# Master's program in Big Data / Business Analytics

**A 1-year Master's degree**

# CY Cergy Paris University

Since the first of January, 2020, Cergy-Pontoise University and EISTI have merged under a new name: CY, Cergy Paris Université. It is composed of 24,000 students. ESSEC is associated with CY as a partner institution.

The academic course offerings are made up of an undergraduate university (CY SUP) and of five undergraduate and graduate schools, four within the university, with the fifth being ESSEC.

In addition to ESSEC, the other graduate schools led by CY university are:

- CY Tech, specialized in Computer Science, Applied Mathematics, Civil Engineering, Biotechnology & Chemistry, Economics and Management;
- CY Arts and Humanities, represented by the National Higher School of Arts Paris-Cergy (ENSAPC), the National Higher School of Architecture of Versailles (ENSAV), the National Higher School of Landscape Design (ENSP) and the National Heritage Institute (INP);
- CY Education, represented by INSPE, EPSS and ILEPS institutions;
- CY Law and Political Sciences, represented by Sciences Po St-Germain-en-Laye campus.

# CY Tech

Located in Greater Paris and in Pau, CY Tech is primarily an Engineering Graduate School.

It has earned the "Grande Ecole" status, the highest recognition stated by the French Ministry of Higher Education & Research. CY Tech is also a member of the "Conférence des Grandes Ecoles" (CGE), a French association that gathers elite higher education institutions, which meet strict criteria regarding the recruitment process, educational approach, international and corporate network. Accessible after the completion of a secondary education diploma or through a dedicated post-secondary preparatory class, it delivers a Master's degree in these four fields: Applied Mathematics, Computer Science, Civil Engineering, Biotechnology & Chemistry.

Two university departments have been incorporated into CY Tech: the Institute of Sciences & Techniques (IST) and the Institute of Economics & Management (IEG), which broadens our overall course delivery in these specific areas. CY Tech course offer is structured in the following manner:

- A five-year Grande Ecole Engineering program;
- Post-secondary preparatory classes leading to Grande Ecole program enrollment;
- Undergraduate & Graduate Programs;
- Continuous training programs: Specialized Postgraduate Master's;
- International Master's with campuses located out of France;
- PHD programs.

# Our mission, our values

The mission of CY Tech is to meet the rising expectations of both students and industry. Through innovative programs and faculty exchanges, we seek to provide our students with an ever-increasingly attractive educational experience. Students can choose undergraduate and graduate programs in both Engineering and Management disciplines. Students also acquire valuable knowledge and global managerial skills through internships and study abroad experiences with universities worldwide.
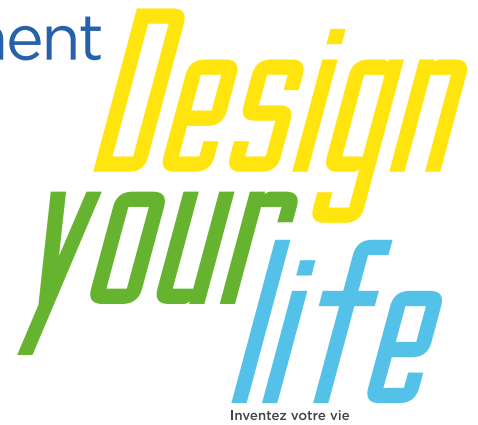
Since CY Tech's inception, the institution has gradually adapted itself to the evolving economy that offers an extensive and diversified curriculum that meets a contemporary vision of today's world.

Its objectives are:

- challenge-driven to prepare students and staff as global citizens and lifelong learners who care and act for the future of the planet and humanity;
- committed to the principles of openness and inclusion, by building open resources and collaborative platforms, endorsing open science agendas, and sponsoring the access, mobility and inclusivity mechanisms that liberate our intellectual and social potential.

# CY Tech international involvement

CY Tech's international involvement is indisputable and includes work experience abroad, academic exchanges as well as dual degree options.
Our institution recently renewed an Erasmus Charter for Higher Education. This recognition demonstrates our expertise in mobility of students & staff and in strong cooperation for innovation and good practices under the Erasmus + policy. CY University is a member of Campus France, the official agency for the promotion of French Higher Education worldwide.
CY Tech has also aligned with different European and international organizations and associations (EUTOPIA, EAIE, NAFSA, n+i Network, AIEA, ...) which aim to promote progress of international education.
CY owns a Language Centre and is also an ETS TOEIC Authorized Test Centre.

Our university was recently awarded the "Bienvenue en France" label, which distinguishes French Higher Education institutions that have developed reception facilities dedicated to international students. CY is establishing solid links with Chinese universities which will contribute to the creation of a Franco-Chinese Institute to further internationalize its educational opportunities. One of the most remarkable achievements at European level is the recent development of an alliance of six like-minded universities, located in Belgium, Slovenia, Spain, Sweden, the United Kingdom and France, entitled EUTOPIA. The mission of EUTOPIA is to build in the long term a unique and daring alliance of transformative and engaged institutions. The alliance has developed strong ties within the regional communities, the institutional structures and the local companies. EUTOPIA students, researchers and staff work together to build a new academic model, reflecting an open and a united Europe, respectful of the citizens and the environment.

CY Tech diplomas require an official language certification in English as a Foreign Language as part of its national diploma recognition criteria. CY Tech will have signed 250 university partnerships worldwide within the two coming years, including more than 20 international dual degree options. A substantial number of cooperation programs allow the institution to enhance incoming mobility through its undergraduate, graduate and post-graduate English-taught course delivery. In keeping with CY Tech's global vision, our institution plans to open a campus in Singapore within the near future.

# What makes CY Tech different?

**One ambitious vision.** CY, defined as a university of diversity, society-oriented and of international standing, seeks to educate new generations in the complex challenges of a globalized society in tune with the sustainable development objectives, academic excellence and quality student experience.

**A high-profile ranking status.** National and international rankings, recognized by many specialized media and websites, show once again that CY course offerings are considered as one of the best in the fields of Engineering, Management, Mathematics & Finance, internationalization and professional integration.

**Cutting-edge Research & Technology Transfer activities.** Research and technology transfer are at the heart of the dynamics of CY Tech, whose missions contribute to the appropriation of scientific knowledge. CY Tech asserts its vision and pursues an active policy in technology transfer innovation of its research activities, conducted by recognized full-time researchers within its fourteen laboratories and five Open Labs in modeling and experimental sciences.

**A wide range of facilities offered at the Campus:**

- Four libraries with over 2 million publications;
- Four university residences and private housing facilities;
- Student sports facilities with over 30 individual & team activities;
- Four student restaurants, four cafeterias;
- 47 student associations;
- A full package of cultural activities including a "cultural Pass voucher", a special pass which offers discounts to theaters & cinemas bookings and to other cultural events in Greater Paris.

**A "Bienvenue en France" label.**

This national recognition, awarded by our university, enhances our expertise dedicated to international students, mainly in the following areas:
- Quality and accessibility of information & reception facilities;
- Tutorial support services;
- Housing facilities and campus life development;
- Post-graduate career development and alumni services.

**Design your life**
*Inventez votre vie*

# Location: greater Paris

The Paris Region has much to offer to international students, such as history, art, culture on top of its academic & scientific excellence. It is a unique place to learn, discover, study, engage and exchange, a place where dialogue, fraternity, freedom and creativity will always prevail. Paris has been listed in the QS best student cities ranking for many years. At only 25 minutes from the world famous Les Champs Elysées, or La Défense (one of the major futuristic skyscraper packed, business districts in Europe) stands the city of Cergy-Pontoise. The historic heart of the area of Cergy-Pontoise thrives on a prestigious past which has often found itself at the crossroads of the history of France itself, as when the Royal Court resided there. Its fame was extended through the long residency of Camille PISSARRO, who painted the varied landscapes of the town and its nearby countryside in numerous works, which are now to be found in the greatest museums in the world. Blessed with rich heritage, Cergy-Pontoise became on March 30th, 2006, a member of the national network of towns and lands of Art and History. This label, delivered by the Ministry of Culture and Communication, embodies a policy aiming to promote heritage and architecture. Today, Cergy is known as a vibrant student hub.

# Program information

The Master's Program in Big Data / Business Analytics, accredited by the French Ministry of Higher Education and Research, is founded on CY Tech Engineering School's expertise in the following fields: Business Intelligence, Decision Support, Business Intelligence and Business Analytics / Big Data.
The program is taught in English and primarily dedicated to non-French-speaking students. Successful students will graduate with a state-recognized Master's Degree.

# Objectives of the master's program

Business Intelligence and Business Analytics have now become key elements of all companies.
The objective of this Master's program is to train future specialists in Information Systems and Decision Support. The program includes solid content in mathematics- and uses a wide range of computer-based tools, which allows students to deal with real problems, analyze their complexity and bring efficient algorithmic and architectural solutions. Big Data is the ultimate game changer.
The targeted applications concern optimizing the processing of large amounts of data (known as Big Data), logistics, industrial automation, but above all it's the development of BI Systems architecture. These applications play a major role in most business domains such as logistics, production, finance, marketing, client relation management systems. The need for trained engineering specialists in these domains is constantly growing and this Master's program answers this emerging need.

# Specifics of the master's program

This Master's Program has grown from the specializations in Decision Support, Business Intelligence and Business Analytics. CY TECH has been ranked amongst the top institutions in France by independent organizations.

**Distinctive points of this course:**
• Triple skill-set with architecture (BI), data mining and business resource optimization;

• This Master's program will be run by a multidisciplinary group: statistics, data mining, operational research, architecture;

• Implementation of interdisciplinary projects;

• Methods and techniques taught in this program come from cutting-edge domains in industry and research, such as opinion mining, social networks and big data, optimization, resource allocation and BI Systems architecture;

• This Master's program is closely backed up by research: several students are completing their final study project on themes from the L@RIS laboratory, followed and supported by members of the laboratory (PhD students and research professors);

• Being familiar with the tools used in industry dedicated to data mining, operational research and Business Intelligence gives the students an advantage in their employability after graduation;

• Industrial partnerships with companies strongly involved in Big Data are an integral part of this program:
  - SAS via the academic program and a 'chaired'entreprise' (business chair),
  allowing our students access to Business Intelligence modules such
  as Enterprise Miner (data mining) and SAS-OR (in operational research);
  - SAP via our University Alliance Program, enabling our
    students' access to the latest versions of BI modules from SAP,
    such as SAP-BW and SAP-Business Objects.

## Course structure

The Master's program includes two semesters:
• A series of modules at Master II level validating 60 ECTS.
  The academic year starts in September;
• An internship including the presentation of a Master Thesis.

## Teaching methods

All lectures will be taught in English with the exception
of the FLE (French as a Foreign Language) course,
which aims to teach students to understand and express
themselves in French as well as to get to know the French culture.
Students will also be familiarized with the 3 pillars of the Big Data Master's program:
• Modeling, operational research and decision support;
• Data analytics and data mining;
• Business Intelligence.

## Internship

Internships will be supervised by a university professor. A minimum of 3 meetings will take place between the trainee, the school representative and the person in charge of the company/research laboratory. Each meeting will result in a professional presentation of the trainee, which will lead to an assessment.
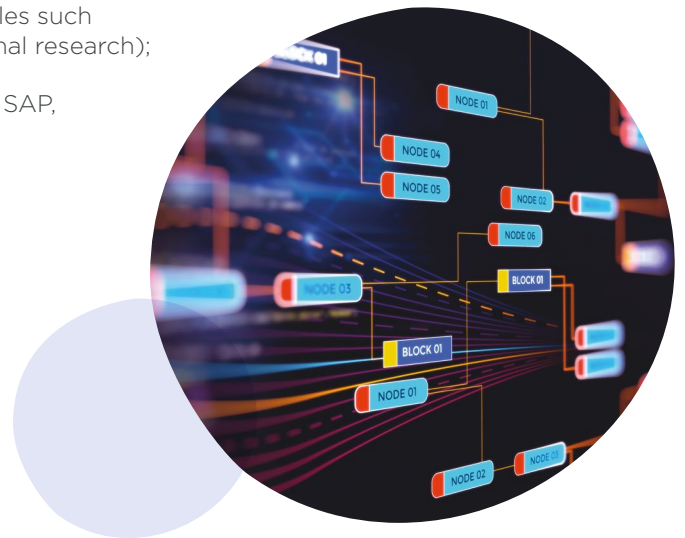In addition to these meetings, the student will be required to write an internship report which will contain the following:
• A presentation of the company/laboratory;
• A presentation of the activities and goals;
• An analysis and synthesis of the work undertaken;
• A personal analysis of the internship: what worked and what did not work.
This internship will last a minimum of 22 weeks.

## Career objectives

The growing and larger demand in these domains offers graduates from this Master's course numerous and diverse job opportunities –in areas linked to decision support- such as Data Scientists, Consulting Engineers, Research and Development Experts, Tool Design Engineers, BI/Business Analytics Solutions Providers, or simply Users of Business Intelligence tools. Graduates who wish to specialize in the area of research can start a career in both public and private research centers, find a position as researchers in Higher Education or prepare for additional education at the doctoral level.

# Course semester outline

This Master's program is based on the three pillars, mentioned above, except at a higher level of expertise. To train experts in our field, we provide students with professional skills in modeling, design and implementation of IT architecture, data mining and optimization.

## Semester 1

| Skills | Lectures | Hours | ECTS |
|---|---|---|---|
| Computer Technologies | Advanced Data Base 2 (PLSQL, transaction, Distributed Database) | 24 | 8 |
| | NoSQL | 20 | |
| | Machine Learning with Scala | 20 | |
| Data Exploration | Data Mining Approach (Time series, logistic regression, Bagging, Boosting, Random forest, Neural network) | 21 | 7 |
| | Semantic Web and Ontology | 21 | |
| | Social Network Analysis | 16 | |
| Business Intelligence | Advanced BI & Data Visualization | 24 | 4 |
| Operations Research | Forecasting Models | 33 | 5 |
| | SAS Analysis | 12 | |
| Foreign Languages and HR | FFL French as a Foreign Language | 26 | 3 |
| | PPP Personalized Professional Project | 15 | |
| | Agile Methodology | 7 | |
| Autonomous Work | Master Thesis preparation | 12 h per week | 3 |
| Total M2 Semester 1 | | 278 | 30 |

## Semester 2

| Skills | Lectures | Hours | ECTS |
|---|---|---|---|
| Data Exploration | Elastic Search Kibana | 21 | 5 |
| | Text Mining and Natural Language | 18 | |
| | Deep Learning (Convolutional Neural Network, Tensor flow, Keras, ...) | 12 | |
| Operations Research | Supply Chain | 18 | 5 |
| | Constraint Programming | 18 | |
| | Multi-Objective Optimization | 18 | |
| | Game Theory | 10 | |
| Software and Architecture | Big Data and Advanced Analytics | 42 | 4 |
| Foreign languages | FFL French as Foreign language | 21 | 1 |
| Total courses in M2 | | 157 | 12 |
| Autonomous Work | Master Thesis and Final Project Defence | 12 h per week | 6 |
| | Internship (22 weeks minimum) | | 9 |
| Total M2 Semester 2 | | | 30 |

# Admission requirements

- Interested candidates in the Master's degree in Big Data (Data Analytics, Data Science, and Data Architecture) with 4 years of Higher Education duly completed (240 ECTS validated or equivalent) or 3 years of Higher education duly completed (180 ECTS validated or equivalent) and 3 years of professional experience in a middle management position, must have:
- Strong skills in Mathematics and Computer Science;
- English proficiency level CEFR (Common European Framework of Reference for Languages): B2, preferably proven via an official external exam test score:

TOEIC: 800                    IBT TOEFL: 80                    IELTS: 6.0

French Proficiency: no prerequisite

French as a Foreign Language: Instruction included in CY Tech program

- Some applicants might be exempt from providing us with a Proof of English language level if their mother tongue is English or if they have studied a fully-taught English program.

# Application procedures

Submit the application and required documents on the following link:
https://ddc.oscar-campus.com/eisti/dc/record/master-international/register, as early as possible, and at the latest on July 29th.

Shortlisted candidates will be contacted 1 week after sending applications and will be accepted after a face-to-face, telephone or Skype interview with a member of CY Tech Admissions Board. Successful interviewees will receive an unconditional offer letter. You can also visit our website for requirements, deadlines and a checklist of materials.

**Program cost**

The tuition fees for one academic year of the Master's program are 7 000 €
One intake per year: September



# Documents required with the application form

- 1 CV.
- Official copies of university transcripts and degrees;
- Copy of identity card/passport;
- Your letter of interest (max. 2 pages).
  Your letter will help us to know about you, your interests, your values and goals. You will explain what encourages you to study a Master's program in Business Analytics at CY Tech.
- One letter of recommendation.
  If you have not yet graduated from your current degree you will need to ask your Home University for a transcript of records corresponding to the level of studies you have obtained. If admitted, you will have to provide us with the original documentation.

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