COURSE TITLE: BIOL 316 – EVOLUTION

SPRING 2021: SH 1108, 11:10 a.m. – 12:30 p.m.
INSTRUCTOR: Dr. Scott Grubbs, OCH G011, e-mail: scott.grubbs@wku.edu
OFFICE HOURS: T, 1:00 p.m. – 3:00 p.m. or by appointment via e-mail.
TEXTBOOK: Herron & Freeman, 2014. Evolutionary Analysis (5th Edition, but the older 4th Edition is fine, too)
LECTURE MATERIALS: Available on your BIOL 316 Blackboard site

Course Description and Purpose

Evolutionary Biology embodies a fundamental framework from which we understand the natural world and comprises two primary components:

1. The historical facts of evolution, and…
2. The theories of how evolution occurs.

Evolutionary biology is multidisciplinary, synthesizing information from geology, paleontology, chemistry, genetics, systematics, ecology, and biogeography. We will address facts (**that life has changed**) and theories of evolution (**how life has changed**). Upon completion of this course, you should be able to:

1. Describe examples of changes in life over time,
2. Identify the four major mechanisms of evolutionary change,
3. Identify the facts and inferences regarding natural selection,
4. Explain the tenets and rationale of Hardy-Weinberg equilibrium theory, and
5. Compare and contrast individuals and populations in the context of evolutionary biology.

Overall, the goals of this course are to:

1. Develop a general understanding of the fact and theory of biological evolution,
2. Learn how to apply an evolutionary perspective to questions in other areas of biology, and
3. Develop an appreciation of evolutionary biology as a dynamic, rigorous, hypothesis-driven field of science.

Important Information

Grade Evaluation

There will be four exams and two short summary papers. Exam 1–4 are worth 50 points each. Exam questions will come from material from lectures and additional assigned videos. Exams may include multiple choice, short answer, and problem-solving questions. The latter includes understand the basic arithmetic of calculating allele and genotype frequencies. Please note that make-up exams are uncommon. You should expect to be present for all exams. In order to qualify for a make-up exam, you need to have contacted me prior to the exam. This is your main bargaining tool, but I reserve the right to decide if a make-up exam is afforded.

At least six readings from the primary literature will be assigned that focus on various aspects of evolutionary biology. You will be required to provide a written, three-page summary of your choice of **two of those papers**. This summary papers are worth 20 points each. I will provide detailed instructions and a written rubric at a later date.

Your final grade, determined from 240 points total, will be based on a straight scale according to WKU 10-point grading scale: A = 100-90%, B = 89-80%, C = 79-70%, D = 69-60%, F = 59-0%.

Attendance

Regular attendance is expected and is the most basic requirement of performing well on exams. Attending alone, however, is not enough if most of your in class time is spent on Snapchat or struggling to stay awake.

Academic Dishonesty

Students are expected to do their own work throughout this course and demonstrate academic integrity. Academic dishonesty in the form of cheating or plagiarism will not be tolerated. Dishonesty on quizzes, exams, or written assignments (see WKU's plagiarism statement below) will result in a failing grade for the class. Cheating (completing an assignment for someone else, allowing someone else to copy your assignment, copying and pasting from internet sources or elsewhere when you have not been instructed that this is acceptable, etc.) on online assignments will be tracked by computer.

Please refer to the WKU Student handbook for polices and definitions regarding academic integrity at: **http://www.wku.edu/Dept/Support/StuAffairs/StuLife/handbook/academicOffenses.htm**

> **WKU'S PLAGIARISM DEFINITION: "To represent written work taken from another source as one's own is plagiarism. Plagiarism is a serious offense. The academic work of a student must be his/her own. Once must give any author credit for source material borrowed from him/her. To lift content directly from a source without giving credit is a flagrant act. To present a borrowed passage without reference to the source after having changed a few words is also plagiarism."**

Classroom Behavior

My policy is simple: be on time and help create a positive learning environment free of distractions. This course is a restricted elective for biology majors and needs to be treated with respect. Food and sleeping are prohibited. **This is also a tobacco-free classroom, including all forms of chewing tobacco**. Students unwilling to abide by my policy will be asked to leave the classroom.

Drop and Withdrawal Dates

Be aware of the dates to drop and receive refunds. This is your responsibility, if you so choose, to drop the class in a timely manner.

Civility

All students are expected to abide by the Code of Student Conduct
https://www.wku.edu/studentconduct/student-code-of-conduct.php

Students with Disabilities – ADA Accommodation

In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center (SARC) located in Downing Student Union, 1074. SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu . Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

Title IX/Discrimination & Harassment

Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Title IX Sexual Misconduct/Assault Policy (#0.2070) at:
https://wku.edu/eoo/documents/titleix/wkutitleixpolicyandgrievanceprocedure.pdf and
Discrimination and Harassment Policy (#0.2040) at
https://wku.edu/policies/hr_policies/2040_discrimination_harassment_policy.pdf.

Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are

encouraged to report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121. Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at 270-745-3159.

Tentative (= subject to change) schedule and pertinent lecture material information

Introduction to Evolution & Evolutionary Thinking (including Chapter 2)

- Lecture 1 - Introduction
- Lecture 2 – Snapshot
- Lecture 3 – General patterns
- Lecture 4 – Natural Selection
- Grant Galapagos Finch seminar (Peter Grant only)

Tuesday, February 9 – EXAM 1

Mechanisms of Evolution (Chapters 3, 5–7)

- Lecture 5 - Mutations
- Knockout Gene Video
- Viral Reassortment Video
- Somatic Mutations video
- Lecture 6 - Selection and Mutation
- HIV videos
- Cystic Fibrosis and Typhoid Fever videos
- Lecture 7 – Genetic Drift
- Hardy-Weinberg math
- Lecture 8 – Quantitative Traits
- Dopamine video

Tuesday, March 9 – EXAM 2

Adaptation, Character Evolution, Sexual Selection & Origins (Chapters 9–11, 17)

- Lecture 9 - Adaptations
- Lecture 10 – Sexual Selection
- Firefly and Damselfly videos
- Lecture 14 – Deep Life Origins
- Lateral Gene Transfer video
- LUCA video (optional)
- Lecture 12 – Phylogenies
- Whale Evolution video

Tuesday, April 6 – EXAM 3

Systematics, History of Life, Macroevolution, & Human Evolution (Chapters 4, 16, 18, 20)

- Lecture 13 - Speciation
- Lecture 15 – Changes in Deep Time
- Lecture 16 – Human Evolution
- Human Evolution video

Tuesday, April 27 – EXAM 4 = FINAL EXAM, 8:00–10:00