



On-Campus Course Syllabus

SCI 206a

Biology

Fall 2018

Class Information

Day and Time: Thursday 8:00am-10:30am

Room Number: E201

Contact Information

Instructor Name: Kirk Spencer

Instructor Email: kspencer@criswell.edu

Instructor Phone: 469.834.5211 (Please sent text first)

Instructor Office Hours: Tues 10:30 to 11:00am, Thurs 10:30 to 11:00am & 12:00 to 4:00pm

Course Description and Prerequisites

A survey of living systems of the world (biological sciences). The content, organization and complexity of life forms will be examined from organic molecules to single-celled organisms to the intricate senses and systems of the human body. The methods and history of science will be surveyed and discussed, as well as an integration of the biological sciences and biblical Christian theism. Practical implications and applications will be explored throughout the course, involving student research and presentations.

Course Objectives

Upon completion of this course the student should be able to:

- A. Explain the basics of scientific method and the history of science.
(Readings in *Heaven and Earth* and lecture/discussion)
- B. Understand the basic concepts of biology, including biochemistry, cell structure and function, genetics, life forms, senses and systems.
(Text readings and classroom lecture/discussion)
- C. Discuss various current popular movements in Biology.
(stem-cell research and cloning).
- D. Do research and present areas of interest in the biological sciences.
(Student Research Project and Presentation)
- E. Recognize and demonstrate the importance of critical and creative thinking in regard to the integration

of Christian beliefs into the study of science, exploring and evaluating the various ways this has been accomplished and applying this knowledge to the daily life of a Christian.
(Readings in *Science and Theology* and Class Debate and Guest Speakers)

Required Textbooks

Spencer, Kirk L., *Heaven and Earth; an Orientation in Natural Science*. Unpublished, 2004

Spencer, Kirk L., *Science and Theology; a compendium*. Unpublished, 2004

Mader, Sylvia. *Inquiry into Life, 13th ed.* New York: McGraw-Hill Co., 2009.

Course Requirements and Assignments

ATTENDANCE and PARTICIPATION GRADE

Attendance and participation is expected from you as a part of the classroom experience. You will begin the semester with a perfect score of 100 points. Consistent attendance and participation in class discussion will maintain the perfect score. Each unexcused absence will deduct 4 points from the total. It is also expected that you will be in class on time. Two tardies will equal one absence. It is expected that students will not be watching computer and phone screens during class or laying their heads on the desk. These actions will significantly reduce your participation grade.

Your Attendance and Participation Grade will determine **20%** of your course grade.

READING GRADE

A reading grade will be determined from annotations (mark-up) you make while reading. As you read through and study the textbooks, mark-up the text using your own methods, involving highlighting or underlining or boxes around text. Also write notes, ideas and comments in the margins. This will document that you have read all of the material in a thoughtful way. At the end of the semester I will collect your manuscript and textbook to determine how thoroughly you have read the material based upon how it is marked and will assign a letter grade. You are required to annotate all reading material; this (especially) includes material over which you will not be tested. This requirement is designed to be a relatively easy assignment to document a close reading of the text. If you do it, it is a simple way to receive a high score. However if you do not do it, I am forced to average in a zero as your reading grade. This is very significant in that your reading grade will determine **20%** of your course grade.

TEST GRADES

Four tests will be given during the course. Each will include multiple choice and matching questions. Each test grade will determine **10%** of your course grade.

FINAL EXAM

A final exam will be given at the end of the course which will be composed solely of questions taken from previous tests. Your score on the final exam will determine **10%** of your course grade.

RESEARCH & PRESENTATION

During the first two weeks of the course you should select a topic of research. It should be related to biology in some way and something in which you are interested. During the first half of the course you will take time each week to search for information on your research topic. I expect that at least one of the sources you use in your presentation will come from the library. During the second part of the course we will schedule an hour of class time for you to present what you have learned in the form of a Powerpoint presentation. Hopefully by this time the class will be a comfortable environment for you to practice communicating what you know. You are not required to write a research paper of any kind, a brief summary of your findings as a handout to give to the class. It is also important that you support your fellow classmates by listening respectfully to their presentation and asking sincere and thoughtful questions after the presentation. At this time you can also make important additions to the discussion. Keep in mind that your participation in each other's presentations will be a significant portion of your attendance and participation grade. The Research and Presentation Grade will determine **10%** of your course grade.

Some research topic suggestions to prime the pump:

StemCells. Cloning. Vitalism. Viruses. CryptoBiology. AstroBiology. Gaia. Vestigial Organs. Sleep. Teratoma Tumors. Slime Mold. Metamorphosis. Human/ Animal DNA Hybrids (Like Spider Man). Macro Mutations (Like X-Men). Vomiting. Hiccapping. Burping. Farting. Yawning. Human Instincts. Mantis Shrimp. Color Blindness. Cryogenics. Emergent Properties.

Course/Classroom Policies and Information

ONLINE EXAM PROTOCOL

Manuscript and Lecture Content Tests

These will be timed tests with multiple choice and matching questions. The student should take the exam as quickly as possible from memory. After the exam is completed, you may use the time remaining to check and change any answers by searching the manuscript and notes you have taken. While you can use the manuscript and your notes in this search, you cannot use any other sources. Each of these exams can only be taken once.

Here is a list of activities which will be considered cheating:

- Talking to someone about the exam to give or get information about the content of the exam.
- Using the course manuscripts or lecture notes to find the answer to a question before you have completed the entire exam. (Although these sources can be used to find answers in an "open-book" format after you have completed the entire exam and still have time remaining.)
- Using any other source material other than the course manuscripts and your notes to look up answers while taking the exam.
- Letting someone else take the exam for you.

- Taking the exam for someone else.

Attendance

The professor will also take roll at the beginning of class and after the break. Being at least fifteen minutes (15) minutes tardy to class, or departing fifteen (15) minutes prior the end of class is considered one absence. Three instances of tardiness of fifteen minutes or less equals one absence. 4pts will be subtracted from the student's participation grade for each unexcused absence.

Grade Weight

ATTENDANCE/PARTICIPATION	20%
READING GRADE	20%
TEST GRADES	
Philosophy & History	10%
Life and Life Forms	10%
Systems & Senses	10%
Evolution Ecology & Theology	10%
FINAL EXAM	10%
<u>RESEARCH & PRESENTATION</u>	<u>10%</u>
TOTAL:	100%

EXTRA CREDIT

(Points are added to a multiple choice test score)

DALLAS	
Perot Museum of Natural History	10pts
Dallas World Aquarium	10pts
Dallas Arboretum	10pts
The Rock Barrel Rock Shop	5pts
FORT WORTH ARTS DISTRICT	
Japanese Garden	5pts
Ft. Worth Zoo or Caldwell Zoo (Tyler)	10pts

Other extra credit projects will be considered with approval from the instructor. However extra-credit can only account for 10% (60pts total) of the course grade or a curve of one letter grade.

Class Attendance

Students are responsible for enrolling in courses for which they anticipate being able to attend every class session on the day and time appearing on course schedules, and then making every effort to do so. When unavoidable situations result in absence or tardiness, students are responsible for acquiring any information

missed. Professors are not obliged to allow students to make up missed work. Per their independent discretion, individual professors may determine how attendance affects students' ability to meet course learning objectives and whether attendance affects course grades.

Grading Scale

A	97-100	4.0 grade points per semester hour
A-	93-96	3.7 grade points per semester hour
B+	91-92	3.3 grade points per semester hour
B	88-90	3.0 grade points per semester hour
B-	86-87	2.7 grade points per semester hour
C+	83-85	2.3 grade points per semester hour
C	80-82	2.0 grade points per semester hour
C-	78-79	1.7 grade points per semester hour
D+	75-77	1.3 grade points per semester hour
D	72-74	1.0 grade point per semester hour
D-	70-71	0.7 grade points per semester hour
F	0-69	0.0 grade points per semester hour

Incomplete Grades

Students requesting a grade of Incomplete (I) must understand that incomplete grades may be given only upon approval of the faculty member involved. An "I" may be assigned only when a student is currently passing a course and in situations involving extended illness, serious injury, death in the family, or employment or government reassignment, not student neglect.

Students are responsible for contacting their professors prior to the end of the semester, plus filing the appropriate completed and approved academic request form with the Registrar's Office. The "I" must be removed (by completing the remaining course requirements) no later than 60 calendar days after the grade was assigned, or the "I" will become an "F."

Academic Honesty

Absolute truth is an essential belief and basis of behavior for those who believe in a God who cannot lie and forbids falsehood. Academic honesty is the application of the principle of truth in the classroom setting. Academic honesty includes the basic premise that all work submitted by students must be their own and any ideas derived or copied from elsewhere must be carefully documented.

Academic dishonesty includes, but is not limited to:

- cheating of any kind,
- submitting, without proper approval, work originally prepared by the student for another course,
- plagiarism, which is the submitting of work prepared by someone else as if it were his own, and
- failing to credit sources properly in written work.

Institutional Email Policy

All official college email communications to students enrolled in this course will be sent exclusively to students' institutional email accounts. Students are expected to check their student email accounts regularly and to respond in an appropriate and timely manner to all communications from faculty and administrative departments.

Students are permitted to setup automatic forwarding of emails from their student email accounts to one or more personal email accounts. The student is responsible to setup and maintain email forwarding without assistance from college staff. If a student chooses to use this forwarding option, he/she will continue to be responsible for responding appropriately to all communications from faculty and administrative departments of the college. Criswell College bears no responsibility for the use of emails that have been forwarded from student email accounts to other email accounts.

Disabilities

In order to ensure full class participation, any student with a disabling condition requiring special accommodations (e.g., tape recorders, special adaptive equipment, special note-taking or test-taking needs) is strongly encouraged to contact the instructor at the beginning of the course, or if a student has a learning disability, please inform the professor so assistance can be provided.

Intellectual Property Rights

Unless otherwise specifically instructed in writing by the professor, students must neither materially nor digitally reproduce materials from any course offered by Criswell College for or with the significant possibility of distribution.

Resources and Support

Canvas and CAMS: Criswell College uses Canvas as its web-based learning tool and CAMS for student data. Students needing assistance with Canvas should contact the Canvas Help Support line at (844) 358-6140. Tech support is available at this number twenty-four hours a day. Students needing help with CAMS should contact the Campus Software Manager at bstifle@criswell.edu.

Student Services: The Student Services Office exists to foster and encourage success in all areas of life—physical, intellectual, spiritual, social, and emotional. Students are encouraged to reach out for assistance by contacting the office at 214.818.1332 or studentservices@criswell.edu. Pastoral and certified counseling services are also available to Criswell students. Appointments are scheduled through the Dean of Students Jeff Campbell, at jcampbell@criswell.edu.

Wallace Library: Students can access academic resources and obtain research assistance by visiting the Wallace Library, which is located on campus. For more information, go to the library website, or email the Wallace Library at library@criswell.edu.

Writing Center: Students are encouraged to consult with writing tutors to improve and enhance their skills and confidence by practicing techniques of clear and effective writing. To consult with a tutor, students can visit the

Writing Center located on the first floor near the Computer Lab, or they can schedule an appointment by emailing writingcenter@criswell.edu or calling 214.818.1373.

Course Outline/Calendar

BOOK 1 PHILOSOPHY & HISTORY OF SCIENCE

Weekly Session

Assignment

Week 1 (August 23)

For Next Week

Introductions and Syllabus

Read Mader Ch. 1 Study of Life (pp. 1-17)

Perspective Earth's Age & Evolution

Read Spencer Chapter 1 "The Scientific Enterprise"

[Begin Leaf Lab Sketchbook with one Work of Botanical Art]

Week 2 (August 30)

For Next Week

Read Spencer Chapter 2 "The History of Science"

SCIENTIFIC ENTERPRISE

Exploration(17th Century)Classification(18th Century)Abstraction (19th Century)Invention
(20th Century) [Why Technological Explosion?]

Purpose and Goodness (21th Century)

SCIENTIFIC METHOD

TheoryFormation.TheoryTesting.TheoryAcceptance.Paradigms.Revolutions

LIMITATIONS OF SCIENCE

ComplexityProblem.PreservationProblem.SampleProblem.TheoryLaden

ObservationProblem.InductionProblem.ProbabilityProblem.IntegrityProblem

SCIENTIFIC FAITH (Faith Assumptions of Science)

UniformityInNature.ContinuityOfCause&Effect.DiscoverableOrderInNature

BeautifulSimplicityInNature(Ockham's Razor Clip from "Contact")

AUTHORITY IN SCIENCE (Reproducibility)

Week 3 (September 6)

Study Spencer

Study Chapters 1 and 2 in Spencer

HISTORY OF SCIENCE

Monotheism & the UniVerse

Aristotle's Universe [Clip Medieval Science]

Galileo Early Thought Experiment

Astronomy Copernican Revolution (Geocentric to Heliocentric)
Light and Hypostatic Union

Week 4 (September 13)

For Next Week
Prepare For Test
Study Study-Guide
Philosophy & History of Science
Begin Reading Mader Ch.2. Molecules (pp.19-44),
Ch. 3 Cell Structure & Function (pp. 45-59)
In Preparation for Next Class
Read Spencer Chapter 5 “Life & Life Forms”

History and Philosophy of Science Catchup & Review

BOOK 2

LIFE & LIFE FORMS

Weekly Session

Assignment

Week 5 (September 20)

For Next Week

TEST History & Philosophy of Science

Read Mader Ch. 4 Cell Membranes (pp. 67-74) Ch. 5
Cell Division (pp. 81-96)

LIFE

ELEMENTS OF LIFE PrereqAtoms.Water.Hbond.CarbonMacromolecules

SIMPLE CELL Osmosis.Nucleus.DNA.ER&Ribosomes.Mitochondria&ATP.

CELLULAR REPRODUCTION

MitosisMiosisMutationsCancers.SelfishGene.

[Simple Cell Anatomy Lab]

Week 6 (September 27)

Read Mader Ch31 Higher Animals (pp.645-660)
Study Spencer Chapter 5 “Life & Life Forms”

LIFE FORMS

Plants.Animals.Fungi.Protista.Bacteria)

ANIMAL PHYLA

SPECIES PROBLEM

MONSTERS

Week 7 (October 4)

For Next Week

Prepare For Test

Read Spencer Chapter 5 “Life & Life Forms”

Study Life & LifeForms Study-Guide

Read Mader Ch.11 Human Organization Tissues (pp.193-206),

Ch. 19 Musculoskeletal System (pp. 367-390)

Ch. 14 Digestive System (pp. 255-277)

Ch. 12 Cardiovascular System (pp. 213-231)

Ch. 15 Respiratory System (pp. 281-295)

Ch. 20 Endocrine System (pp. 393-411)

In Preparation for Next Class

Read Spencer Chapter 5 “Systems & Senses”

Life & Life Forms Catchup & Review

BOOK 3

SYSTEMS & SENSES

Weekly Session

Week 8 (October 11)

TEST Life & Life Forms

Assignment

For Next Week

Ch. 13 Lymphatic & Immune Sys (pp. 235-252)

Ch. 22. Development and Aging (pp. 443-448, 452-458)

Ch. 17 Nervous System (pp. 315-341)

Ch. 18 Senses (pp. 345-363)

Study Spencer Chapter 5 “Systems & Senses”

SYSTEMS

key

() = Major Part of Component Before [] = Accessory Organs to Component Before AV = Artery & Vein

SKELETAL SYSTEM

Upper Body

CraniumMandibleClavicleScapulaSternumVertebraeHumerusRadiusUlnaCarpalsMetacarpalsPhalanges

Lower Body

FemurTibiaFibulaTarsalsMetatarsalsPhalanges

MUSCULAR SYSTEM

Upper Body

Trapezius Deltoid. Pectoralis Major. Latissimus Dorsi. Biceps Triceps. Gluteus Maximus.
Muscle Memory

DIGESTIVE SYSTEM

Pharynx Esophagus Stomach [Gallbladder. Liver. Pancreas. Spleen] Small Intestine (Duodenum) Large Intestine (Colon Ascending Transverse Descending. Rectum Anus)

CIRCULATORY SYSTEM (Cardiovascular)

Heart

Heart (Right Atrium Right Ventricle. Left Atrium Left Ventricle. Aortic Arch)
Veins Blue In. Arteries Red Out.

Upper Body

Aorta Pulmonary AV [Lungs] Jugular AV. [Brain]. Arm AVs. Superior Vena Cava.

Lower Body

Descending Aorta. Renal AV [Kidney]. Gonadal AV [Gonads]. Femoral AV Leg AVs. [Movement in large muscles in Arms and Legs move blood back to heart] Inferior Vena Cava

RESPIRATORY SYSTEM

Nasal Cavity/Oral Cavity Pharynx Epiglottis Vocal Fold Trachea Bronchi (Main Intermediate. Alveoli) Lobes (Superior Middle Inferior) Diaphragm

IMMUNE SYSTEM (Lymphatic System)

Lymphocytes. Lymph Nodes (Neck Under Arm Groin). Antibiotics. Tonsils/Adenoids. Thymus. Spleen. Appendix. Bone Marrow

ENDOCRINE SYSTEM

REPRODUCTIVE SYSTEM

Gestation

Week 9 (October 18)

Study Spencer Chapter 5 "Systems & Senses"

SENSES

NERVOUS SYSTEM

Neurons (Dendrites. Cell Body. Axon. Synaptic Cleft. Neurotransmitters) Spinal Cord. Brain (Frontal Lobe. Parietal Lobe. Occipital Lobe. Temporal Lobe. Cerebellum. Brain Stem [Pituitary Gland]. Hemispheres. Corpus Callosum).

TOUCH

Nerve Endings

SIGHT

Cornea. Iris. Pupil. Lens. Ciliary Muscle. Vitreous Humor. Retina (Rod Cell. Cone Cell). Blind Spot. Optic Nerve.

HEARING

Auditory Canal. Tympanic Membrane. Malleus “hammer” Incus “anvil” Stapes “stirrup”. Semicircular Canals. Cochlea (Cochlear Canal. Cochlear Fluid. Spiral Organ. Hair Cells. Cochlear Nerve) Auditory Nerve

SMELL/TASTE

Nasal Cavity. Olfactory Bulb. Olfactory or Cranial Nerve. Oral Cavity. Tongue (Taste Buds). Lingual Nerve

Week 10 (October 25)

For Next Week

Prepare For Test

Study Spencer Chapter 5 “Systems & Senses”

Study Systems & Senses Study-Guide

Read Mader Ch. 33 Ecology (pp. 696-702)

Ch. 34 Ecosystems (pp. 714-716)

Ch. 35 Biosphere (p. 736)

Begin reading Spencer “Science & Theology”

Systems & Senses Catchup & Review

BOOK 4

Ecology, Evolution & Theology

Week 11 (November 1)

For Next Week

TEST Systems and Senses

Read Mader Ch. 27. Evolution (pp. 541-568)

Ch. 32. Behavior (p. 681-682, 684)

Ch. 31. Human Evolution (pp. 661-667)

Read Spencer “Science & Theology”

GHOSTS

ECOLOGY

Ecologic Time. Symbiosis. Parasitic. Defense Mechanisms (Mimicry). Animal Rationality & Emotions (Mader p. 679)

Subduing the Earth. Dominion Over the Earth, First Great Commission, Can We Subdue the Earth?

Week 12 (November 8)

Read Spencer “Science & Theology”

Research Presentations

EVOLUTION Mader p. 555 Evolution Questions
Mutation.NaturalSelection.SexualSelection Altruism

Week 13 (November 15)

Read Spencer “Science & Theology”

Research Presentations

THEOLOGICAL PERSPECTIVES

Militarism(ScientificNaturalism.ScientificCreationism)Concordism(ProgressiveCreationism)
Separatism(GapTheory.ProchronicView.ComplementaryView.LocalCreationView)

HOLEY FLOOR VIEW

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THANKSGIVING (November 22)

For Next Week
Prepare For Test
Study Ecology, Evolution & Theology Study-Guide

Thanksgiving Break

No Class
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Week 14 (November 29)

Read Spencer “Science & Theology”

Research Presentations

Evolution, Ecology & Theology Catchup & Review

Week 15 (December 6)

Read Spencer “Science & Theology”

TEST Evolution, Ecology & Theology

Research Presentations

Week 16 (December 13)

FINAL EXAM: