INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

2nd YEAR ICBE_SEMESTER 4 INSA

Practical info

Location(s)

Toulouse

Mathematics and transport phenomena

ECTS
7 crédits

Hourly volume
109h

Introducing

Objectives

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

Mathematics:
The concept of series, the different types of convergence, the power series and Fourier series, the solution of the heat equation, the use of Matlab.

Transport phenomena:
- The basics of continuum mechanics
- The concept of balance and the different scales of application

The student will be able to:

Mathematics:
Study the convergence of numerical series or function series, solve a differential equation with power series, compute a Fourier series, solve the mono-dimensional heat equation.
Apply the mathematical knowledge via the development of simple Matlab programs allowing to illustrate these concepts in examples taken from physics, biology and chemistry.

Transport phenomena:
- Define a system and its contours, and calculate inlet, outlet and transformation fluxes
- Write local and macroscopic balances of mass, energy and momentum
- Solve analytically simple problems of Newtonian fluid mechanics

Necessary prerequisites

Necessary knowledge:

First year mathematics, first year computing.
Unit « Thermodynamics - Fundamentals and applications »
(# I1ANTH11) of the INSA first year curriculum or equivalent.

Practical info

Location(s)

Toulouse

Structural biochemistry

ECTS
4 crédits

Hourly volume
42h

Practical info

Location(s)

Toulouse

Basis of chemical reaction engineering

ECTS
3 crédits

Hourly volume
38h

Introducing

Objectives

Objectives:
At the end of this module, the student will know and be able to explain (main concepts):
- Mass balances applied to reactors
- Reaction progress parameters
- Kinetic law of a reaction, kinetic order and constant, activation energy
- Continuous and batch stirred reactors
- Continuous plug flow reactors

The student will be able to:
- define a system, its boundaries, for a defined purpose; calculate all the molar fluxes (inlet, outlet, transformation, variation);
- write mass balances by using reaction progress parameters
- determine kinetic law for a homogeneous reaction from experimental data
- determine a kinetic constant for a temperature (Arrhenius law)
- choose the best ideal reactor for a homogeneous isothermal chemical reaction and calculate it (reactor design)
- treat a general homogeneous isothermal problem of chemical reaction engineering

Necessary prerequisites

Necessary knowledge:
Have a good understanding of the concept of concentration. Integration. Linearity and linear regression

Practical info

Location(s)

Toulouse

Analytical Methods 1

ECTS
5 crédits

Hourly volume
57h

Introducing

Objectives

Objectives:
At the end of this module, the student will have understood and be able to explain the principles of analytical techniques implemented currently in laboratories and the associated mechanisms using his/her knowledge in quantum physics and chemistr (chemical reactions, physical and chemical properties ¿)

The student will be able to:

AA1 Choose the most relevant technique regarding the problem by explaining the relating theoretical concepts.
AA2 Carry out these analytical techniques
AA3 Analyse and discuss the results in a critical way

Necessary prerequisites

Necessary knowledge :

Thermodynamic 1Y (I1ANETTH) and 2Y (I2BETH11) / Chemistry 1Y (I1ANETCH) / Organic Chemistry 2Y icbe (I2BECH11)

Practical info

Location(s)

Toulouse

Communicating in Foreign Languages

ECTS
5 crédits

Hourly volume
57h

Introducing

Objectives

LV2 Module (Spanish/ German / Chinese / Portugese / French Sign Language):
The objectives defined with reference to the CERL for the 5 language skills are specific to the language studied and the student¿s level.

The student will be able to :
-strengthen their listening, reading and note-taking skills
-analyse and synthesise information
-organise and efficiently communicate information
-speak in front of a group
-attend or lead a job interview
-interact with another person in the foreign language

Remedial English
A module can be proposed to students in certain very specific cases, as a substitute to LV2.

Necessary prerequisites

Necessary knowledge:

First-year LV1, Expression and LV2 skills (D1ANHU01)
Second-year LV1 and Expression skills (I2CCGE31)

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project – level 2B

ECTS
6 crédits

Hourly volume
138h

Introducing

Objectives

To be able :
- deepen self-knowledge (analyze my strengths and weaknesses),
- self-assessment,
- take into account the skills (strengths and weaknesses) of its partners,
- to adjust and regulate their behavior according to others.

Necessary prerequisites

1st year learning outcomes.

Practical info

Location(s)

Toulouse

Energetic thermodynamics

ECTS
4 crédits

Hourly volume
35h

Practical info

Location(s)

Toulouse