BREF2203 Wood transformation and valorisation

[30h] 2.5 credits

This course is taught in the 1st semester

Teacher(s): Tomas Avella y Shaw
Language: French
Level: Second cycle

Aims

By the end of this course, students will have :
- acquired knowledge of the procedures and techniques for industrial use of wood as raw material;
- analyzed the environmental issues linked to these transformations;
- received updated, scientific information about advanced technologies.

Main themes

This course, complementary to that on Anatomy and Properties of Wood, deals with subjects linked to the industrial use of wood. While it puts the environmental and economic dimensions in perspective, the course is essentially focused on learning the techniques for the transformation of wood as :
- engineering material (study of technologies of sawing, drying and preservation)
- raw material for obtaining derivative products (technology for the manufacture of wood panels, pulp and paper, chemical usage of wood).
In addition, the course will deal with new processes to improve the properties of wood, in particular wood copolymers and thermal or chemical treatments.

Content and teaching methods

1. Sawmilling : basic saw types (band, frame, circular). Mill design and efficiency. Optimizing saw log breakdown.
2. Drying of timber : the drying parameters; movement of moisture through wood. Drying methods (air drying, kiln drying, dehumidifiers, vacuum drying). Drying degrade.
3. Timber preservation : natural durability. Preservative formulations. Treatment processes. The philosophy of preservation: environmental issues.
4. Gluing of timber : Adhesion and types of glues.
5. Wood panels : plywood (manufacture, rotary veneer and sliced veneer, properties. Timber-like products). Fiberboard and particleboard processes.
6. Pulp and paper manufacture : mechanical, thermo-mechanical, semi-chemical and chemical pulping. Bleaching of pulps. The manufacture of paper.
7. Energy : wood as fuel, charcoal, pyrolysis. Hydrolysis and gasification of wood.8. Wood modification : thermal and chemical processes. Wood copolymers.

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

Precursory courses BREF 2102 Anatomy and Properties of Wood
Evaluation Oral with written preparation
Support - Transparencies and slides
- Biblography : J.C.F. WALKER - Primary Wood Processing - Chapman & Hall, 1993-
Miscellaneous Visits of sawmills, papermills and particle board or MDF plants

Other credits in programs

ARCH23	Troisième année du programme conduisant au grade d'ingénieur civil architecte	(2.5 credits)	
BIR22/6E	Deuxième année du programme conduisant au grade de bio-ingénieur : Sciences et technologie de l'environnement (Nature, eau & forets)	(2.5 credits)	Mandatory
BIR23/6E	Troisième année du programme conduisant au grade de bio-ingénieur : sciences et technologie de l'environnement (Nature, eau & forets)	(2.5 credits)	Mandatory