

Faculty of Biological, Agronomic and Environmental Engineering

BIRC2201 Project in industrial chemistry

[60h] 5 credits

This course is taught in the 1st semester

Teacher(s): Patrick Gerin
Language: French
Level: Second cycle

Aims

Know-how and skills

- Capacity to integrate basic disciplines and industrial technical and economic constraints for solving one problem relevant for industrial chemical engineering and /or bioengineering.
- Capacity to present, justify and defend the intellectual approach followed and the solutions developed, with the rigour and technological feeling required from (bio-)engineers.
- Capacity to work in a team, which requires initiatives and organisation to take in charge and to carry out the project.

Knowledge:

- Introduction to the functioning of industrial enterprises.

Main themes

The Project in Industrial Chemistry requires the students to use in an integrated way the knowledge and competence they have acquired through all the courses of their bio-engineer education, 1) to understand and analyse an engineering problem in industrial chemistry or biotechnology, 2) to identify and document the possible ways to solve it, 3) to select the most promising solutions, 4) to develop the latter, ideally up to the dimensioning of the unit operations, 5) and finally to critically review the retained solutions. The problem is submitted to the student with a complexity compatible with both a real professional situation and the possibility to solve it within the course time framework. As much as possible, the problem submitted to the students is relevant to their field of specialisation. The project requires the students to communicate both orally and in written on the problem solving in a way that must be understandable and usable by other engineers without specific specialisation. In addition to the project, the course comprise the visit of industrial enterprises, organised to introduce students on the one hand to the global functioning of these enterprises, and on the other hand on the technological aspects of one specific production line.

Content and teaching methods

Real industrial problems in chemistry or biotechnology are submitted to the student by engineers working in industry. The latter provide also some relevant data that they have already gathered. Several types of projects can be proposed:

1. dimensioning of the whole or part of an industrial installation which comprises several (2 or 3) unit operations (e.g.. filtration, sedimentation, distillation, drying, shredding...);
 2. exploratory study to identify and to assess the feasibility of several possible solutions to an industrial problem;
 3. technical (possibly technico-economical) comparison of two or several industrial processes to perform the same production.
- The students organise themselves as a team of 4-6 students to solve one of the submitted problems. To carry out the project, the students have to share their time between individual work (information search, new theoretical background learning, calculations,...), team work, weekly meeting with the academic supervisor. Around the 7th week, each team has to write, present and discuss with the industrial partner an intermediary report which describes the problem, the possible solutions envisaged, and which justify which solutions will be further developed. Each team presents its whole project during the 13th or 14th week to all the students and the industrial partner. The written report must be finalised by mid-February. The oral and written presentations must be understandable by (bio-)engineers.

For the visit of industrial enterprises, the student have to write a short report to present the visited company in its industrial and economical context, as well as a critical analysis on the visited process.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Precursory courses Knowledge and skills acquired through all the courses in science, engineering and economy of the BIRC program.

Evaluation Oral presentation and written report on the subject

Support Bibliographic and technical information research with guidance by the teachers

Other credits in programs

BIR23/0C	Troisième année du programme conduisant au grade de bio-ingénieur: chimie et bio-industries (Technologies et gestion de l'information)	(5 credits)	Mandatory
BIR23/1C	Troisième année du programme conduisant au grade de bio-ingénieur: chimie et bio-industries (Sciences, technologie & qualité des aliments)	(5 credits)	Mandatory
BIR23/2C	Troisième année du programme conduisant au grade de bio-ingénieur : Chimie et bio-industries (Ingénierie biomoléculaire et cellulaire)	(5 credits)	Mandatory
BIR23/3C	Troisième année du programme conduisant au grade de bio-ingénieur : chimie et bioindustries (Nanobiotechnologies, matériaux et catalyse)	(5 credits)	Mandatory
BIR23/4C	Troisième année du programme conduisant au grade de bio-ingénieur : chimie et bio-industries (Technologies environnementales: eau, sol, air)	(5 credits)	Mandatory