



# Faculté d'ingénierie biologique, agronomique et environnementale

## AGRO

BIR1334

Introduction to forest science

[22.5h+7.5h exercises] 3 credits

This course is taught in the 2nd semester

**Teacher(s):** Quentin Ponette  
**Language:** french  
**Level:** 1st cycle course

### Aims

- To understand the dynamics of natural forests, with special emphasis on disturbances;
- To be able to assess the reaction of individual trees and stands in terms of growth and regeneration patterns, to various factors either of human or of natural origin;
- To identify the main functions of forests, and the criteria needed for their optimization;
- To identify the objectives associated to the main silvicultural operations and to understand their effects at the tree, stand and ecosystem levels;
- To understand the spatio-temporal organization of forest operations, at the stand and ownership scales.

### Main themes

1. Dynamics of natural forests: 1.1. Forest communities; 1.2. Requirement and tolerance of tree species; 1.3. Interactions, competition, and strategies involving tree species; 1.4. Gradients and niches; 1.5. Successions and disturbances; 1.6. Stand dynamics following major disturbance; 1.7. Gap dynamics
2. Tree ecophysiology: 2.1. Growth; 2.2. Rooting; 2.3. Regeneration; 2.4. Shade tolerance
3. Managed forests: 3.1. Functions of managed forests; 3.2. Principles of integrated management; 3.3. Silvicultural systems; 3.4. Regeneration and tending of forest stands: principles
4. Development stages and characterization of the main silvicultural systems: 4.1. even-aged high forests; 4.2. selection and uneven-aged high forests; 4.3. Coppice and coppice selection; 4.4. Coppice with standards
5. Silvicultural operations and treatments: 5.1. Even-aged high forests - tending; 5.2. Even-aged high forests - regeneration; 5.3. Coppice; 5.4. Uneven-aged high forests
6. Practical work and excursions: 6.1. Excursions: two half-day excursions illustrating various aspects of forest science.

### Content and teaching methods

The course is made up of three parts, corresponding to (i) the individual tree, (ii) the plant populations and communities, and (iii) the ecosystem levels, respectively. The main functions of woodlands as well as the management principles involved in their fulfilment at the various spatio-temporal scales are deduced from the biological and ecological processes operating at each level of organization.

**Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)**

Prerequisite Applied ecology, Economy of natural resources, Bioclimatology, Soil science

Related courses Silviculture

Assessment methods Oral examination, summary and synthesis of an article

Course materials Lecture notes

Recommended readings

Barnes, B.V., Zak, D.R., Denton, S.R., Spurr, S.H., 1998. Forest ecology. 4th ed. John Wiley & Sons, New York, USA, 774 p.

Kimmins, J.-P., 1997. Forest ecology. A foundation for sustainable management. 2nd ed. Prentice Hall, Upper Saddle River, USA, 596 p.

Nyland, R.D., 2002. Silviculture : concepts and applications. 2nd ed. McGraw-Hill, USA, 682 p.

Schütz, J.-P., 1990. Sylviculture 1. Principes d'éducation des forêts. Presses polytechniques et universitaires romandes, Lausanne, Suisse, 243 p.

Smith, D.M., Larson, B.C., Kelty, M.J., Ashton, P.M.S. 1996. The practice of silviculture: applied forest ecology. 9th ed. John Wiley & Sons, New York, USA

Training | supervision Professor, assistant, technician

Other Two half-day excursions

**Other credits in programs**

<b>AGRO23/F</b>	Troisième année du programme conduisant au grade de bio-ingénieur (Horticulture)	(3 credits)	Mandatory
<b>BIR21/E</b>	Première année du programme conduisant au grade de bio-ingénieur (Environnement)	(3 credits)	Mandatory