

# Génie Biologique

The program aims to train high-level generalist engineers in biotechnology and bioprocesses, capable of developing and operating various types of production systems in industry involving the use of biological material.

## Mise en avant



- En alternance
  - Contrat de professionnalisation
- Modalités**
- Présentiel

The Biological Engineering Department at Polytech Clermont is committed to training high-level generalist engineers capable of analyzing, assessing, innovating, designing, and managing production systems for industries involving the use of living material. Given the wide range of challenges they must address, these engineers are equipped with strong scientific, technical, human, and economic skills across all fields related to the transformation of living matter or materials derived from it. The program prepares graduates to adapt to a wide variety of professional contexts, reflecting the diversity of both the industrial and service sectors in France and abroad.

Engineers certified in the Biological Engineering specialization at Polytech Clermont are capable of optimizing the interface between scientific disciplines to develop sustainable biotechnologies for industrial applications. These include innovations in diagnosis, treatment and prevention of diseases, the design of new bio-based materials, and new processes for environmental applications such as bioenergy and biorefining.

Graduates will master techniques for identifying and modifying raw materials and/or biocatalysts, as well as the tools required to design and operate production processes, from initial concept to packaging. Regulatory compliance, environmental standards, sustainable development, and quality assurance are central to the program.

[Plaquette Génie Biologique](#)

[Télécharger la plaquette](#)

## Lieu(x) de la formation

- Aubière

## Contacts

**Polytech  
Clermont**

### Renseignements

#### Responsable(s) de formation

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[https://admissions.polytech-](https://admissions.polytech-reseau.org/frontblocks)

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/Candidats/

## Présentation

### Enjeux

Biological Engineering is a broad field that encompasses all stages of a process based on the use of living materials or those derived from living organisms. Emerging careers in biological engineering involve understanding, designing, and implementing processes that use biological materials and systems to produce goods that benefit society. Mastery of sustainable biotechnologies and bioprocesses at an industrial scale is a competitive advantage for certified biological engineers, who must operate at the crossroads of multiple disciplines.

The Biological Engineering Department at Polytech Clermont offers a comprehensive education in Biotechnology and Sustainable, Innovative Bioprocess Engineering. It equips certified engineers with the skills to work across a wide range of sectors that rely on biotechnologies, including synthetic biology, agri-food, pharmaceuticals, healthcare, cosmetics, and environmental industries.

Laboratoires



Laboratoires

Entreprises



Entreprises partenaires

# Admission

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## Pré-requis

### Niveau(x) de recrutement

Baccalauréat +2

### Spécialités / options du bac

Mathematics Specialty Physical Chemistry Specialty

### Formation(s) requise(s)

The Biological Engineering program recruits students for the engineering cycle from various backgrounds:

- \* Students from preparatory classes (CPGE): BCPST, PC, TB
- \* Students from the PeiP preparatory cycle
- \* Students with a second- or third-year university degree (L2, L3)
- \* Students from a University Bachelor of Technology (BUT) with a profile suited to the program
- \* Students with other Bac+2 or Bac+3 qualifications, provided their background aligns with the program requirements

## Candidature

### Modalités de candidature

[En savoir plus sur les modalités de candidature](#)

# Programme

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Les informations ci-dessous sont données à titre indicatif et peuvent faire l'objet de mises à jour.

Professional Training Contract (Contrat de professionnalisation)

Professional training contracts are available to final-year engineering students.

Students enrolled in the initial training program change their status to become employees of the host company. The professional training contract lasts for 12 months.

A win-win approach

For the student, the goal of the professional training contract is to gain a professional qualification while also completing their engineering degree. Participants are paid a percentage of the minimum wage (Smic), depending on their age and level of education.

For exact remuneration details, please refer to the official Ministry website.

For the company, this contract offers the opportunity to recruit an engineer who is quickly operational and trained in its specific methods. In some cases, the contract also grants partial exemptions from employer social security contributions.

Eligibility

The professional training contract is open to:

- \* Polytech Clermont students aged 16 to 25 enrolled in the final year of the engineering cycle
- \* All employers subject to funding vocational training, except for the State, local authorities, and their administrative public institutions

Students with disabilities who wish to sign a professional training contract receive dedicated support. Learn more about these measures [\[HERE\]](#).

## Assessment methods

This program includes two interim presentations, a written report, and a final oral defense. These are in addition to all assessments given by faculty as part of continuous evaluation. It is not possible to validate individual skill blocks independently.

## Funding

Training costs, covered by the host company, include tuition fees and the cost of education at Polytech Clermont. All or part of these costs may be funded by the **\*\*Skills Operator (OPCO)\*\*** relevant to the company.

# Diplôme d'ingénieur en Génie biologique

## Diplôme ingénieur en Génie biologique

### ● AN 1

- CHOI 1
  - UE1
    - Mathématiques 1
      - Mathématiques
      - Statistiques et probabilités
    - Supplément GB
    - Chimie organique 1
    - Bioénergétique biocatalyse
    - Biochimie structure & métabolisme 1
  - UE2
    - Comp Scientifique
      - Electronique
      - Traitement du signal
      - Mécanique
      - Biologie
      - Matière matériaux
      - Energétique
      - Initiation dessin technique
      - Autour du web
      - Maths 1 GC/GE/GP/Archi
      - Maths 2 GC/GE/Archi
      - Maths GB
      - Méthodes statistiques
    - Socle informatique
    - Génie des bioprocédés 1
- UE3
- U3
  - Communication 1
    - E2C1
    - Anglais 1

- Sciences Sociales 1
  - Droit
  - Economie
- Semestre 6
  - UE4
    - Biochimie struct & metabo 2
    - Biologie moléculaire
    - Microbiologie 1
    - Chimie organique 2
  - UE5
    - Modélisation
      - Analyse numérique
      - Bases de données
    - Génie des bioprocédés 2
    - Techniques de séparation
    - Synthèses et bilans
  - UE6
    - Communication 2
      - E2C 2
      - Choix de langue
    - Sciences sociales 2
      - Ouverture - projet
      - Ouverture - Respo asso
      - Ouverture - SHBN
    - Stratégie d'innovation
  - UE7 STAGE
- **Elt élément année GB4A**
  - Semestre 7
    - UE1
      - GénétiqueGénétique
      - TP biologie moléculaire
      - Biotechnologies végétales
    - UE2
      - Génie des bioprocédés 3
      - Microbiologie 2
      - Synthèse de biomolécules
    - UE3
      - Anglais choix unique
      - Gestion
      - Communication
  - Semestre 8
    - UE4
      - TP Bioprocédés et Biocata
      - Immunologie

- Genie génétique bioinfo
- UE5
  - Génie des bioprocédés 4
  - Module optionnel
    - Microbiologie industrielle
    - Biotech'
  - Projet tutoré
- UE6
  - Choix langue
    - Anglais choix unique
    - Anglais LV1 et LV2 au choix
  - Communication
  - Psychosociologie
- UE7
- UE8

### ● **Elément année GB5A**

- Semestre 9
  - UE1 Poly'compétence
    - Polytech'Entrepreneuriat
    - Polytech'Gestion Environ.
    - Polytech'Management
    - Polytech'Recherche
    - Polytech'Ressources Humaines
    - Polytech'Ind cosmétiques
    - Polytech'Mon projet 5A
    - Polytech'Imagerie num
    - Polytech'Archistrukture
    - Polytech'Urbanisme
    - Polytech'Logistique
    - Polytech'Contrat Pro
    - Polytech'Mobilité Durable
  - UE2 Spécialisation
    - Génie biologique
      - Module Théorique
      - Culture Micro-organismes
      - Module optionnel
    - Energie
      - Energie et énergétique
      - Energies renouvelables
      - NRJ fos. carbon. et nuc.
      - Stock. tr. & distr. el.
      - Maitrise des conso. NRJ
    - Mbd2
      - Module 1: Les matériaux biosourcés pour le développement dur

- Module 2: Propriétés et caractérisation des matériaux biosou
- Module 3: Industrialisation des matériaux biosourcés
- Module 4: Réglementation, qualité, certification
- Module 5: Développement durable et économique circulaire
- UE 3
  - EXPRESSION COMMUNICATION
  - ANGLAIS
  - PROJET
- Semestre 10
  - ALTERNANT
    - BILAN MI-PARCOURS
    - BILAN FINAL
  - UE STAGE
    - MATIERE STAGE

### Stage(s)

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Oui, obligatoires

## Et après ?

### Niveau de sortie

#### Année post-bac de sortie

- Bac +5

#### Niveau de sortie

- Level 7: Master's degree

### Débouchés professionnels

#### Secteurs d'activité

## **Careers**

- \* **Biotechnology Engineer**
- \* **Process & Methods Engineer**
- \* **Research and Development Engineer**
- \* **Quality, Health, Safety and Environment (QHSE) Engineer**

## **Industry Sectors**

- \* **Pharmaceutical industry**
- \* **Cosmetics industry**
- \* **Agri-food industry**
- \* **Energy and Environment sector**
- \* **Healthcare sector**
- \* **Consulting sector**
- \* **Logistics**

## **Types of Jobs**

**R\&D engineer, project manager, research manager, (bio)process engineer, industrial production engineer, QHSE engineer, regulatory affairs engineer, methods and industrialization engineer, continuous improvement engineer, industrial maintenance engineer, consulting & analysis roles, start-up director, logistics engineer.**