Plant Ecology & Global Change (EFB 445/645) Spring 2021

State University of New York College of Environmental Science & Forestry Syracuse, NY

Instructor: Dr. Martin Dovciak; *Online Office Hours (Spring):* Tu, Th 11-12 or by appointment
Email: mdovciak@esf.edu; *Contact/Web*: https://www.esf.edu/faculty/dovciak/

Teaching assistant: Joanna Lumbsden-Pinto; *Online Office Hours*: W 1:30-3 pm or by appointment;
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Class times: Lecture- TuTh 9:30-10:50 am; **Course Format is Online Synchronous (in real time)**

Class meetings & Office hours: Held in Online Classroom (Zoom link on Blackboard course site)

Public course website: https://www.esf.edu/efb/dovciak/EFB445-645.htm

Internet Access, E-mail & Syracuse University NetID: *Internet access and E-mail is required for this course. SU NetID is required to access course Blackboard site. All lectures, discussions, reading materials, exams, and office hours are in an online format.* Announcements will be posted on Blackboard and students will receive email notifications about them at their '@syr' email address. Students are responsible for checking their '@syr' email regularly (at least once per day).

Course description: The course examines in detail how terrestrial plant communities and ecosystems respond to ongoing global changes in climate, land-use, biogeochemical cycles, invasions by non-native species, and native biodiversity loss. We examine how these global environmental changes can alter the structure and function of plant communities, their interactions with other ecosystem components (such as herbivores or decomposers), and their effects on ecosystem flows (such as nutrient or water cycles). We will examine how global change affects plant communities and ecosystem processes across a range of spatial and temporal scales — from ecophysiological processes occurring in individual leaves to global patterns of primary productivity and biodiversity. The course lectures include interactive discussion of key research papers in plant ecology and global change. Undergraduate students should register for EFB 445, graduate students for EFB 645 (3 credits). Prerequisite: EFB 320 General Ecology (or similar).

Learning outcomes: This is the only 3-credit course at SUNY-ESF or Syracuse University that devotes a full semester to a detailed study of the effects of global environmental change on plants, plant populations and communities, and ecosystems. The course addresses the following college learning outcomes: scientific reasoning, critical thinking, basic communication skills, technological and information literacy, ethics, and diverse perspectives. After completing this course, the student should be able to:

- explain the main aspects of global environmental change and their effects on plants across scales,
- explain major concepts and theories of plant ecology,
- construct and test hypotheses critical to plant ecology,
- understand important quantitative methods common in plant ecology,
- apply critical thinking and analytical skills in the study of plants in ecosystems,
- effectively communicate and discuss scientific findings,
- analyze interrelationships between plants and global contemporary environmental challenges.

Examples of student work may be used for assessment purposes with student names/identifiers removed.

Course readings:

- Textbook: Gurevitch J, Scheiner SM, Fox GA. 2020. The Ecology of Plants. 3rd Edition. Oxford University Press. [eBook available on Blackboard via SU Orange Instant Access Program @ $60]
- Research papers published in primary literature (made available via Blackboard)
- Additional materials available via Blackboard or public course website (including this syllabus).

Grading:

- **Exams:** Three cumulative exams cover lectures and assigned readings from textbook and selected papers.
- **Discussion contributions:** Students' discuss selected papers and their contributions can be either oral during online classroom discussions OR written by submitting their discussion points in advance to the Blackboard Discussion Forums (by noon of the day preceding classroom discussion). At least 15 thoughtful contributions are required (orally or in writing).

	EFB 445	EFB 645
Exam 1	25	25
Exam 2	25	25
Final Exam	30	30
Discussion contrib.	20	10
Discussion leader	---	10
Total Percentage	**100**	**100**

- **Discussion leadership (EFB 645 only):** Graduate students work in pairs to introduce Discussion Forum papers using a short PowerPoint (no more than 7-minute duration) and they moderate the following discussion (no more than 20 minutes long). Each graduate student is expected to contribute to both developing and presenting their joint PowerPoint presentation AND developing the discussion questions and leading the discussion. One PowerPoint with the presentation AND the discussion questions should be posted on Blackboard by midnight of the day preceding the classroom discussion.

Attendance Policy: Attendance does not count toward the grade, but it is required to do well in class.

Make-up exams or assignments: Provided only if the student has a valid reason and confirmation such as: (1) Illness or hospitalization–requires a note from a physician, (2) Traumatic personal issues–requires ESF Student Life notification, (3) Death in the Family–requires an Obituary or Mass card.

Academic Dishonesty: Academic dishonesty is a breach of trust between a student, one's fellow students, or the instructor(s). Examples of academic dishonesty includes but is not limited to plagiarism and cheating, and other forms of academic misconduct. By registering for courses at ESF you acknowledge your awareness of the ESF Code of Student Conduct. More information regarding Academic Integrity, including the process for resolving alleged violations, can be found in the Student Handbook (https://www.esf.edu/students/handbook/).

Students with Learning and Physical Disabilities: Students requiring disability-related accommodations can contact the Center for Disability Resources (CDR, 804 University Av., Suite 303, 315-443-4498; https://disabilityresources.syr.edu/) to schedule an appointment and discuss their needs and the process. Students may also contact ESF Office of Student Support (110 Bray Hall, 315-470-6660; https://www.esf.edu/students/support/) for assistance. Authorized accommodation forms must be in the instructor's possession at least 1 week prior to any anticipated accommodation. Accommodations require early planning and generally are not provided retroactively. [Contact CDR as soon as possible to schedule exam (if needed) to allow sufficient time for CDR and the course instructor to coordinate the exam].

Lecture, Discussion, & Exam Schedule (February 8, 2021)†

Discussion Forum Dates, Topics, and Papers are in Bold.

Month	Day	Lecture Topic:	Assigned Readings—Textbook Pages & Selected Papers	
Febr.	9 (Tu)	1. Introduction to Global Change:	Book (439-441; 471-473; 566-572)	Ripple et al. (2017, 2019)
	11 (Th)	2. Biomes & Plant Physiognomy:	Book (513-520; 523-541)	The Private Life of Plants
	16 (Tu)	3. Climate Template:	Book (447-471; 505-507)	
	18 (Th)	**4. Global Climate Change:**	Book (475-493)	**Williams *et al.* (2007)**
	23 (Tu)	5. Light Environment:	Book (21-50; 474)	
	25 (Th)	**6. Water & Thermal Balance:**	Book (53-81)	**Pfautsch *et al.* (2016)**
March	2 (Tu)	7. Soils & Plant Nutrition	Book (83-108)	
	4 (Th)	**8. Ecosystem Processes:**	Book (111-139)	**Reich & Hobbie (2013)**
	9 (Tu)	**Exam 1**		
	11 (Th)	9. Adaptation & Evolution:	Book (231-257)	
	16 (Tu)	**10. Growth & Reproduction:**	Book (143-150; 153-154; 170-175)	**Reich & Oleksyn (2008)**
	18 (Th)	11. Life History Strategies:	Book (177-195)	
	23 (Tu)	*EFB Wellness Day (No Classes)*		
	25 (Th)	**12. Population Structure & Dynamics:**	Book (199-229)	**Doak & Morris (2010)**
	30 (Tu)	13. Interactions Among Plant Species:	Book (261-288)	
April	**1 (Th)**	**14. Models of Community Dynamics:**	Book (289-294)	**Chesson *et al.* (2004)**
	6 (Tu)	15. Interactions Across Trophic Levels:	Book (297-331)	
	8 (Th)	**16. Community Properties:**	Book (333-349; 508-511)	**Kelly (2008), Breshears (2008)**
	13 (Tu)	**Exam 2**		
	15 (Th)	**17. Comparing Plant Communities:**	Book (349-368)	**Jurasinski & Kreyling (2007)**
	20 (Tu)	18. Disturbance:	Book (377-385)	Keddy (2017, Chapter 5)
	22 (Th)	**19. Succession:**	Book (371-376; 385-396)	**Fridley & Wright (2018)**
	27 (Tu)	20. Abundance Curves- Rarity-Invasions:	Book (397-412)	
	29 (Th)	**21. Biodiversity Effects on Ecosystems:**	Book (412-418)	**Isbell *et al.* (2015)**
May	4 (Tu)	22. Spatial Patterns & Processes:	Book (421-439; 442-446)	
	6 (Th)	23. Global Plant Diversity Patterns:	Book (543-566)	***Review session at the end of class***
	TBA	**Final Exam**		

Footnotes: † Schedule above is subject to change. Updates will be made if needed.

Student Notes: