

**Biol. 1120: SURVEY OF BIOLOGY/Fall/2011 PRIBOR**  
**INFORMATION ABOUT THIS COURSE**

Professor: Dr. Donald B. Pribor

Office: WO 1267A; Phone: 530-2528 Office hours: T. R.: 9:00 - 11:00 am; 12:30 – 1:00 pm

E-mail: [donald.pribor@utoledo.edu](mailto:donald.pribor@utoledo.edu)

**Class Meetings:** T.R. 11:00 – 12:15 .....BO 1045

T.R. 5:30 – 6:45 .....WO 1205

**Textbook: UNIVERSAL CREATIVITY. INDIVIDUATION OF THE BIOSPHERE. A CONSTRUCTIVISM EPIC, 1<sup>st</sup>.ed., 2004, by Donald B. Pribor. Kendall/Hunt Pub. Co. Can be purchased only at The Student Bookstore, 3059 W. Bancroft St. phone: 536-9154 and the main UT Bookstore, phone: 530-2516.**

**Exam Schedule**

The grade for this course will be determined by: three multiple choice exams each consisting of 100 or more questions and two required papers; the second required paper will count as the final exam. The schedule for these exams and the required papers are listed below.

1. First exam worth 45/150 pts. = 30% of final grade.....[R]9/22
2. Second exam worth 30/150 pts. = 20% of final grade.....[R]10/27
3. Required paper worth 15/150 pts. = 10% of final grade due in my Office **WO 1267A**  
Due before or on **Tuesday, Nov. 8**. If I am not there, slide paper under my door or put it in the box outside my office door. **I will not accept papers sent by email. I will accept a hard copy in my office, Nov. 10 – 19, but I will deduct 5 pts. for it being late.**
4. Third exam worth 45/150 pts. = 30% of final grade.....[T] 12/6
5. Final Exam equals second required paper worth 15/150 pts. = 10% of final grade  
Due before or on **Sat., Dec. 10** by 7:00 in my office, WO 1267A. If I am not there, slide paper under my door or put it in the box outside my office door. **I will not accept papers sent by email. I will accept a hard copy in my office, Dec. 13 - 16, but I will deduct 5 pts. for it being late.**

**Description of Required papers see Syllabus.**

**Missed Exams.**

If one has a legitimate excuse for missing an exam, he/she can take a makeup exam. The makeup exam must be taken within a week after the missed exam was given. This will be strictly enforced. A student who has not taken the makeup exam after two weeks will receive a zero for that exam.

**Study Guidelines**

Each multiple choice exam will test for material in review sheets I will pass out in each of the three sections of the course. With the possibility of a few exceptions, the topics covered by the multiple choice questions are in the textbook and handouts for this course. The “lecture-dialogues” for this course are designed to facilitate students creating for themselves an understanding of the review topics for each exam. Thus, these lecture-dialogues will not give information that students are expected to copy and memorize for the exam. I will pass out at the beginning of each section, a set of questions taken from the exam for that section. Students are encouraged to relate sections in the textbook and handouts posted on the internet blackboard to the student selected answer to each of these sample questions. The answers to these sample questions will be posted on the internet blackboard.

# SYLLABUS

## Biology 1120-Fall-2011 PRIBOR

### FIVE OVERALL THEMES OF BIOLOGY 1120-Fall/ 2011

Theme One: Present the narrative of evolution of animal consciousness of ancestor apes to the emergence of hominids and then humans with group-ego that evolved to humans with the sequential emergence of body ego and Mind to produce *metaphorical, conceptual knowing*. This kind of knowing led to the emergence of the first civilizations that further evolved in stages to the emergence of Enlightenment science in Europe in the 17<sup>th</sup> century.

Theme Two: *Metaphorical, Conceptual Knowing* is a major driving force of human creativity. The cognitive psychological theory of metaphorical, concepts, as described by George Lakoff, indicates how it guides creativity. Measurement, which is the core of modern science, involves metaphorical, conceptual knowing and Newton's theory of gravity exemplifies how metaphorical, conceptual knowing is essential for creating scientific theories. The various other theories described in this course also illustrate the above statement.

Theme Three: The science that evolved from Enlightenment science involves rejection of natural law and liberal education. It affirms nominalism, constructivism, systematic experimentation, and the scientific method defined by four characteristics. This transformation from medieval philosophy-religion to Enlightenment science was driven by a critical mass of humans committing to constructivism. This historical process involved: religious diversity in Europe, Renaissance humanism, the intellectual diversity problem, Newton's constructivism theory of motion, positivism, and the radical opposition between science and religion. The description of thermodynamics associated with the theory of machines provides the foundation for understanding many aspects of life. It also facilitates the transformation of scientific constructivism to *narrative, scientific constructivism*. This plus systems science leads to a universal theory of creative evolution that integrates all the subdivisions of biology.

Theme Four: Present core ideas of biology by means of and as an example of *student-teacher constructivism* that promotes creative learning. This theme is one way to define the UT mission statement of a "student-centered university." It also is consistent with the mission statement of the Judith Herb College of Education, which is *[we facilitate] Individuals at the center of their own learning within a rich intellectual environment characterized by choice*. This course interprets these mission statements to mean that college education should promote collaboration between subjective engagement involving individual insights and free choices and objective conceptual understanding of validated knowledge. Thus, student-teacher constructivism avoids two extremes. One extreme is subjective opinion not based on objective knowledge or the choice to define relevance only in terms of one's personal goals to the exclusion of humans' innate desire for knowledge and for meaning and moral right action. The other extreme is objective knowing consisting of memorization of facts or blindly submitting to an ideology such as the patriarchal, philosophic perspective of liberal education or scientific positivism.

Theme Five: Present and organize course content by means of *postmodern, scientific positivism*, which promotes diversity and exclusiveness. On the one hand, it allows coexistence and possible collaboration among diverse scientific ideologies (that can be converted into narratives) and

associated paradigms. On the other hand, it excludes any ideology not associated with a paradigm that can solve a type of empirical problem that satisfies the requirements of systematic experimentation and the scientific method. For example, it rejects creationism or any ideology that includes the idea of a Creator God or other ideas that cannot be operationally defined. Sometimes it may be possible for a scientific ideology to collaborate with a non-scientific ideology. The collaboration becomes possible when each ideology (logical, conceptual model) is converted to a narrative. After the collaboration of narratives, each component narrative must be reduced to a logical, conceptual model that generates a paradigm for solving a particular type of problem. For example, science by itself cannot deal with human self-consciousness because this idea cannot be operationally defined. Some types of human psychology, such as integral psychology (Wilber) can deal with human self-consciousness. Then the narratives associated with animal behavior and neuroscience can collaborate with narratives associated with human psychology. This course will exemplify this collaboration. This same approach applies to transcending the opposition between science and religion.

### **GUIDELINES FOR STUDENT PAPERS FOR BIOLOGY 1120-Fall-11**

First Required Paper. The systems science theory of universal creativity, as presented in this course, describes the individuation of various non-human systems as the collaboration between Eros-chaos and Eros-order that generates Order, Chaos, hierarchal New Order. Each civilized human also may individuate to a higher level of self-consciousness by Eros-chaos bringing the stabilized ego into some degree of Chaos. If the person chooses to endure this chaos, he/she eventually will see new possibilities to produce a higher level of self-consciousness that includes a modified previous level of self-consciousness. This model applied to a human may be represented as Life, Death, Rebirth. What many people, especially young persons, do not realize is that as life goes to irreversible Chaos, that is not the end of one's story; rather, it is a beginning of a new phase of that story. Typical types of Chaos for young people are transforming from high school mentality to young, rational, adult mentality, breaking up of a romantic relationship, or various challenges to one's athletic, emotional, or intellectual capabilities. It is important for young people to see that Chaos can provide new potentials for a rebirth to a new level of self-consciousness.

*In a 2-3 typed paper present reasons why you agree or disagree with this course's description of human individuation. You may use your own life experiences or someone else's experience that you know about to exemplify your agreement or disagreement with this idea. I will not grade your paper; you will receive automatically an A+.*

Final Exam Required. Theme four for this course interprets the mission statements of UT and the Judith Herb College of Education in terms of student-teacher constructivism that promotes collaboration between subjective engagement involving individual insights and free choices and objective conceptual understanding of validated knowledge.

*In 3 typed pages or more state reasons why you agree or disagree with the idea of this theme for this course. Your answer may include reasons why you liked or disliked the way this course integrated student-teacher constructivism that leads to creative learning with the traditional teacher-centered (university-centered) conveyer-type of teaching. I will not grade your paper; you will receive automatically an A+, which is worth 15 pts.*

**OUTLINE OF BIOLOGY 1120-Fall-11: CONTENT**  
**First Exam Period**

I.. Homeostasis: Fundamental Characteristics of Life, **Ch.4, pp. 83-88.**

NARRATIVE OF ANCESTOR APES EVOLVING TO CIVILIZED HUMANS

- I. Analogical understanding of animal consciousness, see “Animal Conscious Communicative Action” **Ch.5, pp. 256-257.**
- II. Mammal homeostatic body plan, **Ch.7, pp.181-184 and figures 7.1 and 7.2**
- III. Feelings are conscious emotions, **Ch.9, pp. 257-261.**
- IV. Evolution to the patriarchal, nuclear family and to the polar mind self, **handout #1.**
- V. Evolution to becoming civilized, see **Ch.3, pp.55-61.**
- VI. Judaeo-Christian, metaphorical, conceptual thinking generated the patriarchal perspective, **Ch.3, pp.62-64 and Tables 3.1 and 3.2(p.65).**

CREATIVITY OF METAPHORICAL CONCEPTUAL THINKING

- I. OVERVIEW: Metaphorical, conceptual knowing generated the first civilizations and was the *creative drive* to the further evolution of humans including the emergence of scientific, mechanistic knowing that emerged in the 17<sup>th</sup> century Enlightenment. This type of knowing enables the seven to eight year old child to become civilized. Enlightenment science combined metaphorical, conceptual knowing with *constructivism* to produce mechanistic science, but then *positivism* glorified logical, conceptual knowing, which was mathematics, to the exclusion of participatory, subjective engagement with nature. Metaphorical, conceptual thinking still was used to produce theories, but then once these theories were empirically validated, the subjective engagement was disregarded. Thus, the *creativity of metaphorical, conceptual knowing* always has been expressed by humans even in their constructing scientific theories, but because of positivism, its creativity has been systematically ignored.
- II. Newton’s metaphorical, mathematical theory of gravity, see **handout #2.**

PATRIARCHAL IDEOLOGY BECOMES SCIENTIFIC CONSTRUCTIVISM

- I. Partial breaking from Catholic, patriarchal thinking, **Ch, 3, pp.64-67 and lecture.**
- II. Partial Enlightenment: “The scientific revolution,” **Ch. 3, pp.67-71.**
- III. Ethic of scientific objectivity, **Ch.3, pp.71-73.**
- IV. The irony and paradox of mechanistic science, **Ch.3, pp. 73-74.**
- V. NOTE: The *full Enlightenment* came with the liberal, constitutional democracy in the independent (since July 4, 1776) American colonies in the late 1700s, see lecture.

SCIENTIFIC CONSTRUCTIVISM TRANSCENDS MECHANISTIC SCIENCE

- I. Core concepts of physics for understanding thermodynamics, see **handout #2.**
- II. Mechanistic cosmology: first law of thermodynamics, **Ch.1, pp.28-29 and handout #2.**
- III. *Break from Mechanistic Knowing*, **Ch.1, p.28 and handout #2.**

THEORY OF MACHINES: SCIENTIFIC CONSTRUCTIVISM BECOMES NARRATIVE,  
SCIENTIFIC CONSTRUCTIVISM

- I. Characteristics of any machine, **Ch.1, pp.17-18.**
- II. Fundamental energy limitation of any machine, **Ch.1, p.18.**
- III. Ideal heat machine, **you will not be tested on this.**
- IV. Seven generalizations about the functioning of an ideal heat machine, **Ch.1, pp.19-27.**

**Second Exam Period**

CELL AS A HOMEOSTATIC MACHINE

- I. The cellular perspective, **Ch. 5, pp.95-97.**
- II. Scientific method in terms of the cell theory, **Ch. 5, pp.98-104.**
- III. The chemical makeup of cells, **Ch.5, pp.104-115.**
- IV. Idealized eukaryotic cell, **Ch.5, pp.120-121.**
- V. Cell as a machine, **Ch.6, pp.141-143 and figure 6.3.**
- VI. Overview of cellular oxidation, **Ch.6, pp. 143-145.**
- VII. Cell maintaining homeostasis. **Ch. 5, p.103 and Ch. 6, pp.151-155**

CELL AS THE FUNDAMENTAL UNIT FOR BIOLOGICAL EVOLUTION

- I. Regulation of intracellular chemical reactions, **Ch.6, pp.155-156.**
- II. Quest for the secret of life, **Ch.6, pp.156-157.**
- III. Watson-Crick model of DNA, **Ch.6, pp. 158-163 and figures 6.21, 6.22, 6.23a, and 6.23b.**
- IV. DNA duplication (involving DNA replication) exemplifying molecular information communication, **Ch.6, pp.164-165 and figure 6.24 BUT especially figure 6.25.**
- V. Protein synthesis, **Ch.6, pp.165-170.**

SYSTEMS THEORY OF EVOLUTION FOR THE EMERGENCE OF LIFE

- I. Origin of life: a *uroboric* puzzle, **Ch.2, pp.44-45.**
- II. General solution to uroboric puzzles: emergent properties, **Ch.2, pp.45-46.**
- III. Systems theory of creativity, **Ch.2, pp.46-50.**

METAPHORICAL, CONCEPTUAL MUTUALITIES OF THE SYSTEMS THEORY OF  
CREATIVITY

- I. Law 1: No event is autonomous; Newton's break with Aristotle and Thomas Aquinas, **Ch.1, 29-30.**
- II. Law 2: Mutuality of Order and Chaos; all isolated systems in the universe tend to change, **Ch.1, pp.30-31.**
- III. Law 3: Mutuality of Chaos and machine creativity, **Ch.1, pp.31-33.**
- IV. Law 4: Hierarchical mutuality of Chaos and non-machine creativity, **Ch. 1, pp.33-34**
- V. Law 5: Physical individuation is an Order, Chaos, New Order process, **Ch.1, pp.34-35.**

HUMAN HOMEOSTATIC BODY SYSTEMS

- I. Homeostatic body plan and the circulatory system, **Ch.7, pp.181-189.**
- II. Regulation of the amount tissue fluid, **Ch.7, pp.193-194.**
- III. Nerve cell communication and the nervous system, **Ch.7, pp.194-204.**
- IV. Human endocrine system, **Ch. 7, pp.204-211 .**
- V. Human neuroendocrine system, **Ch.7, pp.211-213.**
- VI. Neuroendocrine-immune system, **Ch.8, pp.219-237.**

### Third Exam Period

- VII. Neuropsychic homeostasis, **Ch.9, pp. 243-270.**

### MENDEL'S THEORY OF GENETICS EXEMPLIFYING SCIENTIFIC CONSTRUCTIVISM

- I. Mendel's insights, **Ch.11, pp.295-297.**
- II. Mendel's first law, **Ch.11, pp.207-210.**
- III. Cellular basis of Mendel's theory, **Ch.11, pp.299-307.**
- IV. Mendel's first law in terms of meiosis, **Ch.11, pp.305-307.**
- V. Examples of Mendel's first law, **Ch.11, pp.307-316.**
- VI. Epistemology of chromosomal theory of inheritance, **Ch.11, pp.310-312.**

### EPIGENESIS: DEVELOPMENTAL INDIVIDUATION

- I. Development of animals, **Ch.12, pp.339-348.**
- II. Human embryonic development, **Ch.12, pp.348-353.**
- III. The human reproductive system, **Ch.12, pp.354-358.**
- IV. Epigenesis of the human reproductive system, **Ch.12, pp.358-370.**
- V. Seven stages of biological sexuality, see **Table 12.2.**

### BIOLOGICAL THEORY OF EVOLUTION

- I. Two themes of biological evolution, **Ch.13, p.377.**
- II. Darwin's metaphorical, conceptual insights that led to the formation of his scientific constructivism theory of evolution, **Ch. 13, pp.378-380.**
- III. Overcoming Greek-medieval philosophy, **Ch.13, pp.380-381.**
- IV. Modern theory of the process of biological evolution, six statements, **Ch.13,p.381.**

### NARRATIVE UNDERSTANDING OF EVOLUTION AND RELATED IDEAS

- I. Ethic of mutuality, **Ch.14, pp.389-390.**
- II. Mutualities of the biosphere, **Ch.14, pp.390-394.**
- III. Mutuality of evolution of life and ecology, **Ch.14, pp.392-394.**
- IV. Mutualities of biological evolution, **Ch.14, pp.394-395.**
- V. Universal harmony versus transformations, **Ch.14, p.396.**
- VI. Evolution as a creative process in terms of seven characteristics, **Ch.14, pp.399-402.**
- VII. Free market capitalism as a metaphor for understanding biological evolution, see **handout #3.**