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UNIVERSITAT POLITÈCNICA  
DE CATALUNYA  
BARCELONATECH

# **TEACHING GUIDE TO FINTECH AND DIGITAL TRANSFORMATION IN FINANCIAL SERVICES 2025-2026**

## GENERAL DATA

<b>Name:</b>	Fintech and digital transformation in financial services
<b>Code:</b>	
<b>Course:</b>	2025-26
<b>Titration:</b>	Master's Degree in Financial Innovation and Fintech
<b>Number of credits (ECTS):</b>	5
<b>Location in the curriculum:</b>	1st year 2nd semester
<b>Department:</b>	
<b>Head of department:</b>	
<b>Date of last revision:</b>	April 2025
<b>Teaching staff:</b>	Gabriela Guzmán (Digital Business, CEO Vesto), Daniel Dang (Telecommunications, CEO Futa), Gerard Albà (Mathematician, CIO MoraBanc)

## 1. OVERVIEW

The main functions of a financial system in the economy include:

- Payment system with medium of exchange.
- Credit: the transfer of resources from savers to borrowers.
- Savings and Investments: the collection of savings for the transformation of pure time.
- Insurance: risk reduction through insurance and diversification.

The recent emergence of fintech (technological change in finance) has greatly expanded interest in financial innovation as new products and services (e.g., payments, cryptocurrencies), production processes (e.g., machine learning, data science), and organizational forms (e.g., platform business models, neobanks) are created and deployed.

In this course, new applications and business models (products and services) in these four major areas of finance will be studied.

The subject combines theoretical rigor with practical cases, preparing students to face the challenges of new fintech applications.

## 2. OBJECTIVES

- Understand the concept of fintech and its evolution.

Analyze the origin, development, and impact of financial technology on traditional systems.

- Explore the main areas of application of Fintech.

Study key sectors such as digital payments, P2P lending, digital banking, blockchain, cryptocurrencies, insurance (insurtech) and investment management (robo-advisors).

- Assess the impact of fintechs on the traditional financial system.

Understand how fintechs are transforming banking, personal and corporate finance, and access to financial services.

- Identify the most common business models in the Fintech ecosystem.

Know the business strategies, operating structures, and revenue models used by financial *startups*.

- Analyze the regulatory framework and legal challenges.

Study current regulations and regulatory challenges in different jurisdictions, including topics such as data protection, KYC/AML and financial supervision.

- Develop a critical view of the risks and opportunities of the sector. Identify technological risks, cybersecurity, financial inclusion and sustainability, as well as opportunities for innovation.

- Foster practical skills for the design or evaluation of Fintech solutions.

Apply technological and financial analysis tools to create, evaluate or implement digital solutions in the financial field.

- Apply knowledge acquired in other modules of the program (machine learning and data science, blockchain, digitalization) to design financial products and services in the different verticals of the sector.

### 3. LEARNING OUTCOMES

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At the end of the subject the student will be able to:

K1.2: Describe the main technological trends that are redefining the financial sector.

K9.1: Identify the different elements of the business model and define the competitive advantage of a technological nature that makes it differential and sustainable.

K9.2: Differentiate different use cases and recognize the successes and failures of financial technology projects in the market.

S1.1: Communicate effectively orally, in writing and graphically with other people about learning, thinking and decision-making, and participate in debates, making use of interpersonal skills, such as active listening and empathy, which favour teamwork.

S2.1: Develop the capacity to contribute to innovation in new or existing business institutions and organizations, through participation in creative projects and have the ability to apply skills and knowledge on technology-based business sales, organization and development.

S3.1: Understand advanced digital technologies, so that they can be applied with a critical perspective, in diverse contexts, in academic, professional, social or personal situations.

S4.1: Differentiate the different types of technology that are being applied in the financial sector based on disintermediation.

S12.1: Design the different elements that make up the business model and apply market tests that can verify the hypotheses on which the model is based.

S12.2: Differentiate the different use cases of technology in finance in order to detect possible untapped opportunities.

S13.1: Examine different profitable business projects and success stories in the sector that are environmentally friendly, socially responsible, and promote teamwork and innovation.

C1.1: Integrate the values of sustainability, understanding the complexity of systems, in order to undertake or promote actions that restore and maintain the health of ecosystems and improve justice, generating diverse visions for sustainable futures.

C2.1: Identify and analyse problems that require autonomous, informed and reasoned decision-making, in order to act with social responsibility, in accordance with ethical values and principles.

C3.1: Develop the capacity to assess gender and gender inequalities and to design solutions.

C4.1: Apply financial decentralization technologies in applications or business models that enable cost reduction and improved profitability, considering the current ethical and legal framework.

C5.1: Lead teams in financial innovation projects, creating workspaces and a corporate culture that promotes teamwork and innovation.

C5.2: Lead, direct or collaborate in teams that are developing new business opportunities through entrepreneurship.

We can highlight:

- Understand the evolution and digital business models in finance. Study how fintechs are redefining traditional financial services through new models and value propositions.
- Analyze the technological, regulatory, and market factors that drive financial innovation. Understand the role of technology (such as machine learning, blockchain, etc.), regulation (such as PSD2), and changes in consumer behavior.
- Explore key areas such as digital banking, payments, e-money and embedded finance. Become familiar with new forms of banking, digital means of payment and the integration of financial services into non-financial platforms.
- Investigate new forms of alternative financing. Evaluate models such as *crowdfunding*, *crowdlending* and solutions such as *Buy-now, pay-later*.
- Apply artificial intelligence and *machine learning* in financial processes. Understand its practical application in credit origination, insurance underwriting and claims management.
- Explore solutions in wealthtech and insurtech through case studies. Develop practical skills by simulating or evaluating applications such as robo-advisors, investment apps or securities loans.
- Learn about the regulatory and investment ecosystem of Fintech startups. Learn about tools such as regulatory sandboxing, regtech, and *venture capital dynamics*.
- Assess the impact of new players such as BigTech and Telecoms on financial services. Analyze the role and strategy of non-financial companies that are entering the financial sector.

## 4. CONTENTS

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### TOPIC 1: FINTECH. DIGITAL BUSINESS MODELS IN FINANCE

#### Specific learning outcomes:

- Define the concept of fintech and its role in the transformation of the financial system. Understand what a fintech is, its origins, and how it has evolved to become key players in the financial ecosystem.
- Identify and analyze the different digital business models applied to finance. Explore real cases of models such as digital banking, payment platforms, alternative credit, automated investment, digital insurance, among others.

- Understand the technological factors that make financial innovation possible. Study key technologies such as APIs, cloud computing, blockchain, artificial intelligence and their impact on financial services.
- Analyze the regulatory environment affecting fintechs. Examine how regulations such as PSD2, MiCA, or the regulation of e-money influence the design of digital financial services.
- To assess the market factors driving the growth of the Fintech sector . Analyze the change in consumer expectations, global digitalization, financial inclusion, and the role of new competitors.
- Develop a critical vision of the opportunities and challenges of the fintech model compared to traditional banking.

### Contents:

- 1.1. Technological, regulatory and market factors.
- 1.2. Digital banking and specializations.
- 1.3. *Embedded finance*.

## TOPIC 2: PAYMENT METHODS AND WALLETS

### Specific learning outcomes:

- Understand how digital means of payment work and how they evolve.
- Explore the different types of digital wallets and their functionalities.

Distinguish between bank wallets, cryptocurrency wallets, mobile wallets (such as Apple Pay, Google Pay), and wallets specific to fintech companies.

- To analyse the role of electronic money institutions (e-money institutions).

Understand their regulatory framework, how they operate, and how they differ from traditional banks.

- Examine the value chain of digital payments.

Identify key players: issuers, acquirers, networks (such as Visa/Mastercard), PSPs (Payment Service Providers) and payment gateways.

- Assess the challenges and opportunities of digital means of payment.

Reflect on aspects such as financial inclusion, interoperability, cybersecurity, consumer protection and operational efficiency.

- Apply technical and strategic criteria for the design or selection of digital payment solutions.

Understand what factors to consider when implementing payment methods in digital businesses or fintech platforms.

### Contents:

- 2.1 E-money financial institutions.
- 2.2 OpenBanking y PSD2.
- 2.3 BigTechs and Telecoms in financial services.
- 2.4 Web3.

## TOPIC 3: ALTERNATIVE FINANCING. *CROWDFUNDING AND CROWDLENDING*

### Specific learning outcomes:

- To know the main modalities of alternative financing.

Understand how crowdfunding and crowdlending work as non-bank ways to access capital.

- Analyze the Buy Now, Pay Later (BNPL) model.

Study its operational structure, benefits for consumers and businesses, and associated risks.

- Explore the use of machine learning in credit origination.

Understand how algorithms can assess credit risk, automate decisions, and expand access to credit.

- To evaluate the impact of these new solutions on the traditional financial system.

Reflect on how these alternatives are changing the relationship between lenders and borrowers, especially in terms of inclusion and agility.

- Identify opportunities and regulatory risks of alternative financing models.

## Contents:

- 3.1 Crowdfunding y crowdlending.
- 3.2 Buy-now pay-later.
- 3.3 Machine learning applied to credit origination.

## TEMA 4: WEALTHTECH

### Specific learning outcomes:

- Understand the concept of wealthtech and its role in the transformation of wealth management.

Analyze how technology is making investment and financial advisory services more accessible and efficient.

- Explore how investment apps and robo-advisors work.

Understand how these automated platforms operate, how they set up portfolios, manage risks and adapt to the user's profile.

- Evaluate the benefits and limitations of wealthtech solutions.

Reflect on its impact on the democratization of investment, personalization, cost, and customer relationship.

- Study the case study of title loans.

Understand this tool as part of investment strategies and their implementation through technological platforms.

- Develop practical skills through the analysis of real cases.

Apply technical and strategic criteria to evaluate, compare or design digital wealth management solutions.

- Assess the regulatory and ethical environment linked to the management of digital investments.

Identify the main regulatory, transparency and investor protection challenges in the wealthtech field.

### **Contents:**

- 4.1 Case study: Inversiones App.
- 4.2 Case study: Roboadvisor App.
- 4.3 Case study: securities lending.

## **TOPIC 5: INSURTECH**

### **Specific learning outcomes:**

- Understand the concept of insurtech and its impact on the insurance industry. Analyze how emerging technologies are transforming the design, distribution, and management of insurance products.
- Explore the use of machine learning in policy underwriting. Understand how algorithms allow risk assessment and pricing in a more accurate, dynamic, and personalized way.
- Analyze the application of machine learning in the management and payment of claims. Explore how automation can streamline claims validation, detect fraud, and improve the customer experience.
- Assess the benefits and challenges posed by these innovations for insurers, customers, and regulators. Reflect on operational efficiency, algorithmic transparency, biases, and associated ethical risks.
- Develop criteria for designing, evaluating, or implementing insurtech solutions. Apply technical and strategic knowledge to analyse digital insurance platforms and their business viability.

### **Contents:**

- 5.1 Machine learning applied to policy underwriting. Price and risk.
- 5.2 Machine learning applied to claims payment.

## **TOPIC 6: STARTUP REGULATION AND FINANCING**

## Specific learning outcomes:

- Understand the regulatory framework for digital financial services.

Analyze the key regulations affecting fintechs, both nationally and internationally, and their role in user protection and system stability.

- Explore the concept and operation of *regulatory sandboxes*.

Understand how these test environments allow experimenting with fintech innovations under regulatory oversight, and their benefits for responsible innovation.

- Know the tools of *regtech* (regulatory technology).

Investigate how *regtech* solutions help financial firms comply with regulations through automation, analytics, and risk management.

- Analyze the different stages and sources of financing for Fintech startups.

Study mechanisms such as seed *capital*, investment rounds, *venture capital*, and institutional financing.

- Evaluate the role of venture capital in the Fintech ecosystem.

Understand the investment criteria, the entrepreneur-investor dynamics, and the specific challenges of fintech growth.

## Contents:

6.1 El *sandbox*.

6.2 *Regtech*.

6.3 El *Venture Capital*.

## 5. TEACHING AND LEARNING METHODOLOGY

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Teaching is carried out through a series of face-to-face sessions, whose spirit is to combine theory and practice in a balanced way, complemented by a series of didactic materials

(manual and presentation), exercises and cases for their resolution, provided online and with *feedback*, also online, using the program's own platform as a digital support.

The face-to-face activities will be carried out through:

- Presentation by the teacher of the practical application of the theoretical contents of the different topics of the subject. It is essential that the student reads beforehand (by the student) the reference manual for each topic that is available in the virtual classroom.
- Discussion of content.
- Application of concepts and methodologies to examples/case studies

Learning will be consolidated through the resolution of the exercises and/or cases that will be provided on the virtual campus of the subject.

## 6. EVALUATION

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In accordance with the Bologna Plan, the model rewards the constant and continuous effort of students. 60% of the grade is obtained from the continuous evaluation of the directed activities and the remaining 40% from the final face-to-face exam. The final exam has two sittings.

The final grade of the subject (NF) will be calculated based on the following formula:

- **NF = Final Exam Grade x 40% + Continuous Evaluation Grade x 60%**
- The minimum grade of the final exam to calculate the NF will be 40 points out of 100.
- The subject is approved with an NF equal to or greater than 50 points out of 100.

Type of activity	Description	% Continuous evaluation	
<b>Questionnaires:</b>			<b>60%</b>
Questionnaire 1	Test Topic 1	10%	
Questionnaire 2	Test Topic 2	10%	
Questionnaire 3	Test Topic 3	10%	
Questionnaire 4	Test Topic 4	10%	
Questionnaire 5	Test Topic 5	10%	
Questionnaire 6	Test Topic 5	10%	
<b>Final examination</b>			<b>40%</b>
	Final examination	100%	

## 7. BIBLIOGRAPHY

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### 7.1. BASIC BIBLIOGRAPHY

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- Parker, G (2016). Platform Revolution: How Networked Markets Are Transforming the Economy - And How to Make Them Work for You. Ed W. W. Norton & Company.
- Tapscott, A (2020). Financial services revolution: how blockchain is transforming money, markets, and banking. Ed Barlow Publishing.
- Tsabolov, S (2024). The Money Revolution: Handbook of AI banking, Cryptocurrency, Robo-Advisory, Neo Banking, Crowdfunding, and More.

### 7.2 ADDITIONAL BIBLIOGRAPHY

CB Insights (2023). State of Fintech report.

CB Insights (2023). State of Insurtech 2023 report.

Gensler, G (2020). Fintech: Shaping the Financial World. MIT OpenCourseWare.