

SPECIAL TOPICS IN BIOLOGY: NEUROSCIENCE AND CHRISTIANITY

Course Number: BIO 250, Spring 2002

Institution: Northwestern College, Orange City, IA

Instructors:

Karen M. Cianci, PhD, course coordinator, <kcianci@nwcsiowa.edu>

Adrienne Forgett, PhD, psychologist, <aforgett@nwcsiowa.edu>

Ralph Davis, PhD, neuroscientist, <redavis@nwcsiowa.edu>

Michael Andres, MA, theologian, <Andres@nwcsiowa.edu>

Don Wacome, PhD, philosopher, <wacome@nwcsiowa.edu>

James Mead, PhD, Old Testament, <jmead@nwcsiowa.edu>

Mind, noun. A mysterious form of matter secreted by the brain. Its chief activity consists in the endeavor to ascertain its own nature, the futility of the attempt being due to the fact that it has nothing but itself to know itself with.

Ambrose Bierce in A Devil's Dictionary

COURSE DESCRIPTION: The purpose of this course is to delve into one of the major mysteries of life, who are we as human beings. What is the nature of our being? What is the conscious sense of awareness through which we watch the world, think things over, live our lives, and call ourselves "I"? Our approach shall begin with a scientific perspective on our brains through which the "problem" of the mind/brain will emerge. We will then proceed through Christian and philosophical reflections on how to think about mind/brain question. The course will conclude by examining issues where the difference between the religious and scientific perspectives is difficult to resolve. In the process of our study, the larger issue of how science informs religious belief and how religious belief informs science will be examined.

COURSE OBJECTIVES: The student will be able to

1. articulate the nature of the mind/brain problem and its implications
2. demonstrate basic knowledge about the anatomy and physiology of the nervous system
3. explain biblical views on personhood and understand basic hermeneutical principles
4. articulate basic monistic and dualistic views of human nature
5. understand the difference in epistemological approach between science and religion
6. analyze complex behaviors from both scientific and religious perspectives, being able to recognize philosophical inconsistencies and incongruities
7. recognize the ethical implications of philosophical positions on the mind/brain

TIME & PLACE: Mondays and Wednesdays, 8-9:30 PM, Van Peurse Hall Room 213

WEB SITE RESOURCES: NWC Course Pages on Home Page
(www.nwciowa.edu/view/overview/biology.asp)

TEXTS:

Smock, Timothy K. (1999) *Physiological Psychology: A Neuroscience Approach*, Prentice Hall, NJ.

Churchland, Paul M. (1988) *Matter and Consciousness*, MIT Press, Boston.

COURSE REQUIREMENTS & EVALUATION:

There will be four areas of student responsibility that will be evaluated for the course grade.

1. Preparation and participation in Class

Each student is strongly encouraged to be prepared by completing reading assignment before class time. Each student is highly encouraged to participate in class discussions. Although the instructors recognize that differences in personality affect the ease with which students are able to speak in class, the discussions are enriched by having the broadest possible participation and the students will gain more by actively engaging the material. It is understood that spontaneous discussion are part of undeveloped, unpolished though processes. Grading of participation is based on willingness to engage, not brilliance, or articulateness, or polish of statements.

2. Journaling

Each student is strongly encouraged to read, review, digest, and react to course content by writing in a journal after each reading assignment or class period. The journals will be graded based on the quality and amount of mental effort shown in wrestling with course content. Personal opinions or emotional reactions will not affect the grade. The student is welcome to react to the material, however, the journal should NOT be primarily a narrative of personal opinion. Entries should address three questions which reflect on any reading or class content:

- a. What was said? Give a summary of content.
- b. What does it mean? Think about the implications of the content.
- c. What do I think about this material? Give your reaction to the content.

Meticulous recording of ongoing content and thoughts throughout the course will assist the synthesizing process which must occur in the final paper.

3. Examinations

Mastery of objective course content will be evaluated with four mini-exams worth 50 points each. The dates for these quizzes are listed on the class schedule. They will primarily be objective questions, testing recall of information, and will not take more than ½ hour of class time.

4. Term Paper

This project will be the major student effort for the course. It will be a group project and a process that will require extensive synthesis of the scientific, theological, and philosophical content of the course.

Evaluation - Distribution of weight

1. Preparation and participation in Class 100 points

2. Journaling 100

3. Examinations 200

4. Term Paper 200

Grades: A (superior) 90-100%, B (good) 80-90%, C (average) 70-80%, D (below average) 60-70%, F (failure) below 60%

Class Schedule

DATE TOPIC & READING INSTR.

Wed Jan 9 What is mind? Cianci

Overview of course

Smock Ch. 1

Demo: measurable mind? Stroop effect

Mon Jan 14 How do we know? How do we approach our fields? Panel

Science, Philosophy, Religion: 3 languages

Templeton: Humble Approach

SCIENCE: Naturalism, empiricism, reductionism Davis

Wed Jan 16 Electrical Messages

Cells, membranes, potentials

Smock Ch. (2) 3

Mon Jan 21 Action Potentials Davis

EEG

Smock Ch. 4

Wed Jan 23 Chemical Messages Quiz #1: Electrical messages Davis

Synaptic transmission

Smock Ch. 5

Mon Jan 28 pharmacology Davis

Smock Ch. 17

Wed Jan 30 Learning & Memory Davis

Smock Ch. 15: 374-

Mon Feb 4 Sense & Perception Quiz #2: Chemical messages Davis

Phantom Limb Ramachandran

Wed Feb 6 Brainstem – reticular formation Davis

attention

Mon Feb 11 Thalamus Davis

Blind sight

How is unconsciousness related to consciousness?

Wed Feb 13 Hypothalamus

Appetite

Smock Ch. 14: 336-

Mon Feb 18 Sexuality

Wed Feb 20 Limbic system Quiz #3

What is will?

PBS Video: Larebus – temporal tumor

Mon Feb 25 Cerebral Cortex

PBS Video: Vickie - Split brain

Wed Feb 27

S P R I N G B R E A K

Wed Mar 13 Cortex Quiz #4

Language & aphasia

BS Video: Tom – language stroke

THEOLOGY: Revelation

Mon Mar 18 OT Anthropology Mead

Dryness, Themes in Old Testament Theology. Ch. 4: 79-96

Wed Mar 20 NT Anthropology Andres

Bultmann, Theology of the New Testament. Pg. 191-210

PHILOSOPHY: Logic

Mon Mar 25 Philosophy of Mind Wacome

Churchland, Matter and Consciousness.

Wed Mar 27 Philosophy of Mind Wacome

Churchland, Matter and Consciousness

E A S T E R B R E A K

Wed Apr 3 Philosophy of Mind Wacome

Churchland, Matter and Consciousness

Mon Apr 8 Stress Forgette

Smock Ch 6: Autonomic Nervous system

PBS video: stress

Wed Apr 10 Prayer, meditation and stress

Herb Benson

Mon Apr 15 Homosexuality

Is sexual orientation mind or brain? Is this a legitimate question?

PBS video: Mrs Brown & Dorner's stress theory

Wed Apr 17 Homosexuality

LeVay, Simon (1991) "A difference in Hypothalamic Structure Between Heterosexual and Homosexual Men". Sci, 1034-37.

LeVay, Simon (1993) The Sexual Brain. MIT Ch 1 & 3

Mon Apr 22 Depression Forgetting

Wed Apr 24 Schizophrenia Forgetting

PBS video: schizophrenia

Schizophrenia Bulletin personal accounts

Mon Apr 29 Animal brains and minds

Dawkins (1998) Through our Eyes only? Ch 1-6

May 1 Conclusions

May 6-9 Final Exam period - Paper due May 9

Paper Project

The most significant student work for this course will be a group project in which one topic will be chosen and the concepts of personhood in neuroscience, religion and philosophy are examined around that topic and a synthesis is attempted. The group is expected to work together, read each others' work and rewrite based on group contributions.

1. Choose topic: Turn in a brief description on topic to be investigated Due: Jan 30

Any topic related to human behavior which has both physical and moral/spiritual aspects:

Emotions, virtues or vices: forgiveness, anger, hate, love

Pathologies or lesions: prosopagnosia, obsessive/compulsive, fetal alcohol

Capacities: religious experience, moral reasoning

Comparisons: gender, culture, developmental, primate

2. Research neuroscience information on topic – a thorough search for all known NS on the topic is expected

list of references and synopsis of information Feb 11

extended outline of topic Feb 25

3. Write a synopsis of biblical view of persons Mar 20

4. Describe one or compare two models of mind/brain Apr 8

5. Final Paper May 9

This paper should contain four sections:

A. thorough behavioral and neuroscience description of the topic, history if appropriate

B. biblical anthropology and theological discussion of the topic

C. philosophical models for conceptualizing mind/brain as related to topic

D. a synthesis of the topic, conclusions, strengths and weakness of your model

6. Evaluation:

-Preliminary assignments Max: 25 points

Graded (1-5) for each assignment being well done and turned in on time

-Peer evaluation Max: 25 points

You will evaluate the contribution of each member of your group

-Final Paper Max: 150 points