



MAPR2118 Fluid-fluid separations

[30h+30h exercises] 5 credits

This course is taught in the 1st semester

Teacher(s): Denis Mignon
Language: French
Level: Second cycle

Aims

Gain a practical knowledge of the operating principles, as well as of the selection, sizing and equipment choice methods applicable to unit operations for fluid/fluid separation.

Main themes

- Diffusion theory. Fick's law and Stefan's law. Convective and molecular transfer coefficients. Analogy between heat and mass transfer.
- Continuous and batch distillation of binary and multi-component mixtures. Graphical (McCabe and Thiele) and numerical sizing methods. Simplified ("shortcut") and rigorous methods. Trayed column design (equipment, efficiency and capacity).
- Absorption of one or more components into a liquid, with or without a chemical reaction. Stripping. Packed column hydrodynamics. Different types of packing and absorbers.
- Liquid-liquid extraction. Single stage and multiple stages, with or without reflux. Extractor types and selection criteria. Supercritical extraction.
- Solid-liquid extraction basics (the principles and equipment).
- Using the ASPEN + process simulator for each of the above techniques.

Content and teaching methods

Study of the fluid/fluid separation techniques : gas absorption into liquids, stripping, distillation, liquid/liquid and solid/liquid extraction. For each of these techniques, the following elements will be presented :

equilibrium between phases of interest;
 sizing methods;
 industrial applications and equipment.

The theoretical considerations will be illustrated by practical work sessions relying on the use of the process simulation software ASPEN+.

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

Nil

Other credits in programs

INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(5 credits)	Mandatory
---------------	--	-------------	-----------