UNIVERSITÉ PARIS 1
PANTHÉON SORBONNE

# MASTER PARCOURS FINANCE TECHNOLOGY DATA

Master Monnaie, banque, finance, assurance

Master 2 "Finance Technology Data" is designed at the interface between finance and data science. It prepares professionals capable of understanding the power and the limits of technologies behind the current wave of financial innovation. Will the future financial infrastructure be decentralized or will it be controlled by the Big Tech? Will Big Data and machine learning improve risk management or will they reinforce financial discrimination? Will Fintech players disrupt banks or are they facing important barriers to entry? Addressing these questions requires technical and research skills that are placed at the heart of this program, and that students will apply whilst working on various practical projects and their Master Thesis.

Our teaching staff includes academic researchers and industry experts (data scientists, quantitative analysts, blockchain professionals, financial economists, regulators and Fintech experts) that study the role technology plays in finance, banking, insurance and money. Moreover, thanks to our numerous partners, students will have an opportunity to meet founders and CEOs, learn about Fintech start-ups, and participate in different professional competitions.

Master 2 "Finance Technology Data" is entirely taught in English and is a work-study program. Students will gain professional experience through their apprenticeship in banks, insurance companies, Euronext, consulting companies, Fintech start-ups and Bank of France.

## Infos pratiques

**Composante :** Ecole d'économie de la Sorbonne (EES)

**Durée :** 2 ans

**Crédits ECTS :** 120

**Campus :** Maison des Sciences Économiques

**En savoir plus :**

M2 FTD LinkedIn page

https://www.linkedin.com/company/master-2-finance-technology-data/

## Présentation

### Objectifs

The goal of the 'Finance Technology Data' program is to prepare financial economists equipped with data skills, and capable to design a research strategy, in order to understand the economics and technology of the financial innovation.

### Savoir-faire et compétences

The program has been designed at the interface between finance and data science, and will equip students with the following skills:

* **Solid foundations in the financial and economic theory** through subjects such as asset pricing, risk management, quantitative finance and econometrics, in order to critically access the value-added of technology in the financial innovation.
* **Programming skills in R and Python** to apply the most recent techniques of data science and big data analytics. Teaching will be done via numerous projects: pricing bonds, options and other financial assets, creating scoring models with machine learning, using natural language processing to convert Wall Street Journal textual content into quantitative indicators, analysing interactions between users on Twitter or Bitcoin network, coding a blockchain.
* **Understanding the global Fintech landscape** through exposure to case studies in FinTech and guest

lecturers from the leading European start-ups, financial companies and universities.

* **Designing a research strategy** under the supervision of a university professor and a corporate tutor to explore a research question in the Master Thesis. Students wishing to pursue PhD studies will have an opportunity to work on their PhD Research Proposal.

## Les + de la formation

**1)** 70% of students in the Master program are international students coming from countries all over the world.

**2)** 70% of the teaching staff are high-level professionals, entrepreneurs and CEOs. This allows students to learn the latest techniques and concepts in the financial sector from a practical perspective.

**3)** The Master program has established strategic partnerships with:

* **GARP** - the Global Association of Risk Professionals ;
* **DataCamp -** online platform for courses in machine learning ;
* **Le Swave** - a French Fintech accelerator ;
* **France Fintech** - a French Fintech association ;
* **Finance-Innovation** - a cluster for innovation in the French financial sector ;
* **La Place Fintech** - a meeting point for Fintech.

If you are accepted to the M2, our partners will forward your CV and cover letter to potential employers. Our partners also teach **specialised courses,** conduct **Fintech case study seminars** and organize **guided visits** in companies.

**4)** The Master program provides full access to all **DataCamp's online courses** for its students and alumni to enable them to further strengthen and develop their skills in data science, data analysis, data engineering and machine learning.

**5)** The Master program prepares its students for the Financial Risk Manager (FRM) Level 1 certificate. The **M2 FTD is an academic partner of GARP** and is therefore, able to offer its students the possibility to take the FRM Level 1.

**6)** The Master program has an active Alumni Association that organizes **events**, supports current students in their studies and helps to provide them with job opportunities.

**7)** The Master program provides high quality computers (Dell / Macbook) to students to help them perform well during their studies. The program also provides students with sweatshirts, t-shirts, bags and mugs with the Master's logo.

**8)** The Master program organises and finances a work-study trip during which students explore a city's financial landscape and cultural activities.

* Study trip to Stockholm, Sweden in April 2023 (**Sweden Central Bank, SEB commercial bank, Swedish Fintech Association and Zimpler start-up**)
* Study trip to Frankfort, Germany in April 2024 (**European Central Bank, BlackRock, Deutsche Bank**).

**9)** Thanks to the M2 constant collaboration with companies, students have the opportunity to participate in various competitions:

* **Best Master Thesis** - competition for the best Master Thesis organized for the students of M2 Finance Technology Data by VO2 Group. 2022 prize - trip to New York, 2023 prize - trip to Shanghai, 2024 prize - trip to Montreal.
* **DRiM Game** - intra-university challenge organized by Deloitte and SAS, and focused on credit risk estimation

using financial and machine learning algorithms. **1st place won in 2023.**

* **FinTech Generations** - FinTech entrepreneurial challenge organized by France FinTech, Le Swave, Société Générale and Treezor. **2nd place won in 2023.**
* **Sorbonne Data Challenge** - data science competition organized by University Paris 1 Pantheon. **1st place won in 2024.**

# Organisation

## Ouvert en alternance

The Master "Finance Technology Data" is a work-study program. Courses start on 1 September. During the first three weeks of September, students will have classes every day. From the fourth week of September, classes will take place on Mondays and Tuesdays at the University, and during the rest of the week, students will gain professional experience through their apprenticeship (in banks, insurance companies, consulting companies, fintech start-ups, regulatory bodies, etc.).

Detailed information about apprenticeship contracts can be found here.

## Membres de l'équipe pédagogique

**Olena Havrylchyk** is the **Founding Director of the Master 2 Finance Technology Data program**. She is Professor of Economics at the University Paris 1 Panthéon-Sorbonne and a researcher at the Centre d'Économie de la Sorbonne, where she leads the research programme on the financial globalisation. She is also a consultant at the OECD on financial regulation and fintech and member of the pilot committee of Le Swave, Fintech incubator. She has been a visiting scholar at the Bank of England, South African Reserve Bank, National Bank of Hungary, National Bank of Poland and other central banks, foreign universities and research centers. Olena has published in the Review of Finance, Journal of Banking and Finance and other academic journals. Her paper on P2P lending won the Best Paper Award at the First Toronto FinTech Conference. She is also the winner of the Trophée SAB 2013 for sustainable finance and Olga Radzyner Award 2011 for scientific work on the European economic integration, bestowed by the Central Bank of Austria. Originally from Ukraine, Olena holds PhD in Economics from the European University Viadrina (Germany). Olena is currently coordinating an ANR research project "Technology and financial (dis)intermediation" and participates in the "A FINancial supervision and TECHnology compliance training programme" that unites 25 university and fintech partners within the framework of the EC Horizon 2020. Olena co-organizes Paris FinTech and Crypto Webinar.

**Janos Barberis** is the **Co-Founder of SuperCharger Ventures**. He skilfully combines academic rigour with an unrivalled entrepreneurial spirit. He has an established track record in the FinTech Industry (named 32nd Most Powerful Dealmaker globally, Institutional Investors, 2018) and in academia (13th legal scholar in the world, SSRN, 2018). He is driven to deliver actionable insights which have benefited the business transformation and innovation of Tier-1 financial institutions, across 400 B2B partnerships with cutting-edge technology start-ups. The 49 start-ups across Janos' accelerator cohorts have raised over US $500 million and are regularly listed as leading FinTech companies, globally. He trained over 100,000 people in the last 4 years through online courses (x2), books (x3) and academic papers (5) in order to raise market awareness on FinTech & Regtech. He was on the FinTech board of the WEF and SFC.

**Ludovic Bonneau**, a graduate of **Ecole Polytechnique**, began his career in banking (BNP and SG) in central functions before moving to a consulting firm. He joined **Allianz France** in 2016 where he took a position in the Strategy and Innovation Department, before moving to the technical department, first as head of the Data & Innovation team, then as Head of P&C Retail / SME / Midcorp portfolio management, and today as **Director in charge of P&C Pricing & Portfolio Analytics SMEs.**

**Caroline Bozou** is **Assistant Professor of Economics at the University Paris 1 Panthéon-Sorbonne.** She holds a **Ph.D. in Economics** from University Paris 2 Panthéon-Assas. After her PhD, she worked as a researcher at the OFCE - Sciences Po. Her research interests include monetary and banking economics, Central Bank communication and macroeconomics. Her research has been published in international peer-reviewed journal including Journal of Financial Services Research.

**Catherine Bruneau** is **Professor of Economics at the University of Paris 1 Panthéon-Sorbonne**, researcher at the CES and associate researcher at the Labex ReFi. She has been a consultant at the Bank of France, and is presently a consultant at the France Strategie. She is an expert in theoretical econometrics, macro-econometrics, financial econometrics and in risk analysis and management, with a specific focus on the extreme risk in finance and insurance. Her publications are notably in the Journal of Econometrics, Oxford Bulletin of Economics and Statistics, Journal of Forecasting, Journal of Risk and Insurance, Journal of Macroeconomics, Journal of Banking and Finance, Journal of Property Research and other academic journals. She has supervised around 20 PhD theses of French and foreign students who have developed an academic or professional career in banks, insurance companies and consulting firms.

**Gunther Capelle-Blancard** is **Professor at the University of Paris 1 Panthéon-Sorbonne**. His research interests include financial markets, financial regulation and taxation, ethics, and corporate social responsibility. His research has been published in international peer-reviewed journals including The Review of Finance, The Journal of Banking & Finance, The Journal of Business Ethics, The Journal

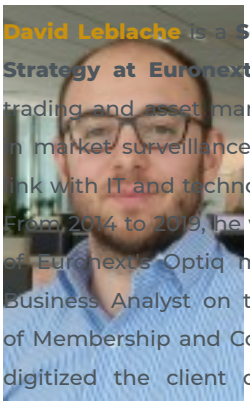
of Environmental Economics and Management, and The Journal of Investing. Dr. Capelle-Blancard received his Ph.D. from the University of Paris 1, for which he was awarded the Euronext Best Thesis in Finance Prize from the French Finance Association. From 2007 to 2009, Dr. Capelle-Blancard served as a **scientific advisor to the French Council of Economic Analysis**, an advisory body, reporting to the Prime Minister. From 2009 to 2013, he was **Deputy Director of CEPII**, a research center in international economics. He was also Deputy Dean of the Sorbonne School of Economics in 2015-2017.

**Rémy Cazabet** is **Associate Professor** in the **Data Mining and Machine Learning (DM2L) group at LIRIS lab, University of Lyon**. He is also a Direction Committee member of IXXI, Lyon's institute of Complex Systems. His research focus in network science and machine learning on graphs, in particular on the analysis of large and dynamic networks of interaction. He obtained his **Ph.D. in Computer Science from University of Toulouse**. He later occupied temporary research positions at the National Institute of Informatics in Japan (NII, Knowledge as Media group, Tokyo), at the Physics laboratory of the Ecole Normale Superieure de Lyon, and at Sorbonne University in Paris (Complex Networks group, LIP6/UPMC). He is involved in the Program committee of two national and two international conferences, in the organisation committee of 4 international workshops and is currently the coordinator of a French National Research Agency Young Researcher project (ANR JCJC) on the analysis of transaction networks between users in cryptocurrencies.


**Etienne Gay** is the **Director of the AI Lab at VO2 Group**, the group's R&D centre. He is also the **Director of the data science division**, specialised in data science, cloud and big data projects. In addition to a **Ph.D. in Applied Mathematics from Université de Paris and ONERA** (aeroacoustics and fluid mechanics), he has conducted research work combining physics, applied mathematics and machine learning (Université Bretagne Sud). His research revolves around machine learning applied in business, particularly in the context of customer relations (B2C, B2B, B2E). Under his direction, VO2 Group's AI Lab has developed works on autonomous trading by machine learning, reinforcement learning, computer vision and complex information segmentation for prediction purposes.

**Bertrand Hassani** is the **CEO and Managing Partner at QUANT AI Lab.** Previously, he was a **Partner at Deloitte** working on the development of the AI and Analytics practice. Before joining Deloitte, Bertrand was Chief Solution Officer and General Manager of the Paris Office InstaDeep, where he was involved in application of advanced AI for Risk Management (Banking, Insurance, Utilities...), model interpretability,

as well as advanced visualisation (AR, VR, 3D...). He was also **VP, Chief Data Scientist for Capgemini Consulting,** where he was developing novel approaches on reducing financial institutions' exposures, relying on data science methodologies (i.e. data mining, machine learning, frequentist statistics, A.I., etc.). He also was the Global Head of Research and Innovations position for Santander bank. Bertrand Hassani holds a **Ph.D. in Applied Mathematics from University Paris 1 Panthéon-Sorbonne.** He is an active associate researcher at Paris 1 Pantheon-Sorbonne University and hold an honorary reader position at University College London. He is also the co-director of the Data Science and Regulation research axis within the Labex Refi (combination of ENA, ESCP and Paris 1 laboratories).



**David Leblache** is a **Senior Manager for Innovation and Strategy at Euronext.** After studying financial markets, trading and asset management, David started his career in market surveillance. He has also always kept a strong link with IT and technology, which he is passionate about. From 2014 to 2019, he was actively involved in the delivery of Euronext's Optiq matching engine, first as the Lead Business Analyst on the project, and then as the Head of Membership and Connectivity, where he designed and digitized the client onboarding process on Euronext's platforms. Shortly thereafter, David took on his current role of innovation and strategy, where he notably helps senior management define Euronext's strategic positioning on topics ranging from Blockchain to ESG.

**Xavier Lavayssière** is an **Entrepreneur and Researcher on blockchains and regulation**, with a particular interest in infrastructures compliant by design. With a background in Computer Science (Claude Bernard Lyon University) and Public Law of the Economy (Panthéon-Assas University), experience in public administration (General Commissariat for Investment, European Investment Bank, Embassy of France in the United States), he has been working since 2014 on policy issues (France Strategy Report, Legalico.io, Libra Compendium..), technical projects (Cryptotux.org, Nanti, Forest as a DAO...) and the building of the ecosystem around these technologies. He **co-founded the Smart Contract Academy, Le Blockfest, Chaintech, ECAN and The Block Café**. Xavier Lavayssière teaches at higher education institutions (Ecole des Ponts, Paris Bar School, EM Lyon ...) and leads the pedagogy of a developers Bootcamp (Alyra).

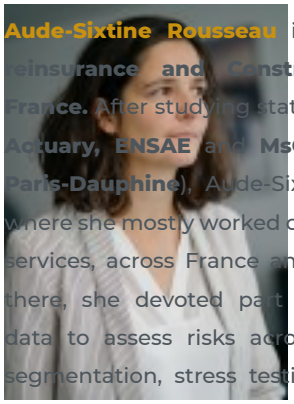
**Caroline Le Moign** is a **Senior Economist working at the European Securities and Markets Authority (ESMA)**. Before that, she used to work in the French Financial Markets Authority (AMF). She likes to understand how things work, and to use data to design policy decisions. Her main work gravitates around financial markets, the financing of the economy, and fintech. She also likes to explore monetary policy and other macro-finance subjects, as well as public policy in general. After **ESSEC Business**

**School and a Master in Development Economics at the Sorbonne**, she joined France Stratégie economists' team to work on macro-finance issues for 5 years. She then **worked for two French MPs as economic advisor at the National Assembly.** Enthusiastic about transmitting and learning, she has been teaching as a lecturer since 2014 in Sciences Po Paris on Financial Stability and European Economics.

**Matias Moya Giusti** is currently part of VO2 Group, working as a **Senior Developer and Data Analyst** along with traders at BNP Paribas. After a **Ph.D. in Mathematics from Université Paris VII - Paris Diderot**, he worked as a researcher at several prestigious research institutes, such as the Institut des Hautes Études Scientifiques (IHES) and the Max Planck Institute for Mathematics, and universities where he has also taught courses in different areas of mathematics. Several of his research papers on Number Theory have been published in renowned scientific journals. In a redirection of his career towards finance, Matias has also worked as a researcher in a high-frequency trading company.

**Clément Gorin** is **Junior Professor of Economics** at the University Paris 1 Panthéon-Sorbonne. He holds a **Ph.D. in Economics from the University of Lyon** and was a post-doctoral fellow at the University of Toronto. Clément's research is positioned at the intersection of spatial economics and machine learning. He is interested in understanding how the movement of people and ideas shape the distribution of economic activity and the development of urban areas. From a methodological perspective, his research makes extensive use deep learning models to exploit original sources of data, with a focus on image and language modelling. He has taught machine learning courses at both MSc and PhD levels in Ecole Normale Supérieure de Lyon, Aix-Marseille School of Economics and the University of Toronto, among others.

**Thomas Renault** is **Assistant Professor of Economics** at the University Paris 1 Panthéon-Sorbonne, from which he holds **Ph.D. in Finance from University Paris 1 Panthéon-Sorbonne**. He is working on the role of the Internet and social media on the price discovery in financial markets. His research area focuses on how data from the Internet can help measuring aggregate investor sentiment, investor attention to news, improve real-time event detection, and help detecting frauds. He has published in the Journal of Banking and Finance, Journal of International Money and Finance, etc.



**Aude-Sixtine Rousseau** is currently the **Head of P&C reinsurance and Construction business** for **Allianz France.** After studying statistics and economics (**Qualified Actuary, ENSAE** and **MsC in applied mathematics at Paris-Dauphine**), Aude-Sixtine joined a consulting firm, where she mostly worked on risk management for financial services, across France and Australia. As part of her role there, she devoted part of her work to better exploit data to assess risks across the organisation (customer segmentation, stress testing, capital optimisation...). She joined Allianz France in 2018, where she took a position in the risk department before moving to the technical department. She now focuses on optimising the reinsurance in the context of growing Nat Cat and emerging risks, and on driving profitable and sustainable growth in construction business.

**Natkamon Tovanich is a Postdoctoral Researcher at École Polytechnique** and an active member of the Blockchain@X Research Center. His research centers on data extraction, analysis, and visualization of blockchain and decentralized finance (DeFi) data. In 2022, Natkamon obtained a **Ph.D. in Computer Science from Université Paris-Saclay**. His thesis contributes to the field of visual analytics, with a specific focus on exploring the economics of Bitcoin mining pools.

**Eric Vansteenberghe** is a **Senior Economist and Researcher at the Banque de France – ACPR**. He joined the research unit after several projects in bank stress testing, namely working on the 2016 exercise at the European Central Bank in Frankfurt. Eric holds a **Ph.D. in Economics from Paris School of Economics**. His research interests are devoted to banking, insurance, and investment funds modeling, exploiting the prudential data from those financial institutions available at the regulator. He developed stress test, extreme events and agent-based models, proposed networks and contagion measures, and explored machine learning techniques to enrich prediction of default, risk and profitability. **Trained as a space engineer in Supaero (France) and Cranfield University (UK)**, Eric holds a research master degree from Paris School of Economics and worked several years in the communication satellite industry in Great Britain and Germany at Airbus and OHB before moving to the finance industry.

# Admission

## Conditions d'admission

Entry into the Master 2 Finance Technology Data is selective. To be successful in this program, students should be interested in technology and quantitative methods. This year students come from the following schools and universities: University of Paris 1 Panthéon-Sorbonne, Science Po, Télécom ParisTech, Ecole Polytechnique Grenoble, National University of Kyiv, University Paris-Cité, University of Strasbourg, University of Lille.

Admission requires a Master 1 degree in Finance, Econometrics, or Economics. Students with Master 1 / Master 2 degrees in other fields such as mathematics, engineering and computer science will be accepted if they have a basic understanding of finance, econometrics and economics.

Students should have basic skills in econometrics and coding in one of the programming languages used by data analysts and data scientists (Python, R, SAS, Stata, etc.). If you have no programming skills, we advise you to complete an online course, preferably with a certificate.

Since all courses are taught in English, a working knowledge of English is essential. Fluency in French is not a requirement, but it is recommended, as it would significantly increase the student's chances of finding an apprenticeship contract.

As the Master is a work-study program ("alternance" in French), foreign students should have the right to work in France. Students can verify their eligibility to work as apprentices in France here.

### Modalités d'inscription

The application window for the 2024 - 2025 academic year is **1 March 2024 - 15 April 2024.**

* **All students (with the exception of those coming from M1 MBFA) have to apply via the eCandidat platform.**
* **M1 MBFA students from Univeristy Paris 1 Pantheon-Sorbonne have to apply via the internal platform ENT.**

1. The application should consist of (i) a CV, (ii) academic records, (iii) a cover letter detailing your interest in the Master program and (iv) a two-page note that provides evidence-based discussion about the role of technology in finance (neobank, big data, machine learning, crypto, crowdfunding, Big Tech in finance, etc). Other documents relevant to a student's application, such as course certificates, work / internship certificates and letters of recommendation, will be accepted, but are not compulsory.

* Details about the two-page note: There is no need to cover all examples of financial innovation. You can choose to focus on a specific topic, such as "The environmental costs of bitcoin" or "The entry of Big Tech in finance". It is important that you write this note based on credible sources of information (academic papers, publications of central banks and international organisations, available data) and cite your sources. In other words, you should not present your opinions, but conduct state-of-the-art literature review.

2. If selected, candidates will be invited to an interview with the Academic Director and the Executive Director.

3. If accepted after the interview, candidates will have to find an apprenticeship contract in a field related to the Master's program in order to be officially admitted. This will require students to apply for apprenticeship positions and to pass one or more job interviews with potential employers.

* The Master encourages candidates to apply directly for apprenticeship positions of their choice. If candidates succeed in finding an apprenticeship in advance of their admission interview, they substantially increase their chances of being accepted to the Master program.

For more information, please, contact:

* **Olena Havrylchyk, Academic Director** - olena.havrylchyk@univ-paris1.fr (academic and strategic questions)
* **Daniel Petrov, Executive Director** - daniel.petrov@univ-paris1.fr (M2 FTD application process, day-to-day management, partnerships, general questions)

### Tarifs

The Master tuition is fully covered by the companies in which students will complete their apprenticeship. Students do not have to pay any university fees.

## Et après

### Poursuite d'études

Given the Master's focus on the theory and quantitative methods (econometrics and data science), graduates will be well prepared to pursue a PhD. The Master Research Thesis gives students an opportunity to start thinking about their future PhD research topic. Since academic literature about Fintech is still in its infancy, work experience during the Master program also helps to formulate relevant research questions.

Two types of PhD contracts could be possible after the end of the Master program:

* A full-time PhD contract financed by the University of Paris 1 Panthéon-Sorbonne. You can find more information **here**.
* A contract that allows you to do your PhD part-time while working (Thèse CIFRE). More information **here**.

## Insertion professionnelle

This Master program is well suited for analytical careers in the traditional financial institutions, Fintech, Insurtech and Regtech start-ups, as well as regulatory and supervisory bodies.

The Master program prepares students for a wide range of job opportunities, such as data scientist, quantitative analyst, risk manager, trader, sales professional, financial markets analyst, structurer, portfolio manager, quantitative researcher, machine learning specialist, AI engineer, financial inspector, data analyst, analyst fintech/crypto, analyst blockchain and tokenomics, sustainability analyst, business analyst, innovation and strategy consultant, project manager, etc.

This year, our students have signed apprenticeship contracts with Euronext, Banque de France, HSBC, BNP Paribas, Société Générale, Crédit Agricole, Natixis, My Money Bank, Allianz, SCOR, Abeille Assurances, VO2 Group, Ostrum Asset Management, QuantCube, Green Got, Pubstack.

# Programme

## Organisation

Teaching is organized around four blocks: **Finance, Data, Fintech and Active Learning.**

The teaching language will be English, but most professional training will be in French.

Detailed information on each subject can be found by clicking on the subject in the table below:

## Master 1 Monnaie, Banque, Finance, Assurance

### Semestre 1

| | | |
|---|---|---|
| **UE1 : Economie** | **16 crédits** | |
| Econométrie appliquée MBFA | | 54h |
| LV1 | 2 crédits | 18h |
| Macroéconomie monétaire | | 36h |
| Microéconomie : risques et comportements | | 36h |
| **UE2 : Monnaie-Banque-Finance-Assurance** | **14 crédits** | |
| Corporate finance | | 36h |
| Economics of Banking | | 18h |
| Economie de l'assurance | | 18h |
| Financial market | | 54h |

### Semestre 2

| | | |
|---|---|---|
| **UE1 : Monnaie-Banque-Finance-Assurance** | **18 crédits** | |
| International finance | | 36h |
| LV1 | 2 crédits | 18h |
| Mutations financières et politiques monétaires | | 54h |
| Produits dérivés et gestion des risques | | 54h |
| **UE2 : Finances quantitative** | **12 crédits** | |
| Econométrie financière | | 54h |
| Finance quantitative sous VBA | | 36h |
| Options | | |
| Analyse financière | | 36h |
| Applied Data Science in Finance (Python) | 4 crédits | 36h |
| Options autre mention | | |
| Crise et répartition | | 36h |
| Economie des territoires | | |
| European integration | | |
| Firmes multinationales | | 36h |
| Industrial Economics | | |
| Sociologie des institutions | | 36h |
| Sociologie politique, sociologie du pouvoir et des conflits | | 36h |
| Topics in environmental economics | | 36h |

## Master 2 Finance technology data

### Semestre 3

| | | |
|---|---|---|
| **UE1 Finance** | | |
| Asset Pricing | | 18h |
| Financial market microstructure | | 18h |
| **UE2 Data** | | |
| Applied Data Science in Finance (Python) | 3 crédits | 18h |
| Financial Econometrics | | 18h |
| Quantitative methods in finance (Python) | | 18h |
| Scoring and machine learning (R and Python) | 3 crédits | 18h |
| **UE3 Fintech** | | |
| Choix 1 option | | |
| Data challenge | 2 crédits | 18h |
| Monetary economics and crypto-currencies | 2 crédits | 18h |
| Economics and technology of Blockchain | | 18h |
| Financial Innovation | | 18h |
| Fintech case study | | 18h |

| | | |
|---|---|---|
| **UE4 Master Thesis** | **5 crédits** | |
| Fintech Research seminar | | 18h |
| Master thesis seminar | 3 crédits | 18h |

## Semestre 4

| | | |
|---|---|---|
| **UE5 Finance (choix cours 6 ECTS)** | **6 crédits** | |
| Choix 2 matières : phD track + 1 cours | | |
| Option à choix | | |
| Financial market analysis and risk assessment | 2 crédits | 18h |
| Risk management | 2 crédits | 18h |
| Topics in insurance | 2 crédits | 18h |
| PhD track : Literature Review | 4 crédits | 36h |
| Choix 3 matières : hors phD track | | |
| Financial market analysis and risk assessment | 2 crédits | 18h |
| Risk management | 2 crédits | 18h |
| Topics in insurance | 2 crédits | 18h |
| **UE6 Data** | | |
| Applied Big Data Analytics in Finance (Python) | | 18h |
| Bitcoin Network and Machine Learning (Python) | | 18h |
| Data privacy | 1 crédits | 6h |
| Financial econometrics | 2 crédits | 18h |
| Quantitative methods in finance (R) | 2 crédits | 18h |
| **UE7 Fintech (choix cours 6 ECTS)** | **6 crédits** | |
| Choix 2 matières : PhD track + 1 cours | | |
| Option à choix | | |
| Applied Machine Learning | 2 crédits | 18h |
| Crypto Industry and Pub | 2 crédits | 18h |
| Fintech regulation and Regtech | 2 crédits | 18h |
| PhD track : Writing PhD Proposal | 4 crédits | 18h |
| Choix 3 matières hors phD track | | |
| Applied Machine Learning | 2 crédits | 18h |
| Crypto Industry and Pub | 2 crédits | 18h |
| Fintech regulation and Regtech | 2 crédits | 18h |
| **UE8 Master thesis** | **9 crédits** | |
| Master thesis | 9 crédits | 18h |