

Courses

Introducing

Description

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

 Toulouse

Unit operations 1



ECTS
5 crédits



Hourly volume
59h

Introducing

Fluid properties and mass transfer.
Hydraulics and dispersed systems.
Basic concepts of Chemistry and Physics .

Description

Évaluation

Objectives

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At the end of this module, the student will have understood and be able to explain (main concepts) :

- the basic concepts of interface and colloidal systems
- phase equilibrium diagrams
- general concept for mass transfer unit operations (ideal stages, operating line...).

Kinetic limitations and their effects on separation and mixing

- different ways to perform separation processes
- basic concepts of deep-bed filtration and membrane separation (UF/MF/NF)

The student will be able to:

- identify interactions between compounds or interface/compounds involved in separation and mixing operations
- identify main membrane fouling phenomena for a given application
- use the equilibrium diagrams

Practical info

Location(s)

 Toulouse

Necessary prerequisites

Thermodynamics.

Unit operations 2



ECTS
5 crédits



Hourly volume
81h

Introducing

Description

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

- Phase equilibrium diagrams
- General concept for mass transfer unit operations (Ideal stages, operating lines...). Kinetic limitations and their effects on separation
- Different ways to perform separation processes (single contact, cross-current and counter-current contactors)
- design tools for separators.

The student will be able to:

- use the equilibrium diagrams
- choose the required technology for a separation

- choose the contact mode
- write the mass balance
- design a multistage separation device (extraction, distillation, adsorption, absorption...)
- then propose a contactor technology.

Necessary prerequisites

Transport and reaction in fluid medium.
Thermodynamics.
Fluid properties and mass transfer.
Basic concepts for unit operations.

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Practical info

Location(s)



Toulouse

Processes simulation and analysis



ECTS
5 crédits



Hourly volume
69h

Introducing

Description

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

- the basics of chemical engineering process simulation tools at various scales
- the life cycle and carbon balance principles
- the basics of multidimensional analysis
- the elementary notions about process optimisation

The student will be able to:

- select the appropriate simulation tool with respect to the scale of investigation
- synthesize their knowledge to analyze the results of a commercial simulation tool
- simulate industrial processes in steady state
- perform the Life Cycle Analysis of an existing process

- use the FLUENT software to simulate single phase flows

- use the PROSIM Plus software to simulate general steady state processes

- use the UMBERTO software to perform a global analysis of a process within its environment.

- gather knowledge from various fields to choose the modelling approach, perform the set-up of the simulation and analyse the results

- perform an optimisation study with PROSIM

- set up simulations of unsteady state processes with PROSIM Batch and FLUENT

Necessary prerequisites

Modelling and numerical solution for fluid mechanics

Thermodynamics

Basic concepts for OPU

Technology and design of OPU

Hydraulic and dispersed systems

Transport and reaction in fluid medium

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Practical info

Location(s)

 Toulouse

Heterogeneous reaction engineering



ECTS
6 crédits



Hourly volume
67h

Introducing

Description

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

- the different types of chemical and biological catalysts and their working modes
- the stoichiometry, kinetic laws and their combination for the description of microbial cell behaviour for growth and production,
- the notion of limiting step(s) in heterogeneous reactions
- the notion of apparent reaction rate
- the expression and meaning of dimensionless numbers (Hatta, Thiele, Weiss, Biot...)
- the notions of effectiveness factor and enhancement factor
- the description and modelling of batch, fed-batch and continuous, single or multi stage biological reactors with or without recycling.

The student will be able to:

- determine the limiting process(es) in a chemical heterogeneous reaction
 - express the apparent global rate of a chemical reaction depending on the working conditions
 - identify the general metabolic scheme of microbial growth
 - establish the stoichiometric equations and kinetic laws for biological reactions with respect to the environment conditions
- establish an intrinsic kinetic law
- select and design the most suitable reactor to perform a given reaction
 - integrate and prioritize the mechanisms in order to model homogenous and heterogeneous biological and chemical reactors

Necessary prerequisites

Transport and reaction in fluid media

Fluid properties and mass transfer

Thermodynamics

Thermal transfers and reactors

Microbiology and statistics

Évaluation

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Practical info

Location(s)

 Toulouse

Chemical and environmental engineer, define and build a project



ECTS
5 crédits



Hourly volume
61h

Introducing

Description

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

AA1: Identify business sectors :engineering, territorial engineering, environmental management, research, development, production, consulting, sales engineer ...), their specificities, their tools and conditions for access.

AA2: Identify major constraints in industrial production, know the key steps of responses to supply and achievement of business calls, the principles of public and private markets, the basics of environmental management and sustainable development.

AA3: applying the acquired scientific and technical training in process engineering in the context of industries and trades

AA4: namely build a professional network of contacts from meetings and information presented by the speakers

AA5: get involved in a group and a project to adapt, dare drive the action, ie abandon, propose ...

Necessary prerequisites

All the Chemical Engineering training

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Practical info

Location(s)

Toulouse

Improve your management abilities



ECTS
4 crédits



Hourly volume
45h

Introducing

Location(s)

 Toulouse

Description

Objectives

At the end of this module, the student will have understood and be able to explain :

- * The basic rules of business law
- * The objectives, principles and means of marketing
- * The principles and procedures of financial diagnosis and / or investment

The student will be able to :

Apply principles and rules of management and law in simple situations. Take into account the parameters of the management (customer needs, cost effectiveness and legal compliance).

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Practical info
