Electron micrograph of Ebola virus

Instructors:

Dr. Joseph L. Graves, Jr.
Associate Dean for Research, Joint School of Nanoscience and Nanoengineering, & Professor of Biological Sciences
Office Suite 2200 2901 E. Lee St.
Phone: 336-217-5172
Email: gravesjl@ncat.edu

Office Hrs: TR 3:15 – 5:00 PM in 211 Hodgin Hall and by appointment.

Dr. Randall Hayes, Assistant Professor, Biology
rdhayes@ncat.edu 285-4462 Hodgin Hall MW 11-12pm and 1-4pm TR 9:30-12pm
214B

Tips for Successful Office Visit

It is important that students utilize office hours to help them clarify topics on which they have questions. It will be useful for you to write down specific questions that you wish to have addressed before your visit. Often times group office visits may be useful and are encouraged.
Required Texts:


Suggested Text:

Graves, J.L., *The Race Myth: Why We Pretend Race Exists in America*, (New York: Dutton Books), 2005...Available at Amazon.com (used copies run as little as $1.99.)

Readings: Additional readings as assigned.

Learning Objectives

This course is interdisciplinary. It will utilize subject matter from a variety of academic disciplines, through the range of organization that exists within them (molecular to societal). Students will read and discuss the established principles of evolutionary medicine along with new material as it arises from the primary literature. The pedagogy of this course introduces students to how to think critically about the origin, maintenance, and approaches to curing disease in humans. This course will specifically address the following university-wide general education learning goals: 5. use analytical thinking skills to evaluate information critically; 7. apply scientific reasoning skills to model natural, physical, social, and aesthetic phenomena using multiple modes of inquiry; 8. use a wide range of disparate information and knowledge to draw inferences, test hypotheses, and make decisions; 14. understand and apply ethical reasoning principles to resolve moral, social, and professional issues; 16. understand and promote principles of wellness that include nutrition, exercise, avoidance of mind-altering chemicals, development of healthy relationships and personal growth; 17. recognize behaviors that place individuals, families and communities at risk.

This course will address a variety of more specific learning objectives. Here are examples of how some of these can be scored along Bloom’s Taxonomy of Learning. Levels 1 – 6 represent more sophisticated understanding of a topic.

Competency

Blooms 1
Blooms 2
Blooms 3

Hypothetical reasoning as it is applied to evolutionary medicine.
Remember the scientific method and be able to define each component step in the context of disease.
Understand how hypothetical reasoning differs from other ways of knowing about disease (e.g. superstition.)
Apply hypothetical reasoning to the origin and maintenance of disease.

Health, disease, and aging.
Remember the definitions of health, disease, and aging and apply to evolutionary medicine.
Understand how health is influenced by disease and aging.
Apply your understanding of health, disease, and aging to a new phenomenon, e.g. health disparity.

Social construction of race.
Remember the biological and social definitions of race.
Understand how biological and social definitions of race impact biomedical research.
Apply biological and social concepts of race to biomedical research on health disparities.

Higher Level Taxonomies

Competency
Bloom4
Bloom5
Bloom6

Hypothetical reasoning as it is applied to evolutionary medicine.
Analyze hypothetical reasoning and explain how each constituent part logically implies evolutionary medicine.
Evaluate specific hypotheses with regard to evolutionary medicine.
Create and test new hypotheses to examine diseases not previously addressed by the evolutionary approach.

Health, disease, and aging
Analyze arguments concerning disease and aging and explain how these fit within the paradigm of evolutionary medicine.
Evaluate specific arguments that relate to disease and aging within evolutionary medicine.
Create new arguments concerning disease and aging and be able to determine their validity within evolutionary medicine.

Social definitions of race.
Analyze biological and social explanations and explain how their constituent parts are explained
within evolutionary reasoning.
Evaluate specific causal arguments concerning biological and social definitions of race within evolutionary reasoning.
Create new causal arguments concerning biological and social concepts of race and their impact in evolutionary medicine.

Course Organization and Evaluation:
The course periods will consist of lecture, discussion, and active learning (individual and group exercises.) Time may be given in sessions for students to spend time in the library, at the computer center, or for working on problems. Students should bring a scientific calculator to every class. Formative evaluations will be given consistently through the term, and may consist of things such as one minute papers, muddiest points, pro & con grids, and concept maps. Also, formative assessments will be conducted throughout the course using the Turning Point Classroom response system. The summative evaluation will consist of one test, two in class examinations, weekly homework assignments, and one research term paper.

Prerequisites:
The prerequisites for this class are completion of the UNST foundation courses (100, 110, 120, 130, & 140.) The other prerequisite is an inquisitive mind. Students should be aware that this class will build on the analytical reasoning skills you developed in UNST 130 and therefore does require use of mathematical and statistical tools. I will review all the mathematics required to comprehend the topics addressed in the course. Finally, since this course does focus on biological and medical topics, students should consider their background in biology before deciding to take this (Biol. 100 or Biol. 101 are recommended but not required.)

Readings:
These will be assigned weekly from the required texts and also from additional journal and magazine articles from the primary research literature as they become relevant. Whenever additional readings are assigned, there will be a 1 page typed summary and critique of them due at the next class. Finally, all lecture notes will be made available on black board, after the lecture is given in class.

Grading:
The final grade will consist of one in-class test [0.20], quizzes (clicker and paper) [0.20], midterm examination [0.20], final examination [0.20], and homework [0.20].
Clickers:

We will be using the Turning Point Classroom response system, all students should have their TP clickers from last year, if not you can purchase one at the bookstore. Students should have their clicker at each class.

Turnitin

All written materials in this class will be turned in electronically via Turnitin.com. Access to this web site will be given to you by the instructor. Turnitin compares your writing with virtually every reference that exists on the internet as well as a bank of student papers that have been submitted from all over the world. Its purpose is to help students learn the difference between proper citation and quotation of other authors’ work and plagiarism (copying others writing without citation.)

The URL for turnitin.com is: http://www.turnitin.org/static/home.html

You will go there and create a user profile using the following information:

**class ID:**

**password:**
Projected Topics Schedule¹:

Part I. Nothing in biology makes sense except in the light of evolution…

Weeks 1 -2. Basic definitions

Pre-scientific medicine

Definition of life and the logical necessity of evolution.

Simple versus complex genetics

The evidence falsifying creationism: simply explained

Differential reproductive success – Darwinian fitness

In this part students will test evolutionary predictions utilizing state of the art computer applications such as Populus 5.4 and AVIDA (artificial life simulation*).

*Both are free access software downloadable from the internet.

Readings:


Part II. Understanding the Meaning of Health in an Evolutionary Context

Weeks 3 - 5. Tu – Th: Definition of health, disease, and aging.

Readings:

Neese and Williams, chapters 1 – 5, pp. 3 – 76.


Nesse, R., How is Darwinian medicine useful? Western J. Med., v.174 (5); May 2001*.

(*In course documents – Blackboard.)
Part III. Critical Thinking About Biomedical Research and Clinical Practice

Weeks 6 - 8

First In-class Test: TBA
Term Paper Thesis Due
Term Paper Outline Due

Readings

Nesse and Williams, Chapters 6 – 10, pp. 77-158.


Graves, J.L., Making Sense of Biology: http://evostudies.org/blog/?p=97, 8-6-2009.

(in course documents)

Part IV. Birth, Life, Death, and Insanity: Homage to the Red Queen.

“For who would bear the whips and scorns of time,
The oppressor's wrong, the proud man's contumely,
The pangs of despis'd love, the law's delay,
The insolence of office, and the spurns
That patient merit of the unworthy takes,
When he himself might his quietus make
With a bare bodkin? who would these fardels bear,
To grunt and sweat under a weary life,
But that the dread of something after death, —
The undiscover'd country, from whose bourn
No traveller returns, — puzzles the will,
And makes us rather bear those ills we have
Than fly to others that we know naught of?”

Hamlet, Act 3, Scene I.
Weeks 9 - 11

Neese and Williams, Chapters 11 - 14.


(*in course documents).

Midterm Examination: TBA
Thursday November 13th: First Draft Term Paper Due

Part IV. Critical Thinking About Stealth: What you don’t know will kill you or why it is good to be a venereal disease.

Weeks 12 - 14

Ewald, Chapters 1 – 4, pp. 1 – 59.
Dvm, E. et al., Viruses use stealth technology to escape from the host immune system, Molecular Medicine Today vol. (3):3, pp. 116-123, 1997*.
(*In course documents.)

Part VI. Recapitulation and Conclusion: How I learned to stop worrying and embrace evolution.

Week 15.

Readings

Ewald, Chapters 5 – 8, pp. 71 - 126.


Final Draft Term Paper due TBA

Final Examination: TBA.

1. The topic schedule is subject to change.