SYNOPSIS AND SCHEDULE
FOREST BIOMETRICS (FO 4213/6213)
SPRING 2007

I. OBJECTIVES: This course is designed to provide students with a comprehensive knowledge of the statistical, mathematical, and mensuration methods commonly employed to collect, process and utilize forest inventory, growth and yield, ecological, and tree taper and weight data.. All example problems and data are drawn from actual research and operational studies. Students, to successfully complete this course, are expected to demonstrate a fundamental understanding in each of the following study areas:

- Randomness, the law of large numbers and the central limit theorem
- Multiple linear regression (Forest tree and stand height, volume, and weight equations)
- Confidence intervals on regression estimates
- Nonlinear regression (Site index, height, and growth curves)
- Simple and stratified random sampling in forest inventories.
- Sampling for proportions as a special case of simple random sampling
- Double, cluster, and two stage sampling methods as applied to forest sampling
- Probability proportional to size sampling for efficient aggregate volume estimates
- Hypothesis testing (two and one tailed)
- Species diversity, evenness, and richness
- Spatial pattern analysis (quadrat and distance methods)
- Stand level growth and yield models
- Individual tree growth and yield models (distance dependent and independent)
- The Wiebull probability distribution as a diameter distribution model
- Diameter distribution growth and yield models
- Non-parametric statistical test (CHI-Square, binomial, and sign tests plus others)
- Example real world problems and solutions from the forestry consulting world.

The primary emphasis of the course is on giving the student a reasonable and practical knowledge and understanding of how to apply statistical and mathematical procedures to solve forestry problems. Problem solving methods are taught and applied to real forestry problems and data. The student will be required to use statistical analysis package, spread sheet, database, and computer programming language software to complete problem assignments.

II. GRADES/TEST/HOMEWORK: Each student's grade will be based on three 100 point hour examinations, a 200 point final examination, approximately 10 graded 10 point problem sets and bonus question points. The final exam will be counted as two 100 point hour examinations, and the 10 or less graded problem sets will count as one hour examination. Letter grades will be assigned using following grade scale with the average score of the six possible 100 point scores plus bonus points. Average grades will be rounded up to the nearest whole number.

Average score range	Letter grade
0 - 59	F
60 - 69	D
70 - 79	C

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80 - 89          B
90 -             A
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It is possible to obtain an average grade exceeding 100, because of bonus points added to the test grade average. The problem set grade average will be expressed as the percentage total points scored is of the total number of possible points on the problem sets.

Grades <u>will not</u> be curved and the lowest test and homework grades <u>will not</u> be dropped.

<u>The problem set grade score will not be counted in the grade average of students not having a passing average grade on the three hour and final examinations plus test bonus points.</u>

III. COURSE REFERENCES (* = course text book):

Avery, T. E. and H. E. Burkhart. 2002. Forest Measurements. 5th ed. McGraw-Hill Inc., N.Y., N.Y. 458 pp.

Conover, W. J. 1980. Practical Nonparametric Ssatistics. 2nd ed. John Wiley&Sons, Inc., N.Y., N.Y. 493 pp.

Bluman, Allan G. 1998. Elementary Statistics: A Step by Step Approach. 3rd ed. McGraw-Hill Inc., N.Y., N.Y. 458 pp.

Freese, F. 1962. Elementary Forest Sampling. Agricultural Handbook No. 232, USDA. Reprinted by OSU Book Stores, Inc., Corvallis, Oregon, 1983. 91 pp.

Freese, F. 1967. Elementary Statistical Methods. Agricultural Handbook No. 317, USDA. Reprinted by OSU Book Stores, Inc., Corvallis, Oregon, 1983. 87 pp.

IV. PREREQUISITES: Statistics ST 2113, Computer Applications for Forest ry Resources (Laboratory) FO 3102 (FO 3101),