

Course title: Advanced Separation Processes – selectable / ~~regular course~~

Number of contact hours: 60 hours (30h lectures/30 Exercises)

ETCS credits: 6

Course description: The aims of the module are [1]:

1. to develop the student's knowledge and understanding of separation processes focussed in the valorization of natural high-added valued compounds
2. to enhance the student's skills in the design of separation processes through modelling and experimentation
3. to introduce students to the concepts of separation processes by equilibrium based staged separations such as: solid-liquid and liquid-liquid extraction; rate based separations on membranes and solid agents; and crystallization and drying.

Education effects: At the end of the module, the learner is expected to be able to reach the following learning outcomes:

1. Select a feasible separation operation with classical or advanced methods exploiting feed and product conditions, property differences, characteristics of separation operation, and economics with the aim of producing high-added natural compounds (bio products).
2. Analyze and design classical extraction equilibrium-staged separations with focus on natural high-added value compounds
3. Implement novel advanced classical extraction separations for complex systems
4. Analyze and design rate-based separations such as: membranes and adsorption as an alternative to classical methods when appropriate.
5. Analyze and design fluid-solid separations such as: crystallization and drying with emphasis on bioproducts.

Literature:

Seader, Henley and Roper: Ernest J. Henley, J. D. Seader, D. Keith Roper, Separation Process Principles, John Wiley & Sons, Third Edition, 2011.

Wang and Weller, Trends in food science & technology; 17 (2006) 300–312

Assessment method:

LOs	Assessment methods	Weight
1	Quizzes/Tests	50%
2	Experimental work	50%

Prerequisites: Before the course unit the learner is expected to be able to dominate basic concepts of:

1. Mass and energy balances;
2. Thermodynamics;
3. Heat and mass transfer;
4. Classical equilibrium-staged separations

Primary target group:

Lecturer: Helder Teixeira Gomes - Polytechnic Institute of Bragança