

FOREST DESCRIPTION AND ANALYSIS (FO-3015)

I. OBJECTIVES: This course is designed to provide students with practical field experience in various aspects of forest measurements, and stand inventory and description. To successfully complete this course, students are expected to demonstrate proficiency in field application and computational analysis methods within each of the following subject areas:

- Compass and pacing, distance measure with Gunter chain
- Closed traverse staff compass surveying
- Use of topographic maps and aerial photographs
- Forest mapping with ArcView
- Basic standing tree measurement
- Felled tree volume table construction
- Local volume table construction
- Site index determination
- Stand table growth projection
- Forest inventory and navigation with USGS quad sheets, hand compass, and GPS
- Strip cruising
- Fixed area plot sampling
- Point sampling
- Double point sampling
- Use of application software for inventory analysis, growth projection, and mapping
- Log scaling short and tree length logs

II. REQUIRED EQUIPMENT: Each student must have the following, personal equipment:

Hand compass (bearings/quadrants)	BAF 10 Prism	Scientific calculator
Diameter tape (20 ft., 0.1 inches)	Hard hat	Engineer's Scale

III. MEETING TIME: The class will meet Monday-Friday at 8:00 a.m. in a208 of the Thompson Hall Annex. Students should gather in the classroom and not in the hallways. No holidays will be observed during the time periods scheduled for the course. Any student arriving late (8:01 a.m.) for class will be considered absent for the entire day. Students with 3 un-excused absences will receive a grade of "F" for FO3015.

Students should bring a calculator, notebook, Field Exercise Manual, and personal field equipment to all classes. Hard hats are mandatory for all field exercises. Each class will begin at 8:00 a.m. in a208 with roll call followed by a lecture covering the information required to complete the day's exercise. A pop quiz may be given on field procedures for the day's exercise. The class will adjourn directly to the field, so students should bring their lunch to class. There will be no time for purchasing lunch materials en route to the exercise site. Class will reconvene each day at a designated remote laboratory site (such as the Starr Forest Logging Show Area on Highway 25 South) where crew site locations will be assigned. **All field work must be completed between the hours of 8:00 a.m. and 5:00 p.m. and all crews must check in and out each day at the designated remote laboratory site.**

V. GRADES: The final grade a student receives will be a percent weighted average of his/her grades for daily pop quizzes (5%), field exercise reports (25%), final project (20%), two practical field exams (20%), and two written exams (30%). **Daily pop quizzes will be given to test the student's understanding of field procedures for the day's exercise.** Students having 3 or more cumulative days of un-excused absences or 3 or more "unsatisfactory" exercise evaluations will be given a final grade of "F" in the course. An excused absence requires a signed statement from a physician or prior approval by one of the instructors.

Each student must have a combined passing grade (i.e. 60.0+ average) on the daily pop quizzes and the practical field and written exams to pass the course. The grades earned on the field exercise reports and the final project WILL NOT be counted into the overall average UNLESS the student has a passing grade average on the daily pop quizzes and the written and practical field exams. Field reports related to forest inventory procedures will be graded for technical content and presentation only if the volume estimate is within $\pm 20\%$ of the true mean volume, as determined by the instructor. Reports containing a volume estimate exceeding the $\pm 20\%$ value will be given an F.

V. EXERCISE REPORTS: All field exercise reports will have the following sections:

- | | | |
|-----------------|------------|------------------|
| A. Title Page | C. Data | E. Results |
| B. Introduction | D. Methods | F. Data Appendix |

Students will be randomly assigned to crews prior to each exercise. Data collection, required computations, and development and presentation of exercise reports will be on a crew basis. Members of each crew shall rotate field and computational duties in order to allow each student to become familiar with each phase of the exercise. Crew members shall participate equally in the computations and preparation of the final report which shall consist of Sections A through E above.

Reports will be typed and printed for submission. Report pages should be stapled or securely fastened together with a binder. Reports not carefully done or not in the proper format will not be accepted. Late reports, including those which are unacceptable, will be docked one letter grade for each day overdue. No report will be accepted for grading more than two days after the end of the course. Neatness, style, form, grammar, spelling, and content will be factored into the report grade.

See Pages 13-20 of the Field and Laboratory Exercises ... manual for a Sample Field Report. Use this report as an example of format and terminology. DO NOT plagiarize the sample report because this would be an academic misconduct offense. Use it as a guide only.

Students should assume the report is being prepared for a professional forester (i.e. a supervisor) in response to his/her assignment of the task(s). Thus, technical terms or standard mensurational methods do not have to be explained; merely, report on procedures and results. The report should be written as a field assignment, not a laboratory exercise. Phrases such as "Standing trees heights were measured to teach the student to use the clinometer" should not be used. Instead, the appropriate phraseology would be "Total height of standing trees was measured to the nearest 1.0 ft using a Suunto clinometer." It is assumed the user of the clinometer is technically competent in it's use; i.e. target distance was measured correctly for the selected scale (topographic vs. percent).

Title Page: The title page should contain the title of the exercise, author(s) of the report, date of preparation, and course number for which the report is prepared. Each piece of title data should be centered vertically (up/down) and horizontally (right/left). An example Title Sheet is attached.

Introduction: In the report introduction, briefly describe the objective of the exercise, the location and characteristics of the timber tract or exercise area, and/or the sampling procedure used. Include an introduction item only if it is appropriate for the report.

Data: The data section should contain a concise description of the type of data collected and the method(s) of collecting and/or sampling. Describe the procedure(s) and method(s) in proper, technical forestry terminology. Put field data sheets and computations in the Data Appendix.

Methods: Explain in the methods section how computations were performed on the data and what was computed. Use technical terminology; not a "blow-by-blow" description of computations. For example, "Mean volume and cruise statistics were computed on a per acre basis for each species-product class encountered in the stand using random sampling procedures."

Results: In the results section, include and DESCRIBE relevant tables and figures (i.e. graphs) prepared in the computation phase and/or discuss any pertinent conclusions that can be drawn from the analysis. Tables/figures must contain a complete title and proper labels for units or measure and/or axes. Results of your assignment should be reported in a manner that is appropriate for a professional forester.

Data Appendix: The data appendix contains the original data sheets and major computations. The computation sheets should be complete so that someone could evaluate your procedures and results. Do not include scratch pages of computations. Any material included in the data appendix should be neat and organized in an understandable/logical manner.

VI. COURSE TEXT/EXERCISE MANUAL: The exercise manual for FO-3015 must be purchased at the University Bookstore:

Parker, R.C., T.G. Matney, and K.L. Belli. 2009. Field and Laboratory Exercises for Forest Description and Analysis. Edition 13.0, Dept of Forestry, College of Forest Resources, Mississippi State University, Spring 2009 271 pp.

VII. COURSE REFERENCES:

- 1 Avery, T. E. and H. E. Burkhart. 2002. Forest Measurements. 5th ed. McGraw-Hill Inc., N.Y., N.Y. 408 pp.
- 2 Freese, F. 1962. Elementary Forest Sampling. Agricultural Handbook No. 232, USDA. Reprinted by OSU Book Stores, Inc., Corvallis, Oregon, 1983. 91 pp.
- 3 Freese, F. 1967. Elementary Statistical Methods. Agricultural Handbook No. 317, USDA. Reprinted by OSU Book Stores, Inc., Corvallis, Oregon, 1983. 87 pp.

VIII. WORKING LABORATORIES AND COMPUTER LABORATORIES: Working laboratories in rooms 132 and 134, and computer labs in rooms 137 and a308 will be open for student use Monday through Friday from 8:00 a.m. until 5:00 p.m., Monday through Thursday nights from 5:00 p.m. until 11:00 p.m., and each Sunday from 2:00 p.m. until 11:00 p.m.. Other days/times will be made available

on an as-needed basis. **There will be no eating, drinking, smoking or "chewing/dipping/spitting" in any of the computer laboratories.** Abuse of and/or inappropriate behavior in any of the laboratory areas will result in forfeiture of privileges.

IX. TRANSPORTATION: Students may use their personal vehicle for traveling to and from the field exercises. Transportation will be provided for students not electing to use their private vehicle or to ride with another student. Students who wish to ride in a Mississippi State University vehicle **MUST WEAR THEIR SEATBELTS**. MSU vans can and will not move until everyone has fastened their seatbelt. Those students and passengers who opt to take their private vehicle to and from field exercise areas must:

- arrive at the exercise site and be ready for instruction at the instructor-designated time,
- leave the vehicle parked until the end of the instruction period, and
- check out with the instructor, or designated teaching assistants, before leaving the exercise area.

Student drivers and, by association, any of their passengers violating any of the above "**personal vehicle requirements**", will be severely penalized. Students arriving late for a field exercise will be marked absent for the day; 3 such (un-excused) absences will result in a final grade of "F" for the course. Leaving the study area and/or field exercise area before checking out with the appropriate person(s) will result in the reduction of the exercise report grade by one letter grade. For obvious safety reasons, excessive speed or tire spinning in or near the exercise area will not be tolerated. Students are not allowed to arrive or leave in the back (bed) of a truck; all participating individuals, including the driver, will receive an exercise grade of "F" for such an activity.

X. ADDITIONAL RULES: Students are expected to conduct themselves in a professional manner. Non-professional behavior in work habits or personal relations with students and/or instructors will not be tolerated. Indecent and discourteous behaviors are to be innately recognized and avoided. Rash actions, obscene gestures, discourteous statements, and racial or gender specific slurs will not be tolerated by your instructors or fellow students. Think of others before you speak or act.

Academic misconduct (i.e. cheating, use the work of others, etc.) will not be tolerated and such activities will be reported to University officials in accordance with the current policy and procedures of the Academic Policy and Procedures Manual. Students should review the policies and procedures listed in the Bulldog Handbook.

The abuse, torture, or killing of any living creature including snakes, lizards, mice, rats, spiders, lampreys, and leeches will not be kindly viewed by your instructor or fellow students. Most individuals feel this type of behavior to be abnormal, offensive, and disturbing. So maintain your self respect, the respect of your fellow students, and your course grade by not molesting the local fauna.

Trash is not to be left in the woods or alongside the road. Take all your trash with you when you leave the exercise area and deposit it in a proper receptacle (this includes flagging). If it didn't grow in the forest, don't leave it behind when you leave!

Students are not allowed to use machetes, bush hooks, Kaiser Blades, or any other brush clearing device during this course. These items can be considered weapons which are prohibited from University property.

XV. COURSE INFORMATION & FIELD EXERCISES: All student materials for FO-3015 are on the Student Lab Server in the N:\fo3015 directory or on the web site www.cfr.msstate.edu ... forestry... courses... fo-3015. The direct web address is www.cfr.msstate.edu/courses/fo.html. You must have Adobe Acrobat reader for viewing the pdf files. You may copy portions of the manual from the web site, but every student is required to purchase a complete copy from the book store.

CODE OF CONDUCT AND BEHAVIOR

College of Forest Resources, Mississippi State University

The following statement is being issued in response to past incidents that threaten the reputation of MSU Forestry. Although the majority of Forestry Students are aware of how to conduct themselves in a professional manner, the nonprofessional actions of a few pose a serious threat to the distinction associated with the MSU forestry degree.

The administrative and technical potential of a professional forester can be adversely or positively affected by his/her personal conduct and behavior. As you continue your educational pursuit of a forestry degree, your progress as a professional will not be judged solely on your technical skills in completing educational assignments and your knowledge during examinations. The manner in which you conduct yourself during these activities will have a profound effect on how you are viewed as a person and professional by your peers and educators. In order to be a successful professional in the business world and a respected member of your community, you must be able to apply the acquired skills of your profession in a manner that is acceptable to and benefits society. Thus, a personal code of conduct and behavior is as important to a professional as his/her administrative and technical abilities.

The College of Forest Resources' Department of Forestry has the legislative responsibility to provide quality educational opportunities to students pursuing a professional forestry degree, but simultaneously, it has both professional and ethical responsibilities to guide and enhance their personal development. The faculty and staff of the Department cannot fulfill their responsibilities if they allow discourteous, disruptive, indecent, or nonprofessional conduct or behavior to interfere with the educational process. Students are expected to exhibit professional behavior and conduct at all times. Nonprofessional behavior and/or conduct will not be tolerated by the faculty, staff, or students. The School of Forest Resources Handbook (see Honor Code), the Society of American Foresters' Code of Ethics, and common courtesy should be the guiding principles for our personal behavior and/or conduct. The faculty and staff will not tolerate nonprofessional conduct or behavior and instructors will exercise their authority to evict a disruptive student from the classroom or laboratory. An evicted student must schedule a personal interview with the Department Head, Dr. Douglas P. Richards, before being allowed to return to class. Depending upon the severity of the student's action(s), appropriate University disciplinary sanctions may be sought by the Department Head.

Academic misconduct (i.e. any activity which may compromise the academic integrity of the university) of any kind will not be tolerated. Students are advised to review the University policies and procedures regarding academic misconduct contained in Section 12.07 of the Academic Operating Policy and Procedures Manual (Rev. 5-26-95) and the Bulldog Handbook.

Examples of behavior that will not be tolerated are as follows:

- Discourteous, rude, and/or disruptive behavior, remarks, statements, or personal actions,
- obscene, racial, and/or gender specific slurs, remarks, gestures, or statements,
- offensive, indecent, and/or degrading remarks, gestures, statements, or personal actions,
- use of drugs or alcohol during or travel to classroom or laboratory exercises,
- professionally inappropriate attire and/or appearance,
- sexual harassment,
- academic misconduct such as cheating on tests/exams or representing someone else's work as your own (see CFR Student Handbook Honor Code), and
- other nonprofessional actions and activities as defined by the Society of American Foresters' Code of Ethics.

ACADEMIC MISCONDUCT

All occurrences of academic misconduct will be dealt with in accordance with guidelines and procedures outlined in the Academic Misconduct Policy at:

<http://www.msstate.edu/dept/audit/1207A.html>

Academic misconduct is any activity which may compromise the academic integrity of the University. Academic misconduct includes, but is not limited to, deceptive acts such as:

- Using unauthorized materials (crib notes, books, etc.) as an aid during an examination.
- Looking at or using information from another person's examination, report, or assignment.
- Providing assistance to, or receiving assistance from, another person in any manner prohibited by the instructor.
- Possessing or providing an examination or assignment, or any part thereof, at any time or in any manner not authorized by the instructor.
- Taking a quiz, examination, or similar evaluated assignment for another person; or utilizing another person to take a quiz, examination, or similar assignment in place of oneself.
- Submitting any course materials or activities not the student's own, allowing such a submission to be made for oneself, or making such a submission for another.
- Using the ideas, organization, or words of another from a book, article, paper, computer file, or other source in any assignment without giving proper credit following accepted citation rules (plagiarism).
- Altering, stealing, and/or falsifying research data used in research reports, theses, or dissertations.
- Disregarding policies governing use of human subjects or animals in research

The following statement should be signed on each exam, text, and laboratory assignment.



"On my honor, as a Mississippi State Student,
I have neither given nor received unauthorized
assistance on this academic work."

Student Signature

EXERCISE AND LABORATORY SCHEDULE

Week 1

Day	Exercise Subject/Topics	Equipment Needed
1	<p>a.m. Course Requirement and Procedures Preparation of Field Exercise Reports:</p> <p style="padding-left: 40px;">The Compass (declination, use, etc.) Bearing and Azimuth Hand and Staff compass</p> <p>p.m. Navigation and Pacing Exercise Hand Compass and Pacing Course</p>	<p>Examples of all Field Equipment</p> <p>Hand compass Staff compass</p> <p>Pacing courses</p>
2	<p>a.m. Distance Measures (Gunter chain, pacing) Use of Staff compass Area Measurement (traverse and GPS)</p> <p>p.m. Maps and Scales -Use of Topographic/Quad Maps - Scale conversion and use -Contours GLO Survey , Lat/Long, UTM - Projection systems - Angle and distance with UTM's</p>	<p>Staff compass Gunter chain Surveying pins</p> <p>Quad sheets Engineer's scale</p>
3	<p>Equipment and Field Skills</p> <ul style="list-style-type: none"> - use of forestry field equipment - tree measurements; dbh, height, form - inventory procedures - inventory plot measurements 	<p>d-tape increment borer clinometer DME devices</p>
4	<p>am/pm Computer Skills and Report Writing Technical Report Writing Exercise</p> <p>pm/am Intro to Forest Mapping with ArcMap10 Parts of a map Cartographic symbols ArcMap themes and shape files</p>	<p>Computer lab</p> <p>Jump Drive or data storage device</p> <p>7.5" quad sheet</p>
5	<p>Basic Tree Measurements Exercise</p> <p>Determining Site Index Exercise</p>	<p>Diameter tape Caliper 100-ft Tape Clinometer 12" increment borer Bark gauge Ruler, 0.1"</p>

EXERCISE AND LABORATORY SCHEDULE**Week 2**

Day	Exercise Subject/Topics	Equipment Needed
6/7	(1/2 class each day; 8:00 a.m.) Use of GPS for Navigating and Mapping <ul style="list-style-type: none"> - GPS Concepts - Data Collection Methods - Collection of Field Data - Differential Correction with Post processing - Exporting shape files - GPS navigation with waypoint/route files 	GPS units Jump Drive or data storage device
7/6	Staff compass and Chain Traverse Traverse computations	Staff compass, 2 chain tape, survey pins
8/9	(1/2 class each day; 8:00 a.m.) GLO corner and boundary location with GPS Navigating to cruise area with GPS & Staff compass Mapping cruise area with GPS and Staff Compass	GPS units Jump Drive Hand calculator
9/8	Mapping with ArcGIS 9.3 and ArcMap10 <ul style="list-style-type: none"> - Digitizing - Use of DOQQ - Mapping techniques - Producing final map Acreage Measurement Methods	Jump Drive
10	Written Exam #1 Practical Field Exam #1	Calculator only No personal field equipment

EXERCISE AND LABORATORY SCHEDULE**Week 3**

Day	Exercise Subject/Topics	Equipment Needed
11	Field Inventory and Product Description Exercise: <ul style="list-style-type: none"> - Use of photo and quad for area location - Navigation procedures - Field sampling techniques - Standing tree products and specifications 	GPS unit Hand compass Clinometer 2 chain tape 75 ft. loggers tape Engineers scale
12	Strip Cruising Exercise: <ul style="list-style-type: none"> - Variable Strip Width by Product - Distance Measure with Chain - Segment Tallies for Statistics - Small Areas or Marked Stands 	GPS unit Hand compass Diameter tape Clinometer 2 chain tape 75' Loggers tape
13	Strip cruise computations and reporting	Memory Device Hand calculator Strip cruise tally sheets
14	(1/2 class; a.m. and p.m.) a. Felled Tree Measurements Exercise Local Volume Table Construction Exercise b. Basal Areas and DBH Distribution in Pine Plantations	Calipers, bark gauge Suunto clinometer 100 ft tape and ruler, 0.1" BAF10 prism Field computers Memory Device
15	Log Scaling Exercise: - Short Logs - Tree Length Logs	Log scale stick/calipers Bark gauge 75 ft Loggers tape

EXERCISE AND LABORATORY SCHEDULE**Week 4**

Day	Exercise Subject/Topics	Equipment Needed
16	Systematic, Fixed-Plot Cruising Exercise: <ul style="list-style-type: none"> - Sample Tree Growth Measurements - Stand Table Projection Exercise 	GPS unit D-tape, compass, Clinometer DME 100 ft tape Increment borer Bark gauge Ruler, 0.1"
17/ 18	(1/2 class; 8:00 a.m. each day) Continuation of Fixed-Plot Exercise Introduction to Forestry Software	Memory Device
19	Line Point Sampling Exercise: <ul style="list-style-type: none"> - Use of prism to select samples - Borderline conditions 	GPS unit D-tape compass Clinometer DME BAF 10 prism 100 ft tape Limiting distance table
20	Line Double-Point Sampling Exercise: <ul style="list-style-type: none"> - Volume and BA Points - Regression Techniques 	GPS unit D-tape compass Clinometer DME BAF 10 prism 100 ft Tape Limiting dist. table

EXERCISE AND LABORATORY SCHEDULE**Week 5**

Day	Exercise Subject/Topics	Equipment Needed
21	Practical Field Project: <ul style="list-style-type: none"> - To Obtain Current and Projected Inventory Volumes and Current Map of an Assigned Area as Per Client Request - Locate Field Exercise Area - Establish Closed Traverse for Area Control and Acreage Determination - Design and Implement Cruise to Achieve 15% Statistical Sampling Precision - Define Inventory Specifications and Procedures - Type Map along Cruise Lines - Draw Finished Map - Collect Growth Data for STP - Compute Current Volume of Pulpwood and Sawtimber - Make STP Projections for 10 yrs - Compute Future Volume of Pulpwood and Sawtimber - Compile Current and Future Appraisal Values - Write Formal Report of Procedures and Findings 	GPS unit Staff compass Jacob staff Range pole Chaining pins Wooden stakes Plumb bob 2 Chain tape Clinometer Increment borer Bark gauge 100 ft tape D-tape, Compass, DME Ruler 0.1" BAF 10 prism Limiting distance table Graph paper Computer lab
22	Continuation of Field Project	
23	Continuation of Field Project	
24	Continuation of Field Project	
25	Written Exam #2 Practical Field Exam #2 Field project results due at 8:00 a.m. the following Monday morning.	Calculator only No personal field equipment