



Oregon State University

Ecampus

Course Name: Field Methods in Plant Ecology

Course Number: BOT 440/540

Credits: 4 Credits

ABOUT THE COURSE

Course objectives

Vegetation is a collective term for the plants of any area, large or small. For example, scientists talk of the vegetation of Oregon and Washington, the vegetation of Crater Lake National Park, the vegetation of Wizard Island, and the vegetation of a 1000 m² study plot on Wizard Island.

Vegetation science is the study of the composition, characteristics, and changes of vegetation. (Want examples? See the section of the course on Ecological Background.) Gathering information from the field is an essential part of many studies in vegetation science, such as rare plant monitoring, vegetation description, and experimentation. The goal of the course is to give you a firm understanding of the concepts and tools needed for describing, monitoring, and experimenting on vegetation. In the course you will explore ecological and statistical material, complete exercises, conduct field projects at your location, and prepare reports describing your field projects and analyses. This course structure — Web-based instruction, field work, and graded projects — aims to build your confidence and provide professional-level training and experience.

I hope that after completing Field Methods in Vegetation Science you will be able — not only to collect field data correctly and efficiently — but to tell if field data collected by others are valid. After all, many of you will be in positions of authority, making important decisions based on field data.

Learning outcomes

Following Oregon State University guidelines, the learning outcomes of **students enrolled in BOT 440** emphasize knowledge, comprehension, and application. After successfully completing BOT 440, students will be able to

- Describe and use various methods of measuring vegetation characteristics.
- Describe and use the concepts of statistical sampling in vegetation science.
- Understand the relative advantages and of different techniques in different field circumstances.
- Design, implement, analyze and report a vegetation field study.

The learning outcomes of **students enrolled in BOT 540** emphasize analysis, synthesis, and evaluation. After successfully completing BOT 540, students will be able to, in addition to the accomplishments listed above,

- Draw original conclusions from data.
- Apply relatively advanced quantitative methods to sampling of vegetation data.
- Compare and explain the limitations and validity of various field methods in vegetation science.

- Analyze and evaluate the field methods, sampling designs, and comparative designs of articles in the scientific literature.

Course structure

Learning in the course comes from studying the online textbook, completing the assignments, and considering my comments on your assignment reports.

The online textbook consists of 11 chapters written especially for this course.

The assignments include online quizzes, indoor exercises, and field projects. There are no examinations.

Work load

Field Methods in Vegetation Science is a four-credit course, which means you should average about 10 hours of work per week over the term. There is no printed textbook. The online textbook is about equivalent to 100 printed pages, smaller than average for a four-credit course. But there is much more effort than usual in the exercises and projects. These are not just assessments, but ways to understand the material -- there is nothing like learning by doing.

Course information

The course information contains almost as much information as the online textbook! Because this material on course structure, technical and other logistics, and supporting resources can be pivotal to success in the course, I suggest familiarizing yourself with each part of each section. Within lurk advice and adjuvants, resource links and spreadsheet tricks, required equipment and required assignments — all with the intention of sharing field methods in vegetation science.

WHAT YOU SHOULD KNOW BEFORE STARTING Field Methods in Vegetation Science

The formal prerequisites for BOT 440 are "a course in ecology, a course in statistics" and for BOT 540 "a course in ecology, ST 511 or equivalent." Because course content can differ considerably, the following list of recommended knowledge and skills should give you a better idea if you have the right preparation to be successful in the course. If you do not know something, but know where you can look it up, you should still be OK. You can also visit the Background chapter of the course; if you are comfortable with the material there, you are probably ready to tackle the course material.

Ecology

- You are familiar with some of the following *terms*: vegetation, biomass, productivity, frequency, cover, species diversity, DBH (diameter at breast height)
- You know the *scientific name* of a few plant species (the names aren't important, but this is a good indicator of whether you have sufficient botanical background)
- You know that one way to define a *plant population* is as a group of individuals of the same species growing in the same area
- You know that one way to define a *plant community* is as a group of plant species growing in the same area

Statistics

- You understand the concept of *uncertainty* and how it leads to variability in our observations of nature

- You know that taking several *observations* is essential for being able to make confident statements about nature.
- You realize that in a sampling study these equivalent observations are called *replicates* (the term replication is used in a slightly different way in experiments)
- You understand and can calculate a *confidence interval*
- You can use a *t-table* or computer program to look up t-values
- You can conduct a one-sample *t-test*
- You can *work outdoors*
- You can *navigate the Web*
- You can send *e-mail* messages with attachments
- You can work with a *spreadsheet* program or the equivalent (this will make completing the assignments a whole lot easier)
- You are prepared for a self-paced course.

For BOT 540 students

- You have read at least some scientific *articles* in ecology, to give you a professional perspective
- You are willing and able to *assess* the success of your use of the field methods in the course
- You can check for *normality* of errors
- You can conduct a *two-sample t-test*
- You aren't scared of learning about the *interquartile* range
- You are facile in using a *spreadsheet* program or its equivalent, so you can handle the extra number crunching in BOT 540

SCHEDULE

The best (but not actually required) way to move through the course is to go through the chapters in order, doing the assignments for each chapter as you go. The early chapters and assignments develop concepts and skills needed in later chapters and assignments. The section on Assignments contains more detailed information.

The course is entirely self-paced. But an important part of the course is submitting assignments, reviewing the comments back from me, and then applying your understanding to the next assignments. **A steady pace through the term is very important for letting this process work** — so keep on or ahead of the recommended schedule. The final day to submit reports is Friday of Week 10.

GRADING

Guaranteed grades. Following university guidelines, the grading system consists of twelve basic grades, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, and F. Getting 94% or more of the possible points guarantees an A, 88% an A-, 85% a B+, 82% a B, 79% a B-, 76% a C+, 73% a C, and 70% a C-. So if you have 95% of the possible points at the end of the course, you know you will get an A. This is true even if *everyone* has over 90%. That is, I will not curve grades down.

Curving up. But I might curve grades up. If at the end of the course the scores are generally low but A and B work is being done, then I must have been scoring too strictly. That means the standards for As, Bs, etc. should be adjusted to include lower point totals.

A special note on the quizzes. The quizzes are a way for you to get feedback on how you're understanding the material. You must get 100% to get any points, but you can take the quiz as many times as you wish.

Grading expectations of students enrolled in BOT 540: Just as you can expect to learn more if you are enrolled for graduate credit (BOT 540), I have additional expectations from your assignments. Your reports should reflect the broad perspective and astute insights of the professional ecologist. Your reports should include any advanced material for 540 students. Some assignments are only for 540 students (lucky you!).

Incompletes--don't go there And in case you were wondering, there is no chance of a casual incomplete at the end of term.

ACADEMIC POLICIES

My policy on academic honesty: Every assignment is open book, open mind, open everything. Feel free to discuss any assignment with anyone you wish. The writing must be your own (but I encourage you to have someone proofread your drafts!). If you use someone's published information, acknowledge your debt by giving proper citation.

Policy on incompletes: Take this course only if you plan to complete the course by the end of the term. There is no chance of a casual incomplete at the end of term. According to OSU policy, you must have completed significant course work at a passing level to obtain an incomplete, and you should not expect or request an "incomplete" grade unless there are extenuating circumstances.

Student evaluation of teaching: The Student Evaluation of Teaching forms are an important part of this course, both to OSU and to me. I change the course materials and my teaching approach each year in response to what you write in your evaluations. I hope and expect that you will complete the online student evaluation at the end of the course.

OSU policies apply: • Academic Regulations • Policy on cheating, plagiarism, honesty, etc. • Services for students with disabilities:

PLAGIARISM

You are expected to submit your own work in all your assignments, postings to the discussion board, and other communications, and to clearly give credit to the work of others when you use it. Academic dishonesty will result in a grade of "F." Link to Statement of Expectations for Student Conduct: <http://oregonstate.edu/admin/stucon/achon.htm>.

STUDENTS WITH DISABILITIES

Accommodations are collaborative efforts between students, faculty and [Disability and Access Services \(DAS\)](#). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.

TEXTBOOK INFORMATION

NOTE: For textbook accuracy, please check the textbook list at the OSU Bookstore website (<http://www.osubeaverstore.com/>). Syllabi may not have the most up to date textbook information!

Field Equipment for BOT 440/540: description and suggestions on where to purchase.

Field work in vegetation science requires field equipment. This is not available from the OSU bookstore, you need to make, borrow, buy from your local hardware store, or purchase online. For the exercises described in the online textbook you will need the following items for both BOT 440 and BOT 540. You may need additional items for the project you design yourself.

1. One roll of flagging tape (any color)
2. Good compass x1
3. 30-m measuring tapes x2
4. stake flags (pin flags)
5. surveyor's pins x2
6. one metric cruiser's crutch or cruise angle (for measuring Stand Basal Area)
7. 7.98 m radius cord x1 (to make a 200 m-square plot, make it yourself)
8. 0.5 m² quadrat frame x1 (you make this yourself with PCV pipe or some other material)
9. one 5m Diameter tape

Some of these items may be purchased from Ben Meadows or Forestry Suppliers (see their online catalogues). If you talk with the sales representative you may be able to get a student discount. Or you may be able to borrow from someone who does field work! Here are some examples from the Forestry Suppliers Catalog with approx. 2012 price. Take a look, perhaps you already have something around the house you can use instead.

1. Flagging: SKU: 57921. Also sold in hardware stores. \$2.50

2. Compass, good quality compass with sighting, like the 2 listed below. Compasses such as Suunto 37010 with optical sight are more accurate but a lot more expensive (\$110). If you decide to use a cheaper compass, you will have to do the bearings very carefully, since they are only accurate to about +/- 5 degrees at best.

37067 Silva Trekker Compass, Azimuth (corrects for true/magnetic north) \$22

37182 Suunto navigator \$42

3. Measuring tape, 30 m. FS 40108 30m OTR-30M. \$25.50 each. Non-metric tapes (feet) can only be used if you convert all measurements to metric before performing any of the class calculations.

4. Stake flags, Pin flags. 33501 Wire Flags, 2.5. x 3.5. x 15., Orange \$6 per bundle of 100, also available in hardware stores

5. Surveyor pins x2. 39503 Orange \$4.40 each (or you can make your own).

6. Cruiser's crutch or cruise angle. FS 59778 Metric Model (\$32 + s/h)

Ben Meadows sells a non-metric cruise angle (basically the same thing as a Cruiser's Crutch) which is only \$12. However, I cannot find one that is metric, and the conversion is quite difficult.

7. Radius cord – Make this yourself from any non-stretchy cord or rope. Before measuring the cord to length, make a loop in one end so you can attach it to a center pin.

8. Quadrat – Note the spelling, Q-U-A-D-R-A-T. It is not called a quadrant. This you also make yourself. It can be 4 pieces of small-diameter PVC pipe with 4 corner pieces, or made from wood or another material. It is useful (not essential) if it can be broken down for carrying and to place around vegetation.

The quadrat frame (inside measurement) will be 0.5m by 1m in size. The online textbook gives detail, including hints on whether you need a different size. The ability to create quadrat frames to specification is a great skill to have as a vegetation scientist!

9. 5m Metric Diameter tape. This is a tape that measures tree diameter directly from the circumference. It has one side in normal meters, the other side is in diameter units. FS 59571 (\$38). You can also buy the “refill” just the tape with no case: FS 59572 (\$23.50). If you decide to use a standard metric measuring tape to measure diameter, you will need to convert circumference values to diameter before using them in your report.