

# Ingénierie Mathématique et Data Science

The Mathematical Engineering and Data Science Department is one of the few programs in France that graduates high-level engineers in Data Science, Digital Engineering, and Artificial Intelligence.



UNIVERSITÉ  
Clermont Auvergne

## L'essentiel

### Nature de la formation

#### Duration

- 3 years

#### Teaching languages

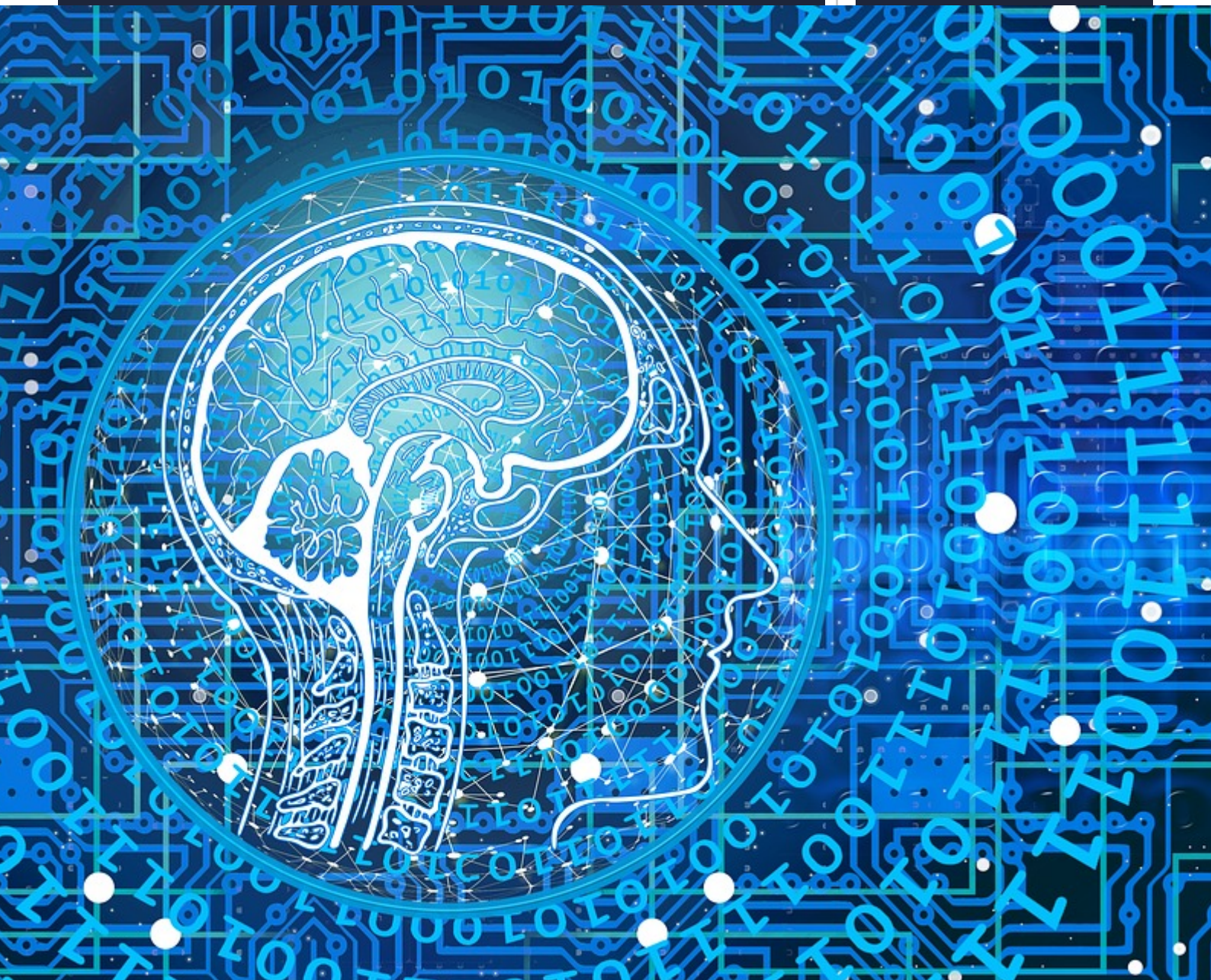
- French

#### Rhythm

- Full time
- Part time
- With blocked release periods
- Contrat de professionnalisation

#### Conditions

- Attending



The **Mathematical Engineering and Data Science (IMDS)** Department trains engineers specialized in:



**Data Science and Big Data**



**Digital Engineering and Artificial Intelligence (AI)**

The IMDS department also offers students the opportunity to pursue a **double degree** in Mathematics (Bachelor's level) at the end of the first year of the engineering cycle. A **double Master's degree (M2)** in Mathematics or Computer Science is also available in the final year.

**Data Science** lies at the intersection of mathematics, statistics, artificial intelligence, and computer science. Its aim is to extract value from data. With the advent of **Big Data**, companies have accumulated vast amounts of information and now seek to exploit it (cleaning, aggregating, analyzing) to offer better services, solve complex problems, or make informed decisions. The demand for **Data Science engineers** is currently very high in sectors such as banking, insurance, major industrial companies, healthcare, sports, and more.

**Engineers specializing in numerical simulation** are trained to model and simulate various phenomena (e.g., climate, tire performance based on physical characteristics) using techniques from **scientific computing** (e.g., partial differential equations) and **artificial intelligence** (e.g., machine learning). Career opportunities are abundant in sectors such as energy and large industrial enterprises.

Engineers trained in our department possess diverse skills and can also work in other sectors, such as **digital services companies (ESN)**.

**Examples of internships or professional training contracts:**

- Data Science applied to predictive maintenance (**ArianeGroup**)

- Model hybridization using machine learning for connected mobility (**Michelin**)

- Implementation of a machine learning algorithm to predict plant species from satellite images (**Spheer.ai**)

- Optimization of geomechanical models using AI methods (**EPFL**)

- Creation of an AI model to predict corn yield (**Bayer**)

- Generative AI models for tire sculpture design (**Michelin**)

- Machine learning models to predict plant fertility from genotype data (**KWS**)

- Development of algorithms for football analysis using tracking and event data (**Clermont Foot**)

- Python development of an interface to manage tools for radar operation (**Thales**)

- Development of an AI algorithm to transcribe voice into text (**MAIF**)

[Télécharger le flyer de présentation de Ingénierie Mathématique et Data Science](#)

RIE  
IQUE  
ENCE

40

ingénieurs

100%

élèves-ingénieurs

ingénierie  
diplômés  
par an

diplômés avec une  
expérience  
internationale

# INGÉNIEZ L'AVENTURE

Département IMDS  
des ingénieurs  
capables  
modéliser ou de  
données ou des  
à l'aide de  
issues de  
artificielle, des  
du calcul  
répondre aux  
transformation  
société.

## ENSEIGNEMENTS

*MATHÉMATIQUES*

*SCIENCES DES DONNÉES*

*Machine Learning*

*Big Data*

*Apprentissage statistique*

*Modèles mixtes et plan d'expérience*

*SIMULATION NUMÉRIQUE*

*Intelligence Artificielle*

*Calcul scientifique*

*Modélisation*

*Deep learning*

*INFORMATIQUE*

*Algorithmique*

*Génie logiciel*

*Programmation orientée objet*



**POLYTECH**  
CLERMONT



ON

INGÉNIEUR

INGÉNIEUR

BAC +5

INGÉNIEUR

BAC +4

INGÉNIEUR

BAC +3



CPGE

BAC +2

CPGE

BAC +1

# PARCOURS

IMDS  
3ème  
année

IMDS  
4ème  
année

TRONC COMMUN\*

IMDS 5ème année

INTELLIGENCE ARTIFICIELLE

BIG DATA

APPRENTISSAGE STATISTIQUE

CALCUL SCIENTIFIQUE

BIO STATISTIQUE

- \* 2 modules au choix parmi les 5
- \* Cours dispensés par des professionnels du monde industriel

# UNE OUVERTURE VERS

## L'ENTREPRISE

# 3

3ème année

COURS

4ème année

COURS

PROJET

STAGE

(min 5)

5ème année

COURS

PROJET

STAGE (min 5)

Possibilité de CONTRAT PRO

# 2

DOUBLES DIPLÔMES  
MASTER DE MANAGEMENT

N RAPIDE

0 € \*

RUT MOYEN  
ÔMÉS

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ROUPES

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S & DU NUMÉRIQUE

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numérique

ement informatique

ce Artificielle

## L'INTERNATIONAL

**5** DOUBLES DIPLÔMES  
MASTER OF SCIENCE

avec des universités partenaires : Canada,  
USA, Suède, Tunisie, Suisse

## LA RECHERCHE

**2**

RE



PROGRAMME  
INFOS PRATI  
MODALIT  
D'ADMISS



## POLYTECH Clermont

Campus universitaire des Cézeaux  
2 av. Blaise Pascal 63178 AUBIÈRE cedex  
Arrêt TRAM : Cézeaux / Pellez

[www.polytech-clermont.fr](http://www.polytech-clermont.fr)

SUIVEZ NOUS SUR LES RÉSEAUX SOCIAUX



Campus universitaire des Cézeaux - 2 av. Blaise Pascal 63178 AUBIÈRE cedex - Imprimé par PRINT CONSEIL sur papier recyclé - Pour la voie publique - Crédits photos : Polytech Clermont, Freepik, Canva, Dcstudio, Pressfoto, Frimufilms, Prostooleh,

### IMDS Graduate Testimonials:

“A dynamic school with quality teaching and a fulfilling student life.”

— *Clément, Class of 2022*

“Great courses, a good working atmosphere, and lots of extracurricular activities — plus, life in Clermont is really enjoyable.”

— *Julie, Class of 2022*

“Skilled, dedicated, and supportive professors who care about everyone’s success, small class sizes, and a pleasant campus.”

— *Guillaume, Class of 2021*

“The quality and human values of the teaching staff.”

— *Nicolas, Class of 2021*

### The truth about Clermont-Ferrand:

<https://www.youtube.com/watch?v=zxd5BM5-n7Q>

#### Partnership:

The Class of 2022–2025 is sponsored by Akkodis.

The logo for Akkodis, featuring the word "AKKODIS" in a bold, sans-serif font. The "AKK" is in yellow and the "ODIS" is in a dark teal color.

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The Class of 2023–2026 is sponsored by Clermont Foot 63.

**CLERM**



Logo Clermont Foot 63

## **Admission**

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### **Prerequisite**

#### **Prerequisites training**

The Mathematical Engineering and Data Science program recruits students for the engineering cycle from:



Preparatory classes (CPGE): MP, MPI, PC, PSI



Students from the Polytech PeiP preparatory cycle



Students with a university background (L2, L3)



Other applicants with a 2- or 3-year degree whose profile matches the program requirements

### **Application**

#### **Conditions of applications**

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

## **Program**

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

## Semestre 5

ECTS  
(crédits)

Se

### Enseignements

30

Ens

**Sciences  
fondamentales 1**

- Mathématiques
- Statistiques
- Probabilités
- Analyse
- Calcul numérique

14

Scien  
fond

**Sciences  
Technologiques,  
Information et  
Ingénierie 1 (ST2I 1)**

- Algorithmique
- Programmation

9

Scien  
Tech  
Infor  
Ingé

**Sciences homme  
et société (SHS 1)**

- Communication • Anglais
- Droit • Économie

7

Scien  
et so

**STAGE OUVRIER - 1**

## Semestre 7

### Enseignements

#### Sciences fondamentales

- Mathématiques • Statistiques • Calcul scientifique
- Machine Learning • Deep Learning • Équation aux dérivées

#### Sciences Technologiques, Information et Ingénierie (ST2I)

- UML • C++
- Java • Python
- Bases de données avancées

#### Sciences homme et société (SHS)

- Anglais • Gestion • Droit • Communication • Organisation
- Management • Projets avec des entreprises de la Data Science

## Semestre 8

### STAGE ASSISTANT INGÉNIEUR À L'INTERNATIONAL

## Semestre 9

### Enseignements

Plusieurs matières au choix parmi les suivantes :

- Deep Learning approfondi
- Transfert Learning appliqué à la vision artificielle
- Intelligence artificielle au service de l'optimisation
- Deep Learning appliqué à la finance

- Big D
- Rédu
- Appr
- Modè

PolyCompétences (1 au choix)

- Entrepreneuriat • Management
- Contrat de professionnalisation

## Semestre 10

### STAGE INGÉNIEUR (5 mois) ou CONTRAT DE PROFES

#### Professional Training Contract (Contrat de professionnalisation)

Professional training contracts are available to engineering students in their final year.

Students in the initial training pathway change status and become **employees** of the host company. The duration of the professional training contract is **12 months**.

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#### A Win-Win Approach

For the student, the goal of the professional training contract is to **gain professional qualifications** while validating their **engineering degree**. Beneficiaries receive a **percentage of the minimum wage (SMIC)** based on their age and education level. For details on compensation, please refer to the official website of the French Ministry of Labor.

For the company, the contract allows access to an engineer who is **immediately operational** and trained in-house. In some cases, this type of contract also grants **exemptions from employer social security contributions**, within specific legal limits.

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#### Eligibility

The professional training contract is intended for:



**Polytech Clermont students** in the initial training pathway, **aged 16 to 25**, and **admitted to the final year** of the engineering cycle;



**All employers** subject to the professional training tax, **except** for the French government, local authorities, and their public administrative institutions.

Students with disabilities who wish to sign a professional training contract are supported through dedicated assistance programs. See available support [HERE].

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## **Assessment Methods**

This track includes:



**Two intermediate oral evaluations,**



**A final report,**



**A final oral defense.**

In addition, students must complete **all ongoing assessments** organized by faculty throughout the year.

**Partial validation** of individual skill blocks is **not permitted**.

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## **Funding**

Training costs, including academic registration and tuition fees at Polytech Clermont, are **covered by the host company**. Part or all of the cost may be funded by the company's relevant **Skills Operator (OPCO)**.

## **What's next ?**

### **Job opening**

#### **Business sector**

- **Finance sector (banking, insurance):** decision support
- **Healthcare sector:** planning and statistical analysis of clinical trials, epidemiology, decision-making support
- **Sports sector:** match analysis, player performance studies
- **Retail sector:** quantitative market research, consumer behavior analysis
- **Large industrial companies:** R&D in artificial intelligence and scientific computing
- **IT sector:** software development, databases, information systems

#### **Professional integration**

Average salary including bonuses (Class of 2022 graduates): €38,950/year