

Lecture 1) Tu. Aug 26th. Tuesday. Introduction to the class. The uses of evolutionary biology.

Lecture 2) Th. Aug 28th. Thursday. The evidence for evolution. The biblical literalists and the evolution debate: The Scopes trial and Inherit the Wind.

www.law.umkc.edu/faculty/projects/ftrials/scopes/scopes.htm

Read Ch 22, Ch 1

Lecture 3) Tu. Sep. 2nd. The history of the concept of Evolution. Greeks, Middle Ages, Renaissance, Linnaeus, Buffon, Lamarck, Cuvier, Lyell, Malthus, Darwin, Wallace, Weismann, Mendel, Fisher, Wright, Haldane, and the modern synthesis.

Read Ch1

Lecture 4) Th. Sep 4th

The Hardy-Weinberg equation: why do we care? Is variability rare in natural populations? Importance of Variation.

Read Ch 9 (to 197); Review chapter 8 (basic genetics) on your own.

Lecture 5) Tu. Sep 9th. - Effects of Violations of H-W Assumptions: effects of non-random mating, error, selection, gene flow, mutation, Lewontin & Hubby and genetic variation in natural populations. The Erosion of Genetic Variability by inbreeding.

Read Ch 9 (197-205)

Lecture 6) Th. Sep 11th- Genetic drift, consequences for conservation biology, effective population size, founder events.

Read Ch 10

Lecture 7) Tu. Sep 16th- Gene flow models; gene flow studies; northern purity/southern richness. One hundred kinds of natural selection: directional selection: competitive character displacement, runaway sexual selection, fluctuating selection, multiple niche polymorphism.

Ch 11 & 12

Lecture 8) Th. Sep 18th- Multiple niche polymorphism, continued. Studs, duds and the importance of heritability; the speed of directional selection mutation and selection; fluctuating, frequency dependent, disruptive selection, Wright's shifting balance, balancing selection.

Ch 12

Lecture 9) Tu. Sep 23rd- Genetic load, genetic variability, geographic variation. Geographic variation (clines in eels and mussels- natural selection or secondary contact), ring species.

Ch 9 (212-224)

Lecture 10) Th. Sep 25th Factors that inhibit gene flow- pre- and post mating isolation. Premating and prezygotic: Mating songs and dances, aggressive mimicry, lock-and-key. Post-mating and Pre-Zygotic: sexual selection and cryptic female choice, sperm-egg contact, natural selection at the molecular level.

Ch 15 (359-373).

Lecture 11) Tu. Sep 30th. Post-mating and post-zygotic reproductive isolation sterile hybrids, polyploids. Species concepts: morphological & phenetic, biological, phylogenetic, cohesion.

Ch 15 (353-359)

Lecture 12) Th. Oct 2nd- Species concepts (cont.) cohesion, practical considerations: large biodiversity studies versus detailed studies of specific genera. Speciation Mechanisms: allopatric, peripheral isolates, founder event speciation, parapatric, sympatric; host races. Case study: *Eumeces skiltonianus* skinks: allopatric speciation (peripheral isolate), disruptive selection-adaptive divergence among ecotypes, secondary contact, gene flow is eroding species differences despite female choice based on body size.

Chs 16

Lecture 13) Tu Oct 7th- Chromosomal Speciation. With and without Hybridization; translocations, polyploidy, polyphyletic species, co-adapted allele complexes. Allochronic: periodical cicadas.

Ch 16.

Lecture 14) Th. Oct 9th- Hybrid zones. Hybrid zones, reinforcement, reproductive character displacement.

Ch 15 (373-377).

Midterm. Tu. Oct 14th.

Readings for the Second Half of the semester will be assigned in a revised syllabus. Topics follow...

Lecture 15) Th. Oct 16th. Systematics: reconstructing evolutionary patterns; understanding biodiversity; the three schools. Homology and homoplasy: convergence, parallelisms, and reversals in evolution.

Lecture 16) Tu. Oct. 21st. Reconstructing evolutionary trees from morphological data; Reconstructing evolutionary trees from molecular data.

Lecture 17) Th. Oct 23rd. The tempo of molecular evolution; is there a molecular clock?

Lecture 18) Tu. Oct 28th. The origin of evolutionary novelties: Body plans, constraints; preadaptation. The origin of evolutionary novelties: modification of existing traits: gene duplication, gene regulation. Chickens with teeth, humans with tails, flies with eyes on their wings.

Lecture 19) Th. Oct 30th. Ontogeny and phylogeny, neotony, paedomorphosis, acceleration & hypermorphosis: incestuous cannibalism, Allometry and giant babies, kings from hermits.

Lecture 20) Tu. Nov. 4th. Introduction and overview of the fossil record. The origin of life. The RNA world. Prokaryote world. The origin of animals; the Ediacaran Fauna.

Lecture 21) Th. Nov. 6th. The cambrian explosion (or was it?). The origin of vertebrates and the invasion of land. Major innovations in the evolution of animals

Lecture 22) Tu. Nov. 11th. Ordovician (the age of jawless vertebrates), Silurian (first life on land), Devonian (the age of fishes) Carboniferous (Dragonflies with 2 ft. wing spans; club moss forests)

Lecture 23) Th. Nov. 13th. Permian. The origin of mammals. The Permo-Triassic boundary mass extinction. Mesozoic: The age of reptiles. Pangea breaks up followed by Laurasia and Gondwanaland.

Lecture 24) Tu. Nov. 18th The K-T Boundary. The extinction of the dinosaurs. Birds and mammals cross the boundary. The Cenozoic: Continental drift, land bridges, mountain building. Modern biogeographic distributions take shape. The great American interchange.

Lecture 25) Th. Nov. 20th. The Cenozoic: Paleocene, Eocene, Oligocene, Miocene, Pliocene, Pleistocene. Global warming to the tropical Eocene; Global cooling until the last ice ages. Change accelerates during the last 30 million years.

Thanksgiving Recess- Tue Nov 25th and Th Nov 27th

Lecture 26) Tu. Dec. 2nd. Primate evolution. Human evolution; Mitochondrial Eve and her relatives. Africa, our most diverse continent. Humans invade Asia and the Pacific and later North America.

Lecture 27) Th. Dec. 4th. Biogeography and Biodiversity

Second lecture exam and Final exam will both be given during finals week in the regularly scheduled 2-hour period.