

Forestry 1001  
Introduction to Forest Mensuration  
2010  
Abilities

**BASIC FOREST MEASUREMENTS**

<b>Individual Tree Measurements</b>			
		Skill	Description
	<i>Species</i>	ITM-S1	Develop a dichotomous key to differentiate an assigned list of species based on leaf and twig characteristics (summer key only)
		ITM-S2	Identify a species using the whole tree or twig samples
		ITM-S3	Use scientific names in the field and in reports
	<i>DBH</i>	ITM-D1	Measure dbh using a diameter tape and calipers
	<i>Height</i>	ITM-H1	Measure height using a Suunto clinometer
	<i>Age</i>	ITM-A1	Determine the age of a tree using increment cores or disks (tree cookies)
	<i>Basal Area</i>	ITM-B1	Calculate the cross-sectional area of an individual tree
	<i>Volume</i>	ITM-V1	Calculate the volume of an individual tree using a volume table or volume equation
		ITM-V2	Use volume estimates and biomass to predict carbon content in tree stems
<b>Plot Measurements</b>			
	<i>Fixed area plots</i>	PLM-F1	Collect data for estimating stand parameters using fixed area plots
	<i>PPS Points</i>	PLM-P1	Collect data for estimating stand parameters using PPS points
	<i>Line Transects</i>	PLM-L1	Collect data for estimating stand parameters for down woody debris using line transects
<b>Stand and Forest Maps</b>			
	<i>Woods Navigation</i>	SFM-W1	Measure distances using pacing in the woods
		SFM-W2	Follow a compass bearing in the woods
		SFM-W3	Mark a location using a GPS
		SFM-W4	Use a GPS to find a location in a stand
	<i>Mapping</i>	SFM-M1	Determine map scale from field measurements, or measurements between two different maps or photos
		SFM-M2	Determine land area using maps and a dot grid or line transect method
		SFM-M3	Be able to locate North on a map or photo from field measurements
		SFM-M4	Be able to determine azimuth between two points on a map or photo

## STAND STRUCTURE DESCRIPTION

<b>Estimation of Stand Parameters</b>			
	<i>Species Composition</i>	ESP-C1	Demonstrate how to estimate species composition on the basis of stand density, basal area, or volume
		ESP-C2	Develop appropriate histograms to show species composition
	<i>Mean Tree Characteristics</i>	ESP-T1	Estimate arithmetic mean tree diameter from a given set of tree measurements
		ESP-T2	Estimate quadratic mean tree diameter from a given set of stand parameters
		ESP-T3	Estimate arithmetic mean tree height from a given set of tree measurements
		ESP-T4	Estimate Lorey's mean tree height from a given set of PPS measurements
		ESP-T5	Estimate appropriate mean tree volume from a given set of tree measurements or stand parameters
	<i>Stand Characteristics</i>	ESP-S1	Develop an appropriate combined stand and stock table for a fixed area plot tally
		ESP-S2	Develop an appropriate combined stand and stock table for a PPS tally
		ESP-S3	Demonstrate how to develop appropriate conversion factors between different Units of measure (m, ft, acres, ha, m <sup>3</sup> , ft <sup>3</sup> , bd. Ft., etc.)
		ESP-S4	Demonstrate how to develop and use product ratio tables
		ESP-S5	Estimate stumpage value given a set of product specifications, costing information, and stand table data
		ESP-S6	Demonstrate how to calculate Tree Factor and use it to estimate average density for a given set of measurements
		ESP-S7	Demonstrate how to calculate Basal Area Factor and use it to estimate average basal area/unit area for a given set of measurements
		ESP-S8	Demonstrate how to calculate Volume Factor and use it to estimate average volume/unit area for a given set of measurements
		ESP-S9	Demonstrate how to calculate stand parameters for down woody debris using line transect data

## STATISTICS AND DATA ANALYSIS SKILLS

<b>Basic Statistical Concepts</b>			
	<i>Data</i>	BSC-D1	Differentiate between categorical, ordinal and nominal data types
		BSC-D2	Describe the appropriate data transformations and statistical analyses possible for categorical, ordinal and nominal data types
	<i>Parameters</i>	BSC-P1	Estimate appropriate sample parameters from sample data
		BSC-P2	Differentiate between bias, measurement error (mistakes) and sample error
		BSC-P3	Calculate an appropriate confidence interval for a sample parameter
<b>Sample Design and Analysis</b>			
	<i>Single Stand Sampling</i>	SDA-S1	Implement a prescribed sampling scheme for a single forest stand to achieve a stated sampling objective
		SDA-S2	Design a random or systematic sampling scheme for a single forest stand to achieve a stated sampling objective
		SDA-S3	Calculate the minimum number of samples required to achieve a desired level of statistical precision
		SDA-S4	Calculate appropriate stand totals for a given set of sample data
<b>Spreadsheet Skills</b>			
	<i>Data Organization</i>	SSS-D1	Use a spreadsheet to develop a field data form
		SSS-D2	Enter field data into a spreadsheet so that the data can be easily analyzed
	<i>Data Manipulation</i>	SSS-M1	Use a spreadsheet to generate a list of random numbers
		SSS-M2	Use spreadsheet formulae to conduct basic data calculations and conversions
	<i>Data Summary and Display</i>	SSS-S1	Use spreadsheet functions to calculate basic statistical analyses (mean, standard deviation, etc.)
		SSS-S2	Use spreadsheet functions to lookup appropriate values of Student's t-distribution and calculate confidence intervals
		SSS-S4	Use spreadsheet graphics to develop appropriate histograms and graphs of data

## PROBLEM SOLVING

<b>Problem Definition</b>			
		PRS-D1	Identify the problem from a problem statement
		PRS-D2	Identify key parameters in a problem statement
		PRS-D3	Identify all unknowns in a problem statement and define them
		PRS-D4	Identify and define all deliverables in a problem statement
<b>Solution Strategy</b>			
		PRS-S1	Develop a list of key steps in solving a defined problem (strategy)
		PRS-S2	Clearly explain the process or methods used in each step of a problem solution (tactics)
		PRS-S3	Define or explain the methods to calculate key parameters
		PRS-S4	Implement a solution strategy
<b>Problem Solution and Results</b>			
		PRS-R1	Summarize data into meaningful tables that are appropriately titled and labeled and cited within the text of a report
		PRS-R2	Summarize data into meaningful histograms or graphs that are appropriately titled and labeled and cited within the text of a report
		PRS-R3	Provide necessary maps that are appropriately titled and labeled and cited within the text of a report
		PRS-R4	Summarize and describe main results
<b>Problem Evaluation</b>			
		PRS-E1	Use a confidence interval to comment on the quality of solution results
		PRS-E2	Identify strengths and weaknesses associated with your results
		PRS-E3	Identify methods to improve the solution