MICROBIOLOGY AND BIOCATALYSIS COURSES

Microbiology and biocatalysis for industry	12 credits	265h
Design project	12 credits	233h
Human Resources Management and Group Work	6 credits	75h

Microbiology and biocatalysis for industry

ECTS
12 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
265h

In brief

Teaching language(s): Français, Anglais

Presentation

Description

Program (detailed contents):

Microbial physiology

- Physiological behavior for industrial production (starter, proteins, polysaccharides, amino acids, antibiotics,...)

- Cell energetics and constraints for industrial implementation

Modelling

- Modelling strategy for the microbial reaction

- Phenomenological models

- Metabolic flux models

- Structured models

Behavior of high cell density bioreactor

- continuous culture reactors, recycled cell reactors

- Fed-batch reactors

Bioreactor control

- Fed-batch control for limiting conditions

- Optimization strategy for no limiting conditions

Distillation - heat exchange - chemical and biological reactors

Biocatalysis

New ways of modifying properties of biocatalysts

Use of enzymes in industry

Bioseparation techniques for proteins

Organisation:

- lectures

- projects

- Lab work

Objectives

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

- High cell density microbial cultures for industrial production, integrating the physiological constraints

- Modelling the biological reaction

- Controlling the fermentation process

- The design of an industrial process

- Applied enzyme catalysis

The student will be able to:

- design and simulate models describing the microbial productions

- design and implement microbial cultures for high performance reactors

- apply enzyme engineering techniques

Pre-requisites

Structural and metabolic biochemistry - Microbiology - Microbiological engineering -Bioreactor engineering

Useful info

Place

› Toulouse

Design project

ECTS
12 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
233h

In brief

Teaching language(s): Français, Anglais

Presentation

Description

With the help of a tutor, students carry out part of an industrial process design/ This work involves a literature survey, getting technical data and design of the process using acquired knowledge on coupled heat and mass transfer, unit operations and associated processes.

Objectives

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

To allow students to apply their knowledge to the design of a practical project in biochemical engineering.

The student will be able to:

- propose an installation flowsheet
- to write global balances on a process in order to calculate matter and energy flows
- make an critical analysis of a process

Pre-requisites

Bioreactor ; Unit operations

Useful info

Place

Toulouse

Human Resources Management and Group Work

ECTS
6 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
75h

Presentation

Objectives

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

Human Resource Management

Aims and organisation of a Human Resources position, job analysis and forecasting, recruiting, work motivation, skills, salary, training, career management, conflict mitigation, work contract

Social Psychology

Groups, what they are, their influences and dynamics

The student will be able to analyse a group situation

Pre-requisites

None

Place

Toulouse

Useful info