

Science: A Theology of Creation

“Scientia Pro Amore Dei: Knowledge for the Love of God”

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PREREQUISITES

1. SC 111 Principles of Science

2. SC 112 Human Biology

** equivalent courses may be used to fulfill the above requirements*

COURSE DESCRIPTION

This is an upper division science elective course that seeks to integrate the natural sciences with philosophy and theology. It seeks to incorporate the scientific discoveries from multiple diverse disciplines such as astronomy, cosmology, astrobiology, geology, physics, chemistry and biology to create a unified and systemic understanding of the universe and life. Major scientific questions of modern time are investigated: “How did the universe as we know it begin?” “How will it end?” “What makes the Earth uniquely fit for life?” “How did life originate and how did it evolve?” “How did human beings evolve?” “What makes human beings different from other living animals?” and “What is the ultimate goal and purpose of creation and man?” The most important question that will be explored is “How can a greater scientific knowledge and understanding of the universe, filled with beauty and unspeakable majesty, teach us about the Christian Faith and how it can contribute to Christian Liturgy?”

Since the time of the Gospel, particularly during the Middle Age, faith’s quest for understanding has been further enlightened through such discipline as philosophy. In the modern era, it can be argued that God is continuing this path of self-disclosure through science, the “modern day” philosophy. Just as philosophy contributed greatly to theology in the past, so will science do for contemporary theology. We live in an age of unprecedented scientific advances and discoveries. It can be aptly considered the era of “natural revelation” where God reveals himself and his plan of salvation through the lifting of the veils of the mystery surrounding creation, which has been hidden in ages past. In studying and reflecting on these scientific discoveries, science can help illuminate the path of faith and broaden and deepen our understanding of Christianity, particularly Sacramental Theology, where the natural intersects the supernatural.

Of equal importance is the investigation of how science can serve to enrich the Christian Liturgy and elevate the worship to a higher level. In our ever expanding knowledge of creation, there is an increasing awareness of how “good” creation is and how everything gives glory to its Creator by the sheer fact of its existence and majesty. Ultimately, science can further deepen the theology of the “Cosmic Liturgy,” broadening its scope to encompass men, nature and all of creation.

The course begins with a study of the nature of science and its methodology and then proceeds to explore the relationship between faith and reason while surveying the development of modern science and its relationship and origin in Christianity. Science and its relationship to philosophy and theology are also explored since these are important foundations on which modern science is built. The majority of the course is devoted to studying and understanding the natural history and development of the universe, the habitability of the Earth, the origin of life and its evolution and on human evolution. An in-depth analysis of several key phenomena and elements found in nature, those with particular relevance to Christian Theology, is conducted.

LEARNING OBJECTIVES

1. To understand the nature of science, its methodology, strengths and limitations.
2. To understand the proper relationship between faith and science, their compatibility and complementarity.
3. A brief survey of the history and development of science and to investigate the claim that science was born of Christianity.
4. To study the contemporary scientific theories pertaining to the history of the universe, including the Big Bang theory, chemical nucleosynthesis, stars and galaxies formation, solar system and planetary formation.
5. To study the origin and development of the Earth, the theory of a “privileged planet,” and the factors that contribute it to its habitability for life, especially complex and intelligent life.
6. To investigate and assess the validity of theories relating to the origin of and evolution of life.
7. To explore the origin and evolution of man.
8. To study and reflect on several natural phenomena and key elements in nature and their theological significances.
9. To understand the intrinsic properties of creation: rationality, coherency, order, complexity, progression in time & space, unity and beauty.
10. To reflect on how science can contribute to Christian Theology, such as a richer understanding of Genesis, Christology, Communion Ecclesiology, Sacramental Theology and finally Christian Liturgy and Worship.

EVALUATION & GRADING

1. Two Written Papers
2. Presentation (involves both peer evaluation and self-evaluation)
3. Final Oral Exam
4. Quizzes
5. Attendance and participation

REQUIRED READINGS FROM THE FOLLOWING SOURCES

1. Augros, Michael. (2015). *Who Designed the Designer? A Rediscovered Path to God's Existence*. San Francisco Ignatius Press.
2. Baglow, Christopher T. (2011). *Faith, Science and Reason: Theology on the Edge*. Illinois Midwest Theological Forum.
3. Catechism of the Catholic Church Second Edition. (1994). Pages 13-23; Paragraphs #1-7 page 54-104; Paragraphs 1-2 pages 106-121; pages 182-205; pg. 272; pages 280-293.
4. Gonzalez, Guillermo and Jay W. Richards. (2004). *The Privileged Plane: How Our Place in the Cosmos is Designed for Discovery*. Washington, D.C. Regnery Publishing, Inc.
5. Jaki, Stanley L. (1990). *Science & Creation*. Maryland. University Press of America.
6. Pope Francis. (2015). Encyclical Letter *Laudatio Si*.
http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html
7. Pope John Paul II. (1998). Encyclical Letter *Fides et Ratio*.

http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_14091998_fides-et-ratio.html

8. Teilhard de Chardin, Pierre. (1959). *The Phenomenon of Man*. New York. Harper & Row Press.
9. Trasancos, Stacy. (2014). *Science was Born of Christianity. The Teaching of Fr. Stanley L. Jaki*. The Habitation of Chimham Publishing Co.

BIBLIOGRAPHY

1. Behe, Michael. (2006). *Darwin's Black Box. The Biochemical Challenge to Evolution*. New York. Free Press.
2. Collins, Francis. (2006). *The Language of God. A Scientist Presents Evidence for Belief*. New York. Free Press.
3. Dembski, William A. (1999). *Intelligent Design: The Bridge Between Science & Theology*. Illinois. InterVarsity Press.
4. Denton, Michael J. (1998) *Nature's Destiny: How the Laws of Biology Reveal Purpose in the Universe*. New York. The Free Press.
5. Hannam, James. (2011). *The Genesis of Science: How the Christian Middle Ages Launched the Scientific Revolution*. Washington D.C. Regnery Publishing, Inc.
6. Harper, Charles L. (2005). *Spiritual Information: 100 Perspectives on Science and Religion*. Templeton Foundation Press.
7. Jaki, Stanley L. (1978). *The Road of Science and the Ways to God*. Chicago, Illinois. University of Chicago Press.
8. Meyer, Stephen. (2009). *Signature in the Cell: DNA and the Evidence for Intelligent Design*. HarperCollins Press.
9. Russell, Robert John et al. (1988). *Physics, Philosophy and Theology: a Common Quest for Understanding*. Vatican Observatory Foundation.
10. Spitzer, Robert J. (2010). *New Proofs for the Existence of God: Contributions of Contemporary Physics and Philosophy*. Grand Rapids Michigan. William B. Eerdmans Publishing Co.
11. Teilhard de Chardin, Pierre. (1961). *Hymn of the Universe*. New York. Harper & Row Press.
12. Temple, William. (1934). *Gifford Lectures 1932-1934: Nature, Man & God*. Macmillan Press.
13. Ward, Peter and Donald Brownlee. (2000). *Rare Earth: Why Complex Life is Uncommon in the Universe*. New York. Copernicus Books.
14. Wiker, Benjamin and Jonathan Witt (2006). *A Meaningful World: How the Arts and Sciences Reveal the Genius of Nature*. Illinois. InterVarsity Press.

MULTIMEDIA REFERENCES

1. Design of Life. Flight: The Genius of Birds. DVD. (2013). Illustra Media.
2. Design of Life. Metamorphosis: The Beauty & Design of Butterflies. DVD. (2013). Illustra Media.
3. The Master Designer- The Song. DVD. (2013). Reel Productions.
4. Evolution's Achilles Heels. DVD. (2014). Creation Ministries International.
5. The Privileged Planet. DVD. (2010). Illustra Media
6. Darwin's Dilemma. DVD. (2010). Illustra Media.
7. The Origin of Life: DNA by Design. DVD. (2010). Koinonia House.

COURSE LECTURE OUTLINE

1. **Introduction: The Relationship between Faith & Reason (*Baglow Ch. 1, *CCC and Fides et Ratio*)**
2. **The Nature of Science (*Baglow Ch. 2*)**
 - a. Its Methodology and Limitations
 - b. The Relationship between Science and Philosophy
 - c. The Relationship between Science and Theology
3. **Science and the Christian Faith (*Baglow Ch. 2; *CCC*)**
 - a. Science "Stillbirths" in other World Religions
 - b. Science was Born From Christianity (*Stanley Jaki, Trasancos*)
 - c. How the Christian Middle Ages Helped Launched the Scientific Revolution
 - d. Scientific Atheism and Scientific Creationism
4. **The Catholic Church and the Scientific Revolution (*Baglow Ch. 3-5*)**
 - a. Galileo Controversy
 - b. The Catholic Church as the Patroness of Science
 - c. Great Christian Scientists Throughout the Ages
 - d. Science and Scripture
5. **A Natural History of the Universe (*Baglow Ch. 7, Gonzalez*)**
 - a. "In the Beginning" with the Big Bang
 - b. The Creation of the laws of Physics, Elements, Stars and Galaxies.
 - c. Born in the Stars
 - i. "You are Dust:" The Chemical Origins of Life, Particularly Carbon, the Fundamental Building Blocks of Life Created in Stars.
 - d. Ultimate Fate of the Universe
 - e. Genesis in Light of New Scientific Understanding of the Universe and Life on Earth
 - i. What is "natural death" in Genesis?
 - ii. What is Work and Manual Labor?
 - iii. Is Creation in a "Perfect" form in the beginning?
 - f. Evidence of "Chaos" in the beginning: Earthquakes, Volcanoes, Collisions and Darkness.
 - g. Natural "Disasters" or Natural Conditions that are Necessary for Life.
6. **The "Privileged Earth": The Creation of A Unique Home for Life (*Gonzalez*)**
 - a. Conditions for a Habitable Planet
 - i. Location from its star- Continuous Circumstellar Habitable Zone (CHZ)
 - ii. Planet size
 - iii. Planet physical composition and core

- iv. Magnetosphere
- v. Atmosphere
- vi. Water composition
- vii. Plate tectonics
- viii. Oxygen
- ix. Nitrogen
- x. Moon
- xi. Life and the Living Biosphere
- xii. Drake Equation

7. A Natural History of Life on Earth and Its “Evolution” (*Baglow Ch. 8*)

- a. The Origin of Life
 - i. The origin and development of the fundamental building blocks of life: genetic code molecules (DNA and RNA) and protein.
- b. The Evolution of Life
 - i. Eras and Epochs of Life on Earth
- c. Critical Milestones Along the Way
 - i. Origin of the genetic code
 - ii. Origin of Life: the first cell (Prokaryotes)
 - iii. From Simple to Complex single cell: Transition from Prokaryotes to Eukaryotes
 - iv. From Single cell to Multicellular Complex Organisms
 - v. Sexual Revolution: From Asexual to sexual Reproduction
 - 1. Binary fission
 - 2. Meiosis
 - vi. Increasing Level of Complexity and Design in Living Organisms
 - vii. Culmination of Intelligent Life Forms and Human Beings

8. “Evolution” of Life and its Theories (*Baglow Ch. 8*)

- a. Microevolution and Macroevolution
- b. Analysis of Darwinism and Natural Selection
- c. Analysis of the Scientific Theory of Design
- d. The Directionality and Purpose of Life on Earth

9. The Beauty & Dignity of Human Beings (*Baglow Ch. 9-11*)

- a. Human kinds’ Origin
- b. Human “Evolution-“ the path to the Modern Man
- c. Theological Implications of Human Evolution and Man’s Destiny (*Teilhard de Chardin*)
- d. The Human Body: a Culmination and Masterpiece of Creation
 - i. A Theology of the Body: The Bridge between the Visible and Invisible Realities.
 - ii. The Sacramentality of the Human Body as an Icon of the Mystical Body of Christ.

10. Natural Wonders in the Universe as Sacramental Signs

- a. Intrinsic Properties of the Universe: Rationality, Coherence, Unity, Beauty, Complexity, & Order.
- b. The Phenomenon of Solar Eclipse: The Moon and its Central Role in creating a habitable planet and essential role in the Liturgy.
- c. The Phenomenon of Metamorphosis (in butterflies): as a Sacramental Sign of the Inner Transformation and Glorification of the Human Body.
- d. The Phenomenon of Flight in Birds- made to fly.
- e. Visible light & its Natural Properties.
- f. Water & its life giving properties.

- g. The Natural Phenomenon of Rainbow: Combining Two Key Elements of Light and Water
 - i. A Sacramental Sign of Christ
 - ii. A Covenantal Sign with all of Creation.
- h. Yeast & Fermentation- A Transformative Chemical Process Essential for Food Production and the Liturgy.
 - i. The Nature of the Eucharistic Elements of Wine and Bread.

11. Theological Reflections on Modern Scientific Discoveries

- a. Copernicus Principle vs. the Privileged Earth Hypothesis
- b. Science's Contributions to Christian Theology and the Divine Liturgy.
 - i. The complementarity of Science to the Christian Dogmas and Sacred Scriptures, especially in regard in to Genesis.
 - ii. A New and Deeper Understanding of the Story of Genesis as revealed by Science: God's action in time and space.
- c. God's Modus Operandi i.e. God's signature in His Work
 - 1. Order
 - 2. Progression in Time
 - 3. Increasing Complexity
 - 4. Beauty
 - 5. Use of Intermediaries
 - a. Incorporates all of Creation (natural and supernatural laws, inanimate objects, living organisms, and intelligent beings both visible and invisible) in the execution of all of Natural and Salvific History.
- d. Life and Death. Signs of Sin and Resurrection.
- e. Ecology: the interdependence of all living organisms and their physical environments, both living and non-living elements.
- f. Mystery of the Cosmos
 - i. Dark matter
 - ii. Dark energy
 - iii. Extraterrestrial Intelligent Life (SETI) & other life forms: Angels

12. Science, Christology and the Liturgy

- a. The Universe and all of creation is Christocentric (**CCC, Stanley Jaki, Chardin*)
- b. The Savior and Fulfillment of Science is Christ, who is the Key to Understanding the Mystery of Creation
- c. Christ: The Alpha and Omega of Creation.
- d. A Reflection on the Contributions of Teilhard de Chardin.
- e. Science and Creation: the Everlasting "Canticle of Creation"
- f. Special guest speaker: *Fr. Jeremy Driscoll's lecture on the "Cosmic Liturgy."*

**CCC- Catechism of the Catholic Church*

WRITTEN PAPER TOPICS (*Other topics not listed may be used with approval*)

1. What is the relationship between science and faith: antagonistic, neutral or beneficial. Explain whether or not science and faith can coexist? Use references from the scientific field, theology, Scriptures and Church teachings to support your position.

2. Stanley Jaki proposed a bold claim that “Science was born of Christianity.” What are the evidences that he uses to justify this position? Do you agree with his assessment and explain why or why not?
3. Provide the historical facts surrounding the controversy with Galileo. What are the fundamental scientific and theological questions involved? Did Galileo and the Church acted prudently at the time? What can modern Christians learn from this case?
4. What is the probability of life occurring in the first place? Is life common or rare in our solar system, galaxy and universe? Explain your reasoning by demonstrating factors (i.e. like liquid water, distance from sun, etc.) that makes life habitable on Earth. Can there exist other life system besides our carbon-based system? Used scientific evidences to support your answers.
5. Is Evolution only a theory? Define evolution (microevolution and macroevolution) and demonstrate evidences for and against evolution. What are the implications for the Christian Faith if evolution is true (or false)? Is Christianity tied down to one or another scientific theory?
6. Human Origin and Evolution. How will you respond if someone asks you whether humans are descended from apes? Explain using scientific, theological and philosophical arguments to support your answer.
7. Select a natural phenomenon or certain elements of creation and describe the natural science behind it. What are its theological implications? How can it teach us about God and enrich the Christian faith.
8. Science & Liturgy. How can Science and the study of creation contribute to Christian Worship and Liturgy? Use examples either from class or other sources to support your explanation.

CLASS POLICY

It is my hope that everyone, from the love to seek and to know God through His works and creation, and out of charity for others in the class, will grace us with his presence at every lecture and meeting. Attendance for *all* lectures is required and absences must be reported and approved for in the cases of severe sickness or emergency. *Excused* absences can be made up with assigned work; on the other hand, *unexcused* absences will adversely affect the participation grade.

Plagiarism is prohibited and will be dealt with according to the official policy of Mount Angel Seminary. Please refer to the Academic Policy and Procedures Manual for further details.

OTHER RESOURCES & REFERENCES

- a. Course website <http://moodle.mtangel.edu>.
- b. Copies of the course books are available in the library under the class reserve section