Cosmology - Diogenes Allen, Langdon Gilkey, Nicholas Lash and David Tracy

Texts:

Hetherington, Norriss S., Cosmology: Historical, Literary, Philosophical, Religious and Scientific Perspectives, Garland Publishing, Inc. New York & London, 1993.

Brummer, Vincent, ed., Interpreting the Universe as Creation: A Dialogue of Science and Religion, Kok Pharos Publishing House, Kampen, The Netherlands, 1991.

In the Course Schedule, the two texts are referred to as Hetherington and Brummer respectively.

Concluding Note: Stephen Toulmin says, "As human beings, we need to understand our own position vis-a-vis the rest of nature, in ways that will permit us to recognize, and feel, that the world is our "home." In addition, we need to discover in what respects, and on what conditions, the world of nature can continue to provide a home for humanity. Only then can we learn to handle ourselves in such a way that we are truly at home in the natural world, and that the world itself is capable of remaining the kind of home it can be for human beings. Those, of course, have always been among the central tasks and themes for cosmology." This significant thought provides the focus for this course.

Most of the books listed in the bibliography are available in our library. Those marked with an asterisk have been put on library reserve. Other reading material is available in three folders at the circulation desk.

Course Schedule

Week 1

Discussion of course syllabus and objectives.

What is Cosmology? Is Cosmology myth or science? Its limitations.

An overview of the universe based on our current knowledge. (Course Outline Section I)

Reading:

Handout on definitions of Cosmology

Hetherington, Part One, "Introduction: Different Cultures, Different Cosmologies", pp. 3-8.

Stephen Toulmin, "Scientific Theories and Scientific Myths", in The Return to Cosmology, (1982), pp. 21-32 (library reserve)

Bas van Frassen, "The World of Empiricism", in Physics and our View of the World, (1994), pp. 114-134 (library reserve)

Francois Jacob, "The Myth and Science" (Library folder)

Kenneth F. Weaver, "The Incredible Universe", National Geographic Magazine, May 1974.

Week 2

Slide presentation (Tuesday)

Methods and Theories in Scientific and Religious Inquiry (Outline IIa)

Reading:

Brummer, "Introduction: A Dialogue of Language Games", pp. 1-17.

Holmes Rolston III, Science and Religion: A Critical Survey (1987), Chapter 1: "Methods in Scientific and Religious Inquiry", pp.1-32. (library reserve)

Ian Barbour, Religion in an Age of Science (1990), Chapter 2: “Models and Paradigms”, pp. 31-65. (library reserve)

J. Soskie, "Knowledge and Experience in Science and Religion: Can We be Realists?" in Physics, Philosophy and Theology: A Common Quest for Understanding (1988), pp. 173-184. (library reserve)

Week 3

Video 1: Assurance and Doubt, Part 6 of The Ring of Truth Series with MIT Physicist Phillip Morrison (Tuesday).

Basic models in relating Science and Religion (Course outline IIb)

Reading:

Robert Wright, "Science, God and Man: New discoveries in physics, cosmology and biology make the universe more explainable, as well as more amazing. Does this undermine religious faith - or reinforce it?", Time, December 28, 1992. (library folder)

Michael Hirsley, "2nd Big Bang is collision of science and religion", Chicago Tribune, May 25, 1992. (Handout)

Ian Barbour, "Ways of Relating Science and Religion", Religion in an Age of Science (1990), pp. 3-30. (library reserve)

Week 4

Early developments in Cosmology.

The classical period - A geocentric and finite universe. (Outline IIIa,b)

Reading:

Hetherington, chapters 3, 4, 5, 6 and excerpts from 7.

Max Wildiers N., "Sources of the Medieval World Picture", The Theologian and his Universe (1982), pp. 19-24. (library folder)

Douglas A. Knight, "Ancient Israelite Cosmology", The Church and Contemporary Cosmology, pp. 29-44. (library reserve)

Week 5

Continuation of the Classical Period.

The Copernican revolution and its aftermath. (Course outline III(d)1&2).

Video 2, The Mechanistic Universe (1984) Sea of Faith Series 1.

Reading:

Hetherington, chapters 8, 12, and 14.

Milton K. Munitz, Ed. Theories of the Universe (1957), pp. 141-145.

(library folder)

Miller and McCall, The Church and Contemporary Cosmology (1990), pp. 65-80.
(library reserve)

Week 6

Hindu Philosophy and Cosmology. (Course outline IV)

Two student presentations.

Reading:

Handouts on Hindu Cosmology

Ursula King, "Modern Cosmology and Eastern Thought", Cosmology and Theology (1983), pp. 76-83. (library folder).

E.O. James, Creation and Cosmology: A Historical and Comparative Inquiry (1969), pp. 34-45. (library folder)

R.F. Gombrich, "Ancient Indian Cosmology", Ancient Cosmologies (1975), pp.110-139. (library folder)

Week 7

Quantum and Relativistic Cosmology.

Recent developments in Scientific Cosmology. (course outline III(e))

Mid-Semester Examination

Reading:

Hetherington, chapter 18.

Paul Davis, "Everyone's Guide to Cosmology". A well-written article for a lay person in Sky and Telescope, March 1991.

Virginia Trimble, "Cosmology: Man's Place in the Universe". A fine article in the American Scientist, Jan-Feb., 1977.

Sharon Begley, "Where the wild things are?: The strange theories of cosmologists might explain how the universe was born." A "not too bad" article in Newsweek. It is in our library microfilm collection; so I have put a copy in the library folder.

Chris J. Isham, "Quantum theories of the Creation of the Universe", in Brummer, pp. 37-64.

Week 8 SPRING BREAK

Week 9

Continuation of Recent Developments.

Pillars of the "Big-bang Theory".

Review of "Steady-state Theory".

One student presentation.

Lecture by Dr. Robert Cathey (Chair, Philosophy & Religious Studies Dept.)
"Christian Cosmology in the Twentieth Century" (Tuesday)

Reading:

Hetherington, chapters 20 and 21.

The "Cosmology" chapter from any Introductory Astronomy text. (See the QB section in the library)

Reading material given by Dr. Cathey on Karl Barth, Langdon Gilkey and Diogenes Allen (Library folder)

Langdon Gilkey, "What the Idea of Creation is About", Maker of Heaven and Earth (1985), pp. 1-40. (library reserve)

Week 10

Philosophical developments in Cosmology - Immanuel Kant, Karl Barth and A.N. Whitehead (Course outline III(d)3).

Two student presentations.

Reading:

Hetherington, pp.277-280.

Miller and McCall, pp. 80-89 (Kant), pp. 120-125, 146-148 (Whitehead) (library reserve).

Milton K. Munitz, Space, Time and Creation: Philosophical Aspects of Scientific Cosmology (1957), pp. 174-179. (library folder).

Ian Barbour, Religion in an Age of Science (1990), Chapter 8: "Process Thought". pp. 218-243. (library reserve)

Holmes Ralston III, Excerpts from his Review Article on Barbour's Religion in an Age of Science, Zygon 27,1 (March 1992), pp.65-87. (library folder)

Week 11

Two recent and contemporary cosmologists - Pierre Teilhard de Chardin and Paul Davies.

Two student presentations.

Reading:

Stephen Toulmin, The Return to Cosmology, Pierre Teilhard Chardin, pp. 113-126. (library reserve)

Christopher F. Mooney, "Teilhard: Evolution and Creation", Evolution and Creation (1985), pp. 290-301. (library reserve)

William Warthling, "Pierre Teilhard de Chardin: The Case Reopened", Cosmology and Theology (1983), pp. 70-74. (library folder)

Paul Davies, God and the New Physics (1983), Chapter 10: "Freewill and Determinism", pp. 135-143 and Chapter 17: "The Physicist's Conception of Nature", pp. 218-229. (library reserve)

Paul Davies, The Mind of God: The Scientific Basis for a Rational World (1992), Chs.2 & 8:"Can the Universe Create Itself?", pp. 39-72 and "Designer Universe", pp. 194-222. (library reserve)

Paul Davies, "The Harmony of the Spheres: If we discover extraterrestrial life, our world will never seem quite the same", Time, February 5, 1996, p. 58. (Handout)

Week 12

God, Creation and Cosmology. (Course outline V)

Genesis 1 and 2.

Modern theological interpretations of God and Creation.

Two student presentations.

Reading:

Dianne Bergant and Carroll Stublmueller, "Creation according to the Old Testament", Evolution and Creation (1985), pp.153-172. (library reserve)

Cas J. Labuschagne, "Creation and the Status of Humanity in the Bible", Brummer, pp. 123-131.

Hefner, Philip, "Basic Christian assumptions about the cosmos", Cosmology, History, and Theology (1977), pp.347-364.(lib. folder)

Paul Davies, "Did God Create the Universe?", God and the New Physics, pp. 25-43. (library reserve)

John R. Albright, "God and the Pattern of Nature: A Physicist Considers Cosmology", The Christian Century, July-August 1992.

Week 13

Creation and Evolution.

One student presentation.

Lecture by Dr. Ken Cramer (Chair, Biology Department) on "Current Understanding of Evolution" (Tuesday)

Reading:

Philip Kitcher, "Evolution for Everyone", Abusing Science: The Case Against Creationism (1994), pp. 7-29. (library folder)

Ernan McMullin, "Introduction: Evolution and Creation", Evolution and Creation (1985), pp. 38-48. (library reserve)

Robert J. Russell, "Theistic Evolution: Does God Really Act in Nature?", CTNS Bulletin 15,1 (Winter 1995), pp. 19-32.

Teilhard de Chardin, "Turmoil or Genesis", Science and Religion: New Perspectives on the Dialogue (1968), pp. 216-228. (library folder)

Christof K. Biebricher, "Evolutionary Research", Brummer, pp.90-99.

Week 14

Cosmology, Theology and Philosophy (Outline VIa)

Two student presentations.

Reading:

Hetherington, chapter 31.

W.R. Stoeger, S.J., "Contemporary Cosmology and its Implications for the Science-Religion Dialogue", Physics, Philosophy and Theology: A Common Quest for Understanding (1988), pp. 219-244. (library reserve)

Robin Le Poidevin, "Creation in a closed universe, or, have physicists disproved the existence of God?", Religious Studies, (1991), (library folder)

For an evangelical approach to this subject, see Christianity Today, August 12, 1988, "How it All Began: Why can't evangelical scientists agree?" by Bill Durbin, Jr., and another article in the same issue by Bruce Watke.

William Lane Craig, "Theism and Big Bang Cosmology", in Theism, Atheism and Big Bang Cosmology (1993), pp. 218-231.(lib. res.)

Quentin Smith, "Theism, Atheism and Big Bang Cosmology", in Theism, Atheism and Big Bang Cosmology (1993), pp. 195-217.(lib. res.)

Paul Davies, The Last Three Minutes (1994), Chs.2&11: "The Dying Universe", pp.9-18,"Worlds without End", pp.141-156.(lib. res.)

Week 15

Philosophical and Ethical Aspects of Cosmology. (Outline VIb)

Two student presentations.

Reading:

Hetherington, chapter 29.

Toulmin, Part I: "Ethics and Cosmic Evolution", pp. 53-71.

Narlikar, Jayant V. "The concepts of 'beginning' and 'creation' in cosmology" Philosophy of Science, (1992). (library folder)

Adolf Grunbaum, "The Pseudo-Problem of Creation in Physical Cosmology", Philosophy of Science (1989). (library folder)

J.W. Bowker, "Cosmology, religion, and society", Zygon, (1990) (library folder)

Martin Palmer, "The Ecological Crisis and Creation Theology", in Brummer, pp. 132-146.

Week 16

Current Trends in Relating Cosmology and Theology (Course Outline VII)

Two student presentations.

Reading:

Ian Barbour, "Astronomy and Creation", Religion in an Age of Science (1990), pp. 125-153. (library reserve)

Robert J. Russell, "Theological lessons from Cosmology: Two case studies", Cross Currents: Religion and Intellectual Life, (Fall 1991). (library folder)

William Stoeger, "The Origin of the Universe in Science and Religion", Cosmos, Bios, Theos (1993), pp.258-268. (lib reserve)

Ernan McMullin, "How Should Cosmology Relate to Theology?", The Sciences and Theology in the Twentieth Century (1986), pp.17-57.

R. J. Russell, "Quantum Physics in Philosophical and Theological Perspective", in Physics, Philosophy and Theology: A Common Quest for Understanding (1988), pp. 343-374. (lib. reserve)

Home Work: The major home work is your assigned readings and a **Term Paper**. The term paper should be on a topic relevant to this course. The topic should be chosen in consultation with me. The paper should have 2000 to 2500 words and should be wordprocessed or typed (with a good ribbon) in double-line spacing (with 1" margin on all sides). Each student will make a class presentation on his term paper. The presentation will be about 10 to 15 minutes followed by a brief discussion. The presentations begin from the 6th week and the paper is due on the date of the presentation. A typed outline of the presentation should be given to me one week before the presentation. In addition there will be a few simple assignments like short papers, reaction papers, quizzes etc.

Exams: There will be a mid-term exam and a comprehensive final examination. I will give study guides for both. Make-up exams will be given only under exceptional circumstances and prior permission from me will be needed.

Attendance and Participation: Most of the classes will be in the lecture-seminar format. 15% of the course grade is assigned for attendance and participation. The participation in class discussions should be of high quality (not quantity) and should indicate that you have done the assigned readings. I can give you an approximate grade for attendance and participation around mid-term. As attendance and participation are essential to the success of this course, any more than two absences will lower your grade. Even the two absences must be for valid reasons.

Grading:

Mid-term exam- 20%	A: 93-100%	C: 65-69%
Final exam- 25%	A-: 90-92%	C-: 60-64%
Term paper and	B+: 85-89%	D+: 55-59%
class presentation – 25%	B: 80-84%	D: 50-54%
Other home-work- 15%	B-: 75-79%	D-: 45-49%
Class participation- 15%	C+: 70-74%	F: below 44%

Bibliography

1. Atkins, P.W., Creation Revisited, W.H. Freeman, 1992.

2. Barbour, Ian G., Issues in Science and Religion, Harper and Row, 1966.

3. _____, Ed., Science and Religion: New Perspectives on the Dialogue, Harper and Row, 1968.

4. *_____, Religion in the Age of Science, Harper and Row, 1990.

5. Blacker, Carmen and Michael Loewe, Ancient Cosmologies, George Allen & Unwin Ltd., 1975.

6. Capra, Fritjof, The Tao of Physics: An Explanation of Parallels Between Modern Physics and Eastern Mysticism, Fontana, 1983.

7. Carvin, Walter P., Creation and Scientific Explanation, Scottish Academic Press, 1990.

8. Chaisson, Eric, Cosmic Dawn: The Origins of Matter and Life, W.W. Norton, 1981.

9. _____, The Life Era: Cosmic Selection and Conscious Evolution, W.W. Norton, 1987.

10. Close, Frank, Apocalypse When: Cosmic Catastrophe and the Fate of the Universe, William Morrow, 1988.

11.*Craig, William Lane and Quentin Smith, Theism, Atheism and Big Bang Cosmology, ClarendonPress, 1993.

12.*Davis, Paul, God and the New Physics, Simon and Schuster, 1983.

13.*_____, The Mind of God: The Scientific Basis for a Rational World, Simon & Shuster, 1992.

14.*_____, The Last Three Minutes: Conjectures about the Ultimate Fate of the Universe, Basic Books, 1994.

15. Drees, Willem B., Beyond the Big Bang: Quantum Cosmologies of God, Open Court, 1990.

16. Ellis, George, Before the Beginning: Cosmology Explained, Boyars/Bowerdean, 1994.

17. Gal-Or, Benjamin, Cosmology, Physics and Philosophy, Springer-Verlag, 2nd ed., 1987.

18.*Gilkey, Langdon, Maker of Heaven and Earth: The Christian Doctrine of Creation in the Light of Modern Knowledge, University Press of America, 1985.

19. _____, Nature, Reality and the Sacred: The Nexus of Science and Religion, Fortress Press, 1993.

20. Greenstein, George, The Symbiotic Universe: Life and Mind in the Cosmos, William Morrow, 1988.

21. Gribbin, John, In the Beginning: After COBE and Before the Big Bang, Little Brown & Co., 1993.

22. Hamilton, Virginia, Creation Stories from Around the World, Pennyroyal Press, 1988.

23. Harrison, Edward, Masks of the Universe, Macmillan, 1985.

24. Hawking, Stephen, A Brief History of time: From the Big Bang to Black Holes, Bantam Hooks, 1988.

25. Hayes, Zachary, What are they Saying about Creation?, Paulist Press, 1980.

26.*Hilgevoord, Jan, ed., Physics and our View of the World, Cambridge University Press, 1995.

27. Hoyle, Fred, Ten Faces of the Universe, W.H. Freeman, 1977.

28. Huchingson, James E., Religion and the Natural Sciences: The Range of Engagement, Harcourt Brace Jovanovich, 1993.

29. Hyers, Conrad, The Meaning of Creation: Genesis and Modern Science, John Knox Press, 1984.

30. Jaki, Stanley, Cosmos and Creator, Scottish Academic Press, 1980.

31. _____, Cosmos in Transition, Pachart Publishing House, 1990.

32. James, E.O., Creation and Cosmology: A Historical and Comparatative Inquiry, E.J. Brill, 1969.

33. Jastrow, Robert, God and the Astronomers, Norton, 1978.

34. Kitcher, Philip, Abusing Science: The Case Against Creationism, MIT Press, 1994.

35.*Margenau, Henry and Varghese, Roy A., Cosmos, Bios, and Theos: Scientists Reflect on Science, Religion and the Origin of the Universe, Life and Homosapiens, Open Court, 1992.

36.*McMullin, Ernan, Ed., Evolution and Creation, Univ. of Notre Dame Press, 1985.

37.*Miller, J.B. and K.E. McCall, The Church and Contemporary Cosmology, Carnegie Mellon University Press, 1990.

38. Moltmann, Jurgen, God in Creation: A New Theology of Creation and the Spirit of God, Harper San Francisco, 1985.

39. Monsma, John C., Ed., The Evidence of God in an Expanding Universe: 40 American Scientists Declare their Affirmative Views on Religion, Putnam, 1958.

40. Munitz, Milton K., Space, Time and Creation: Philosophical Aspects of Scientific Cosmology, Free Press, 1957.

41. _____ Ed., Theories of the Universe, Free Press, 1957.

42. O'Shaughnessy, Thomas J., Creation and the Teaching of Qur'an, Biblical Institute Press, 1985.

43. Peach, J.V., Cosmology and Christianity, Hawthorn, 1965.

44. Peacocke, A.R., Ed., The Sciences and Theology in the 20th Century, Univ. of Notre Dame Press, 1986.

45. Peters, Ted, Ed., Cosmos as Creation, Abingdon Press, 1988.

46. Polkinghorne, John, One World: The Interaction of Science and Theology, SPCK, 1987.

47. _____, Reason and Reality: The Relationship between Science and Theology, Trinity Press, 1991.

48.*Rolston, Holmes, Science and Religion: A Critical Survey, Random House, 1987.

49.*Russell, Robert J., Stoeger, W.R., and Coyne, G.V. Eds. Physics, Philosophy, and Theology: A Common Quest for Understanding, Univ. of Notre Dame Press, 1988.

50. Schroeder, Gerald L., Genesis and the Big Bang, Bantam, 1990.

51. Smoot, George & K. Davidson, Wrinkles in Time, William Morrow, 1993.

52. Steiner, Rudolph, Cosmology, Religion and Philosophy, Sun Publishing, 1993.

53. Templeton, John M., and Robert Herrmann, Eds., Is God the Only Reality? Science Explores the Meaning of the Universe, Continuum Publishing Co., 1994.

54. Tilby, Angela, Soul: God, Self and the New Cosmology, Doubleday, 1994.

55. Tipler, Frank J., The Physics of Immortality: Modern Cosmology, God and the Resurrection of the Dead, Doubleday, 1994.

56. Toulmin, Stephen, The Return to Cosmology: Postmodern Science and the Theology of Nature, Univ. of California Press, 1985.

57. Tracy, David and Nicholas Lash, Ed. Cosmology and Theology, Seabury Press, 1983.

58. Trefil, James S., The Moment of Creation, Charles Scribner, 1983.

59. Wildiers, Max, The Theologian and his Universe: Theology and Cosmology from Middle Ages to the Present, Seabury Press, 1982.

60. Whitehead, A.N., Process and Reality: An Essay in Cosmology, Corrected Edition, Ed. David Griffin and Donald Sherburne, The Free Press, 1978.

61. Yourgrau, Wolfgang and Breck, Allen D., Cosmology, History and Theology, Plenum, 1977.

Articles (not listed in the course schedule):

1. Atkins, Peter, "Will science ever fail?" New Scientist, 8 August 1992. (Response to Midgley's article)

2. Carr, B.J. and M.J. Rees, "The anthropic principle and the structure of the world", Nature, 12 April 1979.

3. William Lane Craig, "What place, then for a Creator?: Hawking on God and Creation", The British Journal for the Philosophy of Science, (1990). (library folder)

4. Grunbaum, Adolf, "Psedo-creation of the Big Bang", Nature, 26 April 1990. (Response to Maddox's article)

5. Horgan, John, "Universal Truths", Scientific American, October 1990.

6. Kaiser, Christopher B., "The early christian belief in creation: Background for the origins and assessment of modern western science", Horizons in Biblical Theology: An International Dialogue, December 1987.

7. Levy-Leblond, Jean-Marc, "The unbegun Big Bang", Nature, 2 November 1989.

8. Maddox, John, "Down with the Big Bang", Nature, 10 Aug 1989.

9. Mascall, E.L., What do we Mean by the Creation of the World?, SPCK booklet, 1960.

10. Midgley, Mary, "Can science save its soul?", New Scientist, 1 August 1992.

11. Narlikar, Jayant, "What if the big bang didn't happen?", New Scientist, 2 March 1991.

12. Nebelsick, Harold P., "God, creation, salvation and modern science", Horizons in Biblical Theology, December 1987.

13. Polkinghorne, John, "God's action in the world", Cross Currents: Religion and Intellectual Life, Fall 1991.

14. Russell, Robert J., "Contingency in Physics and Cosmology: A Critique of the Theology of Wolfhart Pannenberg", Zygon, March 1988.

15. Wicken, Jefrey S., "Theology and Science in the evolving cosmos: A need for dialogue", Zygon, March 1988.

Reference:

Hetherington, Norriss, ed., Encyclopedia of Cosmology (QB 980.5 E53)

Videos (available in the library)

Canticles to the Cosmos with Brian Swimme:

1. The Primeval Fireball

2. The Feast of Consciousness

3. The Fundamental Order of the Universe

4. A Magical Planet

5. The Nature of the Human

6. The Human Story

The Astronomers: A Window to Creation

The Origin of the Universe

The Grand Design