PALEOBOTANY Fall 2024

3 Credits, BOT4935, BOT5305, GLY4930, GLY6932

This course deals with the evolution of plants through geologic time, based upon the fossil record. We begin with the earliest known life on earth and consider the history of major phylogenetic groups of plants through time with attention to changes in morphology and community structure. Topics include the earliest land plants, the first leaves, the first trees, and changes in reproductive biology leading from spores to seeds and pollen and the evolution of flowering plants. We will also emphasize the response of plants to continental rearrangements, extraterrestrial impact, and consider the contributions and response of plants to changes in climate.

An optional field trip is planned for students to gain experience collecting fossil leaves.

Professor: Steven Manchester, Florida Museum of Natural History: steven@flmnh.ufl.edu

Prereq: Upper level course in botany or geology or permission of instructor.

Meeting times: Monday 1:55–2:45, Wed 1:55–4:55 pm

Lectures: Mon, Wed 1:55; Rolfs Hall rm 105.

Laboratory: Wed: 3:00-4:55,Rolfs Hall 105. Learn to analyze and identify fossil specimens

Office Hours: Flexible, by appointment: steven@ufl.edu

Textbook, recommended: Paleobotany and the Evolution of Plants, by Stewart and Rothwell 2010. Cambridge University Press

Field trip to collect fossil plants. Optional, to be arranged.

Grading Basis. 3 exams covering lecture and laboratory; Graduate students are required to give a class presentation on a paleobotanical project of their choice.

Course Expectations

• Attend class and arrive on time. Details on university attendance policy are available at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

• Participate in class discussions, including your thoughts on the assigned readings.

Grading Scale: A (≥90 & <93), B+ (≥87 & <90), B (≥83 & <87), B- (≥80 & <83), C+ (≥77 & <80), C(≥73 & <77), C- (≥70 & <73), D+ (≥67 & <70), D (≥63 & <67), D- (≥60 & <63), E (<60). GPA information can be found: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Schedule of Lecture & Laboratory Topics Fall 2024

1. Aug. 26, Introduction to Paleobotany [reading: textbook p. 1-30]

2. Aug. 28, Origin of life, Precambrian diversification [reading Ch. 4] **[Lab A: Modes of fossil preservation**; **Precambrian fossils**]

Sep. 2, Labor Day Holiday.

3. Sep. 4, Origin of land plants, Tracheophytes [Ch. 7, 9,10, 13] **[Lab B: Early Land Plants]**

4. Sep. 9, Early Lycophytes; isoetalean clade [Ch. 11].

5. Sep. 11, Lycophytes 2 **[Lab C. Lycopods]**

6. Sep. 16, Sphenophytes [reading: textbook Ch. 14, 15, 16]

7. Sep. 18, Early Ferns. **Lab D, Sphenophytes**; coal ball peel preparations.

8. Sep. 23, Ferns; Paleogeography [Ch. 17-19]

9. Sep. 25, Ferns; Wrap up: lower vasc plants **[Lab: E. Ferns]**

Sep 30, **Examination I**

10. Oct. 2, Origin of Lignophytes, Progymnosperms **[Lab F.Progymnosperms]**

11. Oct. 7, Origin of Seed plants [Ch. 21]

12. Oct. 9, Paleozoic seed ferns [Ch. 22, 23] **[Lab G. Paleozoic seed ferns]**

13. Oct. 14, Paleozoic climate and environments; Cordaites [reading Ch. 28]

14. Oct. 16, Early coniferophytes **[Lab H: Cordaites, Conifers]**

15. Oct. 21, Plate tectonics, conifer diversification and evolution [reading: textbook Ch. 29]

16. Oct 23, Mesozoic gymnosperms Cycads, Bennettitales [Ch. 24-27] Gnetales and other gymnosperms continued. **Lab I. Cycads, Bennettitales**]

Oct 28, **Examination II**

17. Oct 30, Plate tectonics; Angiosperm origins, relationships to other seed plants **[Lab. J. Cretaceous angiosperms]** [Ch. 30]

18. Nov. 4, Biogeographic patterns, evolutionary trends in flowers and seeds.

19. Nov. 6, Evolutionary patterns in leaves and pollen [Ch. 31] **[Lab K. Angiosperm case histories]**

Nov. 11, Veterans Day holiday

20. Nov. 13, Diversification of extant angiosperm families **[Lab L. Cenozoic angiosperms]**

21. Nov. 18, Climate change as deduced from fossil plants; angiosperm case histories

22. Nov. 20, *Student Project Presentations* **[Lab. M. Palynology]**

Nov 25-29: **Thanksgiving Holiday**

23. Dec. 2, Paleobotanical insights on the K-T and P-E boundaries.

24. Dec. 4, Current and future research directions in Paleobotany. [Lab materials according to request] **Examination III - Final Exam [take home, due** Dec. 11]