

# Biotechnologies and Chemical Therapies



ECTS credits  
5 credits



Semester  
Spring

## In brief

> **Course language:** English

## Presentation

### Prerequisites

First year Common Core courses and first semester of the second year at École Centrale Méditerranée

### Learning objectives

The development of a drug is a multi-parameter project that includes regulatory, time and societal constraints and an innovation component. In addition, there are complex specifications to integrate (efficacy, availability, safety, etc.). It is therefore a field par excellence where solutions emerge from the ability to mobilize complementary skills and to address a multi-parameter problem. The study of the development and life cycle of a pharmaceutical compound illustrates the multidisciplinary required in the sector and shows the value of a generalist education for the new scientific, technological and societal challenges.

### Description of the programme

The core of this Teaching Unit concerns the creation and marketing of new active ingredients and biotechnological devices. The aim is to stimulate the ability to invent creative, ingenious and original solutions through what has been produced in the past and is being developed today. In addition, a large part of the teaching is devoted to bioinformatics and biotechnologies which aim to use genomes, biomolecules, cells and tissues to create innovative devices that respond to future human challenges. This teaching unit is divided into four parts:

"Molecular therapeutic strategy";

Pharmaceutical Processes"; "Bioinformatics"; and

"Bioinformatics;

"Inorganic biochemistry and bio-inspired chemistry".

Detailed content of the courses in the online documentation on the school's website (in French and English).

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## Generic central skills and knowledge targeted in the discipline

This Teaching Unit mobilizes knowledge in process engineering and chemistry for pharmaceutical aspects and for the bio-organic study of living systems leading to biomimetic chemistry. They also mobilize skills in discrete mathematics and fundamental computer science for bioinformatics. The knowledge provided complements that already acquired in these disciplines, and is useful in itself. The field itself is conducive to stimulating the imagination since it is in direct contact with the living world, which, thanks to its creativity over millions of years of evolution, is the richest source of inspiration for humans.

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## How knowledge is tested

CC in each part, contributing 35%, 15%, 30% and 20% respectively

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## Bibliography

Ng. Rick, Drugs: from discovery to approval, Wiley-Liss, 2004.

J. W. Mullin, Crystallization, Butterworth Heineman, 2001.

O. Papini, H. Prade, L'intelligence artificielle : frontières et applications, Cépaduès, 2014.

J. E. Huhey, E. A. Keiter, R. L. Keiter, Inorganique Chemistry, De Boeck, 2004.

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## Teaching team

- \* Karine ALVAREZ
- \* Stéphane BETZI
- \* Stéphane CANAAN
- \* Philippe ROCHE
- \* Nelson IBASETA
- \* Paul VILLOUTREIX
- \* Élisabeth REMY
- \* Thien VU MANH
- \* Alexandre MARTINEZ

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## Sustainable Development Goal



Access to health



Quality education



Clean water and sanitation



Life on land



Life below water

**Total des heures**

CM	Master class	58h
TP	Practical work	10h

## Useful info

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Name responsible for EU

**Lead Instructor**

Alexandre Martinez

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