

FOR 796 QUANTITATIVE SILVICULTURE

Instructor : Lianjun Zhang
Office : Room 323 Bray Hall
Phone : (315) 470-6558
E-Mail : lizhang@mailbox.syr.edu
Lecture : TBA
Office Hours : T.TH. 2:30-5:00 pm or by appointment
References : (1) **Timber Management: A Quantitative Approach. 1983. By J.L. Clutter et al. Krieger Publishing Company.**
(2) **Modeling Forest Growth and Yield: Application to Mixed Tropical Forests. 1994. By J.K. Vanclay. CAB International.**
(3) **Forest Management. 3rd Ed. 1987. By L.S. Davis and K.N. Johnson. McGraw-Hill.**

Objective of Course:

This course covers the concepts and principles of forest tree and stand growth and yield, and quantitative techniques used for evaluating site quality, measuring stand density, predicting forest growth and yield. Applications of ecological and biological rationales to forest growth and yield modeling will be emphasized. The course will NOT focus on any particular forest type(s) or region(s), but lead students to an understanding of the concepts involved and a familiarity with the quantitative tools useful in ecosystem management.

Procedures:

This is a lecture, reading, and discussion class. A course outline is provided describing topics, dates of each session, and assignments. Other faculty members and experts from Forest Service and Industry will be invited to give seminars on some topics. About 50 papers have been selected and organized in a reader. You are encouraged to read the literature. You may choose one article from each of the four topics to present to the class (20-minute presentation) and lead the discussion. You are required to turn in a summary for each presentation. The report should include introduction, methods, analysis procedures, results, and conclusions. Several small projects will be assigned for you to practice on constructing stocking charts and stand density management diagrams, and developing growth and yield models using real data.

Grading:

Your progress will be evaluated by (1) Literature presentation and report (50%), and (2) projects (50%).

Course Outline:

1. Introduction and literature review.
2. Theory and principles of tree and stand growth and yield.
3. Quantifying site quality: (1) Methods: tree and stand height data, periodic height growth, direct and indirect estimates of site quality. (2) Techniques: guide curves, difference equations, parameter prediction.
4. Measures of density: (1) Methods: $-3/2$ power law of self-thinning, stand density and stocking, point density, competition indices. (2) Techniques: stand density management diagrams and stocking charts.
5. Predicting growth and yield: (1) General methodology: normal and empirical yield tables, stand growth and yield equations, stand table projections. (2) Simulation models: whole-stand models, size-class distribution models, single-tree / distance-independent and distance-dependent models, process models, linkage of models at different levels. (3) Evaluation, calibration, verification, and validation of forest growth and yield prediction systems.
6. Introduction to existing forest growth and yield simulators.