

### 2nd YEAR ICBE\_SEMESTER 4 INSA

### Practical info

Location(s)





#### Mathematics and transport phenomena

### Introducing

ECTS 7 crédits Hourly volume 109h

and momentum

- Solve analytically simple problems of Newtonian fluid mechanics

#### 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

#### Necessary prerequisites

Necessary knowledge:

First year mathematics, first year computing.

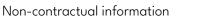
Unit « Thermodynamics - Fundamentals and applications »

(# I1ANTH11) of the INSA first year curriculum or equivalent.

### Practical info

Location(s)

Toulouse







### Structural biochemistry





## Practical info

### Location(s)





### Basis of chemical reaction engineering

### Introducing

**ECTS** 

3 crédits

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Necessary knowledge:

Hourly volume

38h

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

### 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

### Practical info

### Location(s)

Toulouse

### Necessary prerequisites





### Analytical Methods 1





### Introducing

### Practical info

### 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  $\dot{c}$ )

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)

### Location(s)



### Communicating in Foreign Languages

Hourly volume

57h

### Introducing

**ECTS** 

5 crédits

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## Practical info

#### 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)

### Location(s)





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





### 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)





### Energetic thermodynamics





## Practical info

### Location(s)

