

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

4 credits

30.0 h + 22.5 h

Q2

Teacher(s)	Jonard Mathieu ;Ponette Quentin (coordinator) ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	1. Main concepts: - Definitions, relevance, measurement and / or estimation of static characteristics of trees (e.g. diameters, heights, volumes, tree form) and stands (e.g. distributions, density and stocking, productivity and site quality); - Growth of trees and stands: concepts, estimation, yield tables; - Total inventory and sampling methods: basic concepts of sampling; sampling units; planning, implementation and processing of inventory results; inventory methods (e.g. systematic sampling, simple random sampling, point sampling, stratified random sampling, single-stage cluster sampling, double sampling); - Principles of forest modeling.
Aims	a. <u>Contribution de l'activité au référentiel AA (AA du programme)</u> M1.1, M1.2, M1.4, M2.1, M2.2, M2.4, M3.5, M3.6, M3.7, M3.8, M6.2, M6.5, M6.8, b. <u>Formulation spécifique pour cette activité des AA du programme</u> At the end of this course, the student: - knows the principles of operation of the main dendrometric instruments and is able to use them appropriately in the field; - knows how to characterize the trees and stands in terms of stocking and growth; - is able to understand the dynamics of forest stands and to formalize the factors involved in a quantitative way; 1 - knows the main 'tools' used to characterize the growing stock (individual tree, stand) ; is able to use existing tools appropriately, and to build them from raw data; - knows and understands the main methods used to estimate the growth of trees and stands ; is capable to use them in a management context; - knows the principles of sampling and is able to establish appropriate sampling strategies to address a management issue related to forestry, forest management and planning; - is able to formalize and synthesize a forest mensuration analysis in a technical report respecting scientific rigor; ----- <i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i>
Evaluation methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change. - Written examination - Evaluation of the mini-project report - Evaluation of an exercise dedicated to the construction of a yield table
Teaching methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change. - Lectures, including concrete examples, case studies and exercises - Realization of a mini-project involving the acquisition of field measurements, a computer-aided processing and the writing of an argued report. This report is illustrated with graphs and tables.
Content	a. Table of contents Part I – Tree-level characteristics - volumes and biomasses : wood density, stem form assessment; stem form and volume ; log rules; volume tables - individual tree size and height Part II – Stand-level characteristics - mean tree characteristics: size, heights, volumes - cumulative variables: basal area, volumes

	<ul style="list-style-type: none"> - distributions - relationships between dendrometric characteristics: dominant height - age - site fertility; total height - size - age <p>Part III - Growth of trees and stands</p> <ul style="list-style-type: none"> - tree growth: size (circumference, radius, diameter, basal area); height and volume increment; stem analysis - stand growth: repeated stand inventories; increment core method; applications <p>Part IV - Inventories</p> <ul style="list-style-type: none"> - fundamentals of sampling: context; variables, scales, units; populations and samples; sampling; types of estimators and tree/plot factors - sampling units : types of sampling units; comparison between sampling units; sampling units over time and space - sampling methods: simple random sampling; systematic sampling; point sampling; stratified random sampling; single- and multi-stage sampling; double sampling <p>Partie V – Forest modeling</p> <ul style="list-style-type: none"> - introduction to forest modeling: definition and features of a model, modeling methodology, modeling approaches : empirical vs process-based, stand, cohort and tree level, distance dependent vs independent - empirical growth and yield models: mathematical formalization of silvicultural concepts, development of a yield table, application to a study case (Patula pine plantation in the Peruvian Andes) - operation and use of an eco-physiological model (HETEROFOR): simulation of stand responses to climate changes and silvicultural operations <p>b. Additional information</p> <p>This course consists of two modules:</p> <ul style="list-style-type: none"> - Module 1 (30h): Theoretical course - 14 sessions of 2 hours on the methods of measurement and sampling as well as on the main tools used for the quantification of trees and forest stands, including modeling. - Module 2 (22.5 h): The principles studied in theoretical courses are implemented in the form of a mini-project involving the acquisition of field measurements and their computer-aided processing.
<p>Inline resources</p>	<p>Moodle</p>
<p>Bibliography</p>	<p>Les supports de cours obligatoires (diapositives power point, documents de référence) sont mis à disposition de l'étudiant sur Moodle</p> <p>Pour en savoir plus, l'étudiant pourra consulter utilement les ouvrages de référence suivants :</p> <ul style="list-style-type: none"> - Rondeux, J. 1999. La mesure des arbres et des peuplements forestiers. Les Presses Agronomiques de Gembloux, Gembloux, Belgique, 521 p. - Shiver, B.D., Borders, B.E. 1996. Sampling techniques for forest resource inventory. John Wiley & Sons, New York, USA, 356 p.
<p>Other infos</p>	<p>This course can be given in English.</p>
<p>Faculty or entity in charge</p>	<p>AGRO</p>

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Forests and Natural Areas Engineering	BIRF2M	4		