Année universitaire 2024/2025

Big data and digital economy - parcours international - 2ème année de master

Responsable pédagogique : ERIC **BROUSSEAU** - https://dauphine.psl.eu/recherche/cvtheque/brousseau-eric

Crédits ECTS : 60

LES OBJECTIFS DE LA FORMATION

Training future young international managers to the challenges of data intensive business models and organizational processes based on «machine learning» and «artificial intelligence». The program is dedicated to the acquisition of skills in digital management and strategies in the digital age. Targeted students are young graduates engineers, economists or lawyers wishing looking for a management expertise to participate to the development of their company with an organizational environment confronted with digital issues and data.

Skills acquired:

- Designing an effective data governance
- Building data visualization for business
- Leveraging the value of users (User generated Content and Customer as a resource)
- Designing a data driven business model
- Critical thinking about the potential and limit of Artificial Intelligence and algorithms

ADMISSIONS

- Applicants must have a four-year bachelor degree from a good Chinese university; Non Chinese degree qualifications should be referred for assessment
- Applicants must be competent in the language of instruction (Mandarin and English), with B1 level
or equivalent English proficiency
- Applicants must hand in an essay about applying big data to decision science

PROGRAMME DE LA FORMATION

- Semester 3
  - Mandatory Courses
    - Introduction to Big Data
    - Data Governance
    - Internet and Network economics
    - Data visualization
    - Strategic management and Data driven business models
    - Big Data Analytical Methods
    - Internet Thinking and Managers
- Semester 4
  - Mandatory Courses
    - Marketing and data
    - Big data and research application
    - Data ethics
    - Innovation Driven Big Data Strategy Analysis and Application
    - Innovation Development of E-commerce in Digital Economy
    - Mémoire appliqué

DESCRIPTION DE CHAQUE ENSEIGNEMENT

SEMESTER 3

Mandatory Courses

Introduction to Big Data

ECTS : 3

Langue du cours : Chinois

Description du contenu de l'enseignement :

- The background of big data: social background, industrial background, engineering background, scientific background.
- Main research areas of big data: Social public management big data (government big data: France - Open data plan, the United States - data. Gov Openness of high value government data), the UK - the Open data, China – government open data platform, etc.), industrial big data (Germany – industry 4.0, the United States - industrial Internet, China - made in China 2025, Britain - British industry strategy 2050, South Korea
-manufacturing innovation 3.0, Japan - dominant industry value chain, etc.), agricultural and ecological environment big data (China Internet plus agriculture, the United States - Crowd Flower), medical big data (China - smart medicine, the United States - Open the FDA, Japan - DPC data,
etc.), national defense big data (China, France, the United States).
- Main problems in the research of big data: Data processing, data modelling, data processing methods, data variation analysis, future situation prediction.
- Architectures of big data system: the architecture of cloud computing, the architecture of Mobile computing, the architecture of IoT, the architecture of artificial intelligence.
- Future applications of big data: smart economy (digital economy, network economy, platform economy, sharing economy), smart society (Internet of things, block chain, virtual society).

- The main contents of Introduction to Big Data including the background of big data(social background, industrial background, engineering background, scientific background), basic elements of big data, architectures of big data systems and applications of big data models. This course aims to help students to understand the basic theories and research methods of big data, analyze and solve problems with the methods of big data, and make a difference in the field of innovation.

Compétences à acquérir :

- Understand the background of big data.
- Master common big data models.
- Master an effective big data analysis method.
- Master the big data system architecture.

Data Governance

ECTS : 3

Langue du cours : Anglais

Description du contenu de l'enseignement :

- Principles and methodology of data governance.
- Organizational and process management – data life cycle management.
- Technical aspects: master data management (MDM).
- Data Quality Management.
- Compliance and regulations indifferent economic zones (EU, USA).
- Health data and other specific data regulation.

- This course focuses on an organizational and technical approach of data management. Extracting value from data requires effective data management process. Value heavily relies on data quality. Research shows that data quality depends on both a technical approach and an organizational approach. Thus, designing the data governance is a key strategic issue for organizations in the Big Data era.

Compétences à acquérir :

- Designing an effective data governance.
- Organizing data management process.
- Managing Data quality in an organization.
- Building Master Data Management (MDM).
- Understand et comply with different data legal frameworks.

Internet and Network economics

ECTS : 6

Langue du cours : Anglais

Description du contenu de l'enseignement :

- Economics of information.
- Networks effects.
- Governance technologies.
- New business models.

- This course aims at teaching the fundamentals of the economics of the three pillars of the digital transformation. Digital technologies allow, first, to generate and market information goods at a very large scale. Second digital technologies are characterized by strong network effects that depends upon both interdependences among components and networks topology. Third digital technologies allow to substitute capital for labor in governance, changing its very nature and allowing radical innovations. The specificities of the marketing of information goods, of network effects and of digital governance explain pricing and competitive strategies in the digital era, as well as the essence of digital business models and their variations.

Compétences à acquérir :

- Principles behind the production, marketing and valuation of goods and services intensive in information and knowledge.
- Understanding of the interactions between socio-economic and technical phenomena in the Internet era.
- Understanding processes of organizational changes supported by digital technologies.
- Analytical methods to analyze and develop sustainable business models.

Data visualization

ECTS : 3

Langue du cours : Anglais

Description du contenu de l'enseignement :

- Principle and methodologies of data representation.
- Key Performance Indicators building and management.
- Analytical methods: visual data representation, visual dashboarding.
- Using data visualization software (Tableau Software).
- Alternative type of representation such as 3D representation.

- As organizations cope with more and more data, the question of how to represent them for decision maker is becoming a hot topic. Thanks to new type of methodologies and software, organizations can build data visualizations that are meaningful for managers. This course deals with topics such as data representation, building effective KPI, choosing the right tools and methodologies to represent large set of data.

Compétences à acquérir :

- Understand the challenges of data visualization in the Big Data era.
- Building effective visual dashboarding.
- Selecting the right methodology in data visualization.
- Building data visualization for business.

Strategic management and Data driven business models

ECTS : 6

Langue du cours : Anglais

Description du contenu de l'enseignement :

- Leveraging value of data: data collection and monetization.
- Building and managing network effects
- Leveraging the value of users (User generated Content and Customer as a resource)
- Platform business models.
- Data driven Business models.

- The world digitization leads to new types of organizations that scholars and policy makers define as platforms. This course gives participants concepts and analytical tools to understand the logic of those new type of business models. The digital foundations of platforms will be analyzed: datafication, networks effects, collective intelligence, digital infrastructure. Building and managing a digital platform is also fully described. Various platform generic business models are presented demonstrating the large potential of such new way of organizing economic transactions.

Compétences à acquérir :

- Understand the platform organizations.
- Building and managing network effects.
- Designing a data driven business model.
- Engaging customers and users in the value proposition.
- Mastering various data driven and digital business models.

Big Data Analytical Methods

ECTS : 3

Langue du cours : Chinois

Description du contenu de l'enseignement :

- The analysis methods in the field of big data, including probability statistics analysis, combinatorial mathematical analysis, queuing theory, graph theory and functional analysis, etc.
- Data modeling, including Monte Carlo algorithm, probability density algorithm, ant colony algorithm, etc.
- Data structure, including OpenStack, Hadoop, Spark.
- Data fusion, including hierarchical control fusion, unstructured data fusion and structured data fusion.
- Data processing, including deep learning, manifold learning and reinforcement learning.

- This course aims to provide an advanced understanding of the core algorithms and topics in the field of big data. From this course, students will understand basic methods of big data analysis, learn main modeling models of big data, master common big data processing algorithms by
solving common big data problems in projects.

Compétences à acquérir :

- Basic methods of big data analysis.
- Main modeling models of big data.
- Common big data processing algorithms.
- Common solution to big data analysis problems.

Internet Thinking and Managers

ECTS : 6

Langue du cours : Chinois

Description du contenu de l'enseignement :

- National policies of Internet thinking (China: Internet plus, the Belt and Road, supply side; policies of France, the United States, and Japan).
 -The fundamental definition of Internet thinking.
- The main manifestations of Internet thinking (divergence, real-time, pseudo reality, mass data memory, predictability, descriptive for big data)..
Classic cases of Internet thinking (taxi-hailing apps, sharing bicycles, sharing cars, new logistics, new manufactures, smart medicine).

- Managers' characteristics of the Internet thinking (master the Internet technology and able to innovate in the field, summarize the thinking methods with customized features; Internet thinking runs through the daily work of the leaders and play an active role in dealing with the affairs; Internet thinking helps contemporary leaders think quickly and provides an accurate reference system).

The innovation of managers with Internet thinking (the traditional thinking is the basis of the Internet thinking; the Internet thinking is the modern description of the traditional thinking; the Internet thinking is a new thinking ideology with distinct characteristics of the times; the Internet thinking is the nuclear mentality of the new thinking).

In the context of continuous exploration and new achievements in the scientific fields such as the Internet, the Internet of things, big data, cloud computing and other scientific fields, Internet thinking refers to a way of thinking that has a great impact on the economic base, superstructure, and the future innovation. It can impact all aspects of society. The purpose of this course is to enable students to master new ways of innovative thinking and lay a solid foundation for future scientific research.

Compétences à acquérir :

- Understand the main forms of Internet thinking.
- Analyze the classic cases of Internet thinking.
- Apply Internet thinking to describe traditional industry.
- Design an industry analysis method with internet customization feature.

SEMESTER 4

Mandatory Courses

Marketing and data

ECTS : 3

Langue du cours : Anglais

Description du contenu de l'enseignement :

- Business Intelligence.
- Segmenting and targeting through social networks.
- Digital communication / Changes in the advertising industry.
- New regulation of private data on marketing activity.
- Getting knowledgeable to interact with internet digital companies
- Developing innovative solutions.

Compétences à acquérir :

- Mastering the new marketing tools.
- Adjusting marketing strategies to private life respect.

Big data and research application

ECTS : 3

Langue du cours : Anglais

Description du contenu de l'enseignement :

- Data gathering and cleaning, managing integrity and security.
- Database integration and Data sharing.
- Data analytics: how to build knowledge
- How to turn knowledge into economic value and business application.

- This course is an introduction to the processes relied upon by data scientists to turn the potential of the availability of data at a large scale into relevant knowledge to analyze socio-economic or psychological phenomena and turn them into value. The aim is not to train the audience in using these technics, but to make it familiar enough with them to discuss with data scientists and to be able to understand the potential and limits of knowledge resulting from big data.

Compétences à acquérir :

- Understanding of the constraints in gathering, cleaning and organizing data sets.
- Mastering the organizational requirements to manage data bases in a long term and business perspective.

- Critical thinking about the potential and limit of Artificial Intelligence and algorithms.
- Alternative analytical strategies to derive knowledge from big data.

Data ethics

ECTS : 3

Langue du cours : Chinois

Description du contenu de l'enseignement :

- The basic principles of data system design: technology, standards (industry standards, national standards, international standards), intellectual property rights, ethics.
- Data ethics cases: professional ethics, technology infringement, data related intellectual property ethics.
- The application of data ethics in technological innovation, enterprise development and social changes.
- This course aims to help students learn the relationship between data ethics and intellectual property rights, data ethics and research methods of technological change, innovation and development.

Compétences à acquérir :

- Methods of intellectual property management.
- Technical standard management methods.
- Common solutions to data ethics problems.

Innovation Driven Big Data Strategy Analysis and Application

ECTS : 3

Langue du cours : Chinois

Description du contenu de l'enseignement :

- Big data development strategies: "Internet plus", " The Belt and Road", "Intelligent Society and Smart Community".
- Innovation driven development strategies: classic national innovation and development strategies of the United States, China, the European Union, Japan and South Korea.
- Innovation driven development case study: Alibaba, Amazon, Jingdong, Tencent, Microsoft, HUAWEI.
- This course aims to train students to understand the innovative development strategies at the national level, the industry level and the enterprise level, and to provide new research ideas and methods for the future innovation system.

Compétences à acquérir :

- National innovation strategies from innovation perspective.
- Industry innovation strategies from market application perspective .
- Enterprise innovation strategies from product perspective.

Innovation Development of E-commerce in Digital Economy

ECTS : 6

Langue du cours : Chinois

Description du contenu de l'enseignement :

- The background of digital economy: digital economy, network economy, platform economy, sharing economy.
- Main models of e-commerce: B2B, B2C, C2C, O2O, G2G, O2On.
- Case study of e-commerce innovation and technology: mobile payment (Alipay, WeChat), intelligent logistics (China post, SF Express), artificial intelligence (Google, Tencent).
- The application of e-commerce strategy in enterprise innovation.
- The application of e-commerce strategy in the development of digital economy.
- This course aims to help students develop new research methods of digital economy, understand main models of e-commerce, and master the integration of digital economy with e-commerce.

Compétences à acquérir :

- New research methods of digital economy.
- Application of main e-commerce models.
- Design an integration method of digital economy with e-commerce.

Mémoire appliqué

ECTS : 12

Description du contenu de l'enseignement :

- A master's thesis is a piece of original scholarship written under the direction of a faculty advisor. It will respond to a relevant debate and will bring new evidence and arguments.

Compétences à acquérir :

- To develop critical thinking.
- To write a state of the art on a hot topic.

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