Forest Ecology

Course Objectives:
The goal of this course is for students to develop a basic understanding in ecology with an emphasis on forest structure and management. In this course, we will cover topics such as ecosystem dynamics, abiotic and biotic factors, trophic cascades, human impact and climate change, and population dynamics. At the end of this course, I expect students to have mastered the basic ecological models (i.e. the exponential population growth model) and to feel comfortable collecting data in the field. The overall aim of this course is for students to learn how to design an ecological study in forest systems, feel confident in the field using various basics tools and to understand the potential broader impacts of basic systems.
We will meet every Monday and Wednesday from 11:30a - 1:00p.

Resources:

- Gotelli, N.J. *A Primer of Ecology*. 2008. Sinauer Associates, Inc., Sunderland, MA (ECO)
- Chapin III, F.S., Matson, P.A., and Vitousek, P.M. *Principles of Terrestrial Ecosystem Ecology*. 2011. Springer Science+Business Media, New York, NY. (CMV) (**There are many copies available at the library.**)

Additional Reading: Additional primary literature articles will be available for students on the website and are listed in the '*Reading*' column of the schedule below. Full citations are also listed.

Field/Lab Sessions: Each week, students will have a lab session for two hours to learn basic ecology fieldwork and labwork. The aim is to provide students with a firm foundation in preparing for fieldwork, basic tool use, and greenhouse and growth chamber use. Students will need to first complete the lab safety module before the first lab session in order to participate. The module can be found on the course website.

Schedule:

Class	Topic	Reading
M: 10 Sept	Intro to Forest Ecology	**CMV: 3-21** & Gilliam (2007)
W: 12 Sept	Forest Management	**CMV: 423-446** & Johnson & Curtis (2001)
F: 14 Sept	**Lab 1:** Preparing for the field	
M: 17 Sept	Thermal & Water Relations	**CMV: 93-121** & Arii & Lechowicz (2002)
W: 19 Sept	Soils Properties	**CMV: 63-89** & Prentice *et al.* (1992)
F: 21 Sept	**Lab 2:** Plant Presses	
M: 24 Sept	Canopy structure & Light	Farrior *et al.* (2016) & Jiquan Chen (2014)
W: 26 Sept	Succession & Recruitment	**ECO: 179-201** & **CMV: 351-365**
F: 28 Sept	**Lab 3:** Dichotomous Key - trees	
M: 1 Oct	Trophic Dynamics	**CMV: 297-319** & Moore *et al.* (2004)
W: 3 Oct	Disturbances	**CMV: 339-350** & Gu *et al.* (2008) & Bailey & Whitham (2002)
F: 5 Oct	**Lab 4:** Dichotomous Key - grass	
M: 8 Oct	Nutrient Cycling	**CMV: 229-256** & Sardans *et al.* (2016)
W: 10 Oct	Carbon Cycles	**CMV: 123-155** & Grassi *et al.* (2017)
F: 12 Oct	**Lab 5:** Field Surveys	
M: 15 Oct	Dispersal & Seed Predation	Clark *et al.* (1999) & Smith (1987)
W: 17 Oct	Reproduction & Growth	Primack (1987) & Aizen & Feinsinger (1994)
F: 19 Oct	**Lab 6:** Seed Collection	
M: 22 Oct	Phenology	Basler & Korner (2014) & Chuine (2010)
W: 24 Oct	Fire Ecology	Whitlock *et al.* (2003) & Larson & Churchill (2012)
F: 26 Oct	**Lab 7:** Succession	
M: 29 Oct	Strategies & Adaptations	Poorter & Bongers (2006) & Lindner *et al.* (2010)
W: 31 Oct	Invasive Species	MacDougall & Turkington (2005) & Stachowicz *et al.* (2002)
F: 2 Nov	**Lab 8:** Growth Facilities	
M: 5 Nov	Trees at Extremes	Sass-Klaassen *et al.* (2016) & Niemelä *et al.* (1996)
W: 7 Nov	Climate Change Impacts	**CMV: 23-59 & 401-421** & Walther *et al.* (2002)
F: 9 Nov	**Lab 9:** Phenology	

Class	Topic	Reading
M: 12 Nov	Competition & Herbivory	**ECO: 99-123** & Ettinger & HilleRisLambers (2017)
W: 14 Nov	Facilitation & Mutualisms	Booth & Hoeksema (2010) & Jandér *et al.* (2016)
F: 16 Nov	**Lab 10:** SLA & DBH	
M & W: 19-23 Nov	Thanksgiving Break!	
M: 26 Nov	Landscape Ecology	**CMV: 369-396** & Roxburgh *et al.* (2004)
W: 28 Nov	Patch Dynamics & Edge Effects	**ECO: 155-176** & Forman & Godron (1981)
F: 30 Nov	**Lab 11:** GPS Mapping	
M: 3 Dec	Diversity & Population Dynamics	**ECO: 203-223** & **CMV: 321-335**
W: 5 Dec	Human Impact & Regeneration	Honnay *et al.* (2005) & McGill *et al.* (2006) & Dupouey *et al.* (2002)
F: 7 Dec	**Lab 12:** Edge Effects	

Grading Rubric:

Type	Percent of Grade
Participation & Discussion	15
Lab Sessions	15
Midterm	30
Final Exam and Project	40

References

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