MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
IVAN FRANKO NATIONAL UNIVERSITY OF LVIV
Faculty of Economics
Department of Finance, Money Circulation and Credit

Approved
at the meeting of Department of Finance, Money Circulation and Credit
Faculty of Economics
Ivan Franko National University of Lviv
(protocol № 1 dated August 26, 2024)
Head of Department
Prof. M. Krupka _____

Syllabus of academic discipline «Financial technologies in the digital economy»,

which is taught within educational-scientific program «Finance and Credit» of the second (master's) level of higher education for students of specialty 072 «Finance, Banking, Insurance and Stock Market»

Lviv - 2024 p.

Course name	Financial technologies in the digital economy
Course teaching address	Lviv, Svoboda Avenue 18
Faculty and department, whose discipline is	Faculty of Economics, Department of Finance, Money Circulation and Credit
Field of knowledge, code and name of speciality	07 "Management and Administration", 072 "Finance, Banking, Insurance and Stock Market"
Teacher of the discipline	Nazar Demchyshak, Doctor of Economics, Professor, Professor of the Department of Finance, Money Circulation and Credit, Faculty of Economics
Teacher's contact	nazar.demchyshak@lnu.edu.ua 096 749 78 07
Consultations on issues of discipline are taking place	every Monday, 10.00-12.00 (Faculty of Economics, Svoboda Avenue 18, room 102) Consultations are held on the day of lectures/practical classes (by prior agreement). Online consultations are also possible through Microsoft Teams or Google Zoom. To agree on the time of online consultations, you should write to teacher's e-mail or call.
Course page	https://econom.lnu.edu.ua/course/finansovi-tekhnolohii-u-tsyfroviy-ekonomitsi
Information about the discipline	The course is aimed at developing the necessary knowledge of the theory and practice of applying financial technologies in the digital economy in order to develop in future masters the relevant systematic ideas, theoretical foundations and practical skills that would ensure the ability to adequately and effectively use the acquired skills in their work.

A short abstract of the discipline	The discipline “Financial Technologies in the Digital Economy” is a normative discipline, which is taught in the 2nd semester in the amount of 3 credits (according to the European Credit Transfer System ECTS).
The purpose and tasks of the discipline	The purpose of the discipline “Financial Technologies in the Digital Economy” is to form the necessary knowledge and skills aimed at developing students' competencies related to the ability to solve complex problems in the process of organizing the effective functioning of enterprises, institutions, organizations at various levels of government, public authorities and local governments, using financial technologies, financial engineering tools and innovative financial services in the digital economy. The aims of the discipline “Financial Technologies in the Digital Economy” are to form knowledge about the peculiarities of the use of financial technologies in the context of digital transformation of socio-economic relations, skills in the analysis of financial processes and business projects, preparation and presentation of startup projects in the field of fintech, management decision-making using modern technologies, the use of innovative financial services, financial engineering tools, crowd technologies based on the digitalization of operations and services and expanding financial inclusion of national economic entities.
Literature for studying the discipline	**Main literature:** 1. Sahoko Kaji, Teruo Nakatsuma, Masahiro Fukuhara (2021). The economics of Fintech. Singapore : Springer. 2. Ruetschi Joerg (2022). Transforming Financial Institutions: Value Creation through Technology Innovation and Operational Change. The Wiley Finance Series. New Jersey : Wiley. 3. Xiuping Hua (2019). Financial Technologies : Artificial Intelligence, Blockchain, and Crowdfunding. Bradford, West Yorkshire : Emerald Publishing Limited. 4. Susanne Chishti, Janos Barberis (2016). The fintech book : the financial technology handbook for investors, entrepreneurs and visionaries. Chichester, West Sussex, United Kingdom : Wiley. 5. Baxter Hines (2021). Digital finance : security tokens and unlocking the real potential of blockchain. New Jersey : Wiley. 6. Hipster Geek, Mark Jobs (2016). FinTech. San Bernardino, CA : CherryTree Publishing. 7. Ana Maria Minescu (2018). Fintech explained. Berlin : epubli GmbH. 8. Devid Lee, Robert Deng (2018). Handbook of blockchain, digital finance and financial inclusion. San Diego, CA: Academic Press. 9. Financial management: textbook / edited by M.I. Krupka. Lviv: Ivan Franko National University of Lviv, 2019. 440 p.

10. Project financing: a textbook / under the general and scientific editorship of professor, Doctor of Economics T.V. Mayorova. 2nd edition, revised and supplemented. Kyiv : KNEU, 2017. 434 p.
11. Laktionova O.A. Project financing: a textbook for students of economic specialties. Vinnytsia, 2018. 216 p.

Additional literature:

12. Digital economy report. UNCTAD. URL: https://unctad.org/topic/ecommerce-and-digital-economy/digital-economy-report
13. Digital finance. European Commission survey. URL: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/digital-finance_en
14. Fintech development strategy in Ukraine until 2025: sustainable development of innovations, cashlessness and financial literacy / National Bank of Ukraine. URL: https://bank.gov.ua/ua/files/DDWIAwXTdqjdClp.
15. Information and analytical materials of the Ukrainian Association of Fintech and Innovative Companies. Ukrainian fintech catalog. URL: https://fintechua.org/.
16. Information and analytical materials of the Ukrainian National Office of Intellectual Property and Innovations. URL: https://nipo.gov.ua/#services
17. On Approval of the Concept of Development of the Digital Economy and Society of Ukraine and Approval of the Action Plan for its Implementation: Order of the Cabinet of Ministers of Ukraine of January 17, 2018, No. 67-p.
18. Demchyshak N.B. Formation of the digital economy and financial regulation of innovation in Ukraine: modern paradigm and sectoral priorities: monograph. Lviv: Ivan Franko National University of Lviv, 2023. 526 p.
19. Demchyshak N., Paslavska R., Sas S. Digitalization of the tax administration system in Ukraine: features, problems and prospects. Transformation of the economic system in the context of information technology challenges : Collective monograph. Riga, Latvia: Baltija Publishing, 2024. 236 p. P. 148-162.
20. Demchyshak N., Shchurevych O. The paradigm of formation of fintech ecosystem in Ukraine: educational-scientific potential and business resilience in the conditions of war. The scientific paradigm in the context of technological development and social change : Scientific monograph. Part 1. Riga, Latvia: “Baltija Publishing”, 2023. 532 p. P. 39-59.
21. Demchyshak N., Brochkovska O. Formation of fintech ecosystem in Ukraine: conceptual fundamentals and prospects in conditions of post-pandemic economic recovery. The economics of postpandemics: prospects and challenges : monograph / Edited by I. Tatomyr, Z. Kvasnii. Praha: OKTAN PRINT, 2021, 151 p. PP. 22-36.
22. Demchyshak N., Misiurak Yu. Instruments for promoting the development of the fintech market in Ukraine in conditions of post-pandemic economic recovery. Transformation of the Economy, Finance and

	Management in a Pandemic: the Development of Digital Technologies : monograph / Edited by A. Pawlik, K. Shaposhnykov. Kielce (Poland): "Publishing House "Baltija Publishing", 2021. 260 p. P. 208-225. 23. Demchyshak N., Klek A. Boosting creative industries development in Ukraine: institutional and financial aspects. Social and economic aspects of internet services market development: monograph / Ed. by V. Fedyshyn, I. Tatomyr. Praha: OKTAN PRINT, 2021, 287 p. PP. 202-216. 24. Demchyshak N., Yarmolovs'ka M. Tools of investment-innovation incentive of development the industry of industrial engineering. New trends in the economic systems management in the context of modern global challenges: collective monograph / Ed. by M. Bezpartochnyi // VUZF University of Finance, Business and Enterpreneurship. Sofia: VUZF Publishing House "St. Grigorii Bogoslov", 2020. 317 p. PP. 155-167. 25. Demchyshak N., Semenchuk K. The role of tax instruments in the formation of innovative economy and digitalization of business in Ukraine. Ukraine in the context of global and national modern servisation processes and digital economy : monograph / Ed. by L. Kvasniy, I. Tatomyr. Praha: OKTAN PRINT, 2020, 265 p. PP. 207-223. 26. Demchyshak N. Crowd technologies in funding innovative projects in terms of development of the digital economy in Ukraine. The role of technology in the social-economic development of the post-quarantine world / Ed. by Magdalena Gawron-Łapuszek. Katowice: Publishing House of Katowice School of Technology, 2020. 465 p. PP. 11-24. **Information resources:** 27. KPMG. Pulse of fintech. URL: https://home.kpmg/xx/en/home/insights 28. Digital economy outlook / OECD. URL: https://www.oecd.org 29. EU statistics / Official data of the European Commission. URL: https://ec.europa.eu/eurostat/home? 30. Ministry of Digital Transformation of Ukraine. Official website. URL: https://thedigital.gov.ua/ 31. State Statistics Service of Ukraine. URL: http://www.ukrstat.gov.ua 32. National Bank of Ukraine. Official website. URL: https://bank.gov.ua 33. Actual journals and publications indexed in the Scopus scientometric database. URL: https://www.scopus.com/sources
The amount of the course	Full-time form of education: 32 hours: 16 hours for lectures, 16 hours for practical classes; 58 hours for students' self-work.

Expected learning outcomes	After completing the course, the student will: - ***know**:* the essence of financial technologies in modern society, types of innovative financial technologies, risks of using virtual assets, specifics of crowd technologies; - the basics of digital finance and the use of financial engineering tools; - methodological principles for preparing and analyzing projects and startups and opportunities to use digital financial services and crowdfunding to diversify sources of financial resources; - the specifics of financial inclusion and operations based on the implementation of digital technologies in the business and public sector of the country; - ***be able to:*** make decisions on the use of financial technologies in the work of various subjects of financial and economic relations; - prepare a fintech startup project and present (pitch) it; - evaluate the feasibility of implementing projects (startups) in the context of the potential for using alternative sources of financing based on crowd technologies; - analyze and practically use the benefits of digital finance in the context of the development of creative industries and the digitalization of industries and sectors of the national economy; - diagnose the level of cybersecurity in the implementation of digital services and the use of virtual assets in financial transactions; - develop financial strategies for the development of enterprises, institutions, and organizations in terms of digitalization of their work; - use modern financial instruments in their professional work to achieve their goals and meet their own needs by using the potential of financial engineering and expanding financial inclusion. **Integral competence (IC).** The ability to solve complex tasks and problems in the course of professional activities or studies in the field of finance, banking, insurance, and the stock market, which involves conducting research and/or implementing innovations and is characterized by uncertainty in conditions and requirements for professional, educational, or research activities. **General competencies acquired in the process of studying this discipline (GC):** GC 2. Ability to communicate in a foreign language. GC 5. Ability to make informed decisions. GC 8. Ability to work in an international context. **Special competencies acquired in the process of studying this discipline (SC):** SC 6. The ability to apply interdisciplinary approaches to solving complex tasks and problems in the field of finance, banking, insurance, and the stock market.

	SC 7. The ability to search for, use, and interpret information necessary for solving professional and scientific tasks in the field of finance, banking, insurance, and the stock market. SC 8. The ability to apply innovative approaches in the field of finance, banking, insurance, and the stock market. SC 13. The ability to develop innovative approaches to financial thinking in an unstable market environment. **Program learning outcomes (PLO):** PLO 04. Find, process, systematize, and analyze the information necessary to solve professional and scientific tasks in the field of finance, banking, and insurance. PLO 05. Communicate fluently in a foreign language, both orally and in writing, on professional and scientific issues, present and discuss research results. PLO 08. Be able to apply and manage innovative approaches in the field of finance, banking, and insurance. PLO 11. Apply advanced knowledge in financial, banking, and insurance management to make decisions. PLO 18. To generate and verify creative, qualitatively new financial ideas in an unstable market environment.
Keywords	Financial technologies, digital economy, digital finance, financial engineering, financial services, financial inclusion, crowd technologies, virtual assets, cryptocurrencies, tokens, creative industries, innovations, projects, startups, cybersecurity, cyber risks, cyber risk management.
Course format	Full-time form of education
Topics	**APPENDIX (course scheme)**
Final control, form	Assessment at the end of the semester
Prerequisites	To study the course, students need basic knowledge of the disciplines of the bachelor's program, in particular, Finance, Money and Credit, Investing, Enterprise Finance, and others, sufficient to understand the conceptual framework.
Teaching methods and techniques that will be used during the course	Presentations, lectures, collaborative learning, project-oriented learning (individual assignment on the preparation and presentation (pitching) of fintech startup projects), discussion.

Necessary equipment	Information and computer support: PC, tablet, smartphone or other mobile device, projector. Software: Microsoft Office or similar programs, Internet access, work with presentations.
Evaluation criteria (separately for each type of educational activity)	The evaluation is based on a 100-point scale. Points are calculated according to the following ratio: - practical/independent works, etc: 50% of the semester grade; maximum number of points 50; - control measurements (modules): 25% of the semester grade; maximum number of points 25; - preparation and presentation (pitch) of a startup project in the field of digital finance and innovation): 25% of the semester grade; maximum number of points 25. The credit is issued based on the results of the current control. The total maximum number of points is 100. Students' knowledge is assessed by current, intermediate control of knowledge during the semester and final control. The following assessment tools are used to check the quality of training, knowledge, skills in the discipline: – for current control - blitz surveys (in oral form), tests, written works on the topic of the current lesson, solving situational tasks; – for intermediate control - module assignments; – for the final control (test) - assigned based on the results of training during the semester. The objects of current control of students' knowledge are: 1) systematic and active work in practical classes; 2) completion of module (control) tasks; 3) performance of independent tasks; 4) solving situational tasks in practical classes and during independent work; 5) successful completion of the task of preparing and presenting (pitching) startup projects in the field of fintech. The assessment of the systematic and active work in practical classes takes into account : - the level of knowledge demonstrated in the answers to the practical classes; - activity in discussing discussion issues; - results of practical work, tasks of current control; - ability to prepare a high-quality presentation of a startup project; - ability to work with foreign information and analytical sources. In assessing the performance of module assignments, the general level of theoretical knowledge and practical skills acquired during the mastery of the content module are taken into account. In assessing the performance of

independent work, the following is taken into account: the degree of development and mastery of the topic as a whole or individual issues, preparation of reports, solving situational tasks, test results, etc.

The procedure for studying and assessing knowledge of the discipline is communicated to students at the beginning and during the semester.

Written work: Students are expected to complete several types of written work (reports, case studies, preparation of a presentation and pitch of a startup project, etc.) **Academic integrity:** Students' papers are expected to be their original research or reasoning. Lack of references to sources used, fabrication of sources, cheating, interference with the work of others are, but not limited to, examples of possible academic dishonesty. Detection of signs of academic dishonesty in a written paper is grounds for non-credit by the instructor, regardless of the extent of plagiarism or cheating. **Attendance** is an important part of learning. All students are expected to attend all lectures and practical classes of the course. students should inform the instructor if they are unable to attend class. In any case, they are obliged to meet all deadlines for all types of written work required by the course. **Literature.** All literature that students cannot find on their own will be provided by the instructor for educational purposes only and may not be shared with third parties. Students are encouraged to use other literature and sources that are not among the recommended ones. **Scoring policy.** Points gained in current testing, independent work, and points for modules and completion of the task of preparing and presenting a startup project (pitch) are taken into account. At the same time, attendance at classes and student activity during practical training are taken into account; inadmissibility of absences and lateness to classes; use of a mobile phone, tablet or other mobile devices during classes for purposes unrelated to learning; cheating and plagiarism; late completion of the assigned task, etc.
No form of violation of academic integrity is tolerated.

Distribution of points received by students

<table>
<tr><td colspan="8">Current testing and independent work</td><td>Module control</td><td>Ind. work (evaluation of startup projects)</td><td>Credit</td><td>Total</td></tr>
<tr><td colspan="8">Content module 1</td><td rowspan="3">25</td><td rowspan="3">25</td><td rowspan="3">As a result of the course</td><td></td></tr>
<tr><td>T1</td><td>T2</td><td>T3</td><td>T4</td><td>T5</td><td>T6</td><td>T7</td><td>T8</td><td></td></tr>
<tr><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td><td>8</td><td>100</td></tr>
</table>

T1, T2 ... T8 – topics of content modules

<table>
<tr><td></td><td>

Scale of evaluation: university, national and ECTS

<table>
<tr><td rowspan="2">ECTS assessment</td><td rowspan="2">Assessment in points</td><td>Assessment on the national scale</td></tr>
<tr><td>Credit</td></tr>
<tr><td>A</td><td>90–100</td><td rowspan="5">credited</td></tr>
<tr><td>B</td><td>81–89</td></tr>
<tr><td>C</td><td>71–80</td></tr>
<tr><td>D</td><td>61–70</td></tr>
<tr><td>E</td><td>51–60</td></tr>
<tr><td>FX</td><td>0-50</td><td>not credited</td></tr>
</table>

Student performance is evaluated on a scale:

Passed (ECTS grade - "A") - the student has a thorough and systematic knowledge of the entire course, can clearly define the essence and features of the problems studied within the relevant topics, and is familiar with the terminology. The student completes 90-100% of the assignments correctly.

Passed (ECTS grade - "B", "C") - the student knows the program material in full, has an idea of the nature and characteristics of the problems studied within the relevant topics, but is unable to think independently, cannot "go beyond" the topic. Performs tasks without significant errors, but may sometimes make some inaccuracies. Reproduction of knowledge is mainly reproductive. The student completes 71-90% of the tasks correctly.

Passed (ECTS grade - "D", "E") - the student knows the main topics of the course, has an idea of the essence and features of the problems studied within the relevant topics, but his knowledge is general, sometimes unsupported by examples. Instead of a clear terminological definition, he/she explains theoretical material at the everyday level. Has gaps in theoretical knowledge and practical skills. The student is able to complete simple tasks. Out of the total amount, 51-70% of the tasks were completed correctly.

Failed (ECTS grade "FX") - the student has fragmentary knowledge of the entire course. He/she does not understand the essence and peculiarities of the problems studied within the relevant topics, and does not know the terminology. Practical skills at the level of recognition. The student has completed no more than 50% of the tasks correctly.

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<tr><td>Questions for preparing</td><td>It is issued based on the results of the current control.</td></tr>
<tr><td>Survey</td><td>An evaluation questionnaire for the purpose of assessing the quality of the course will be provided at the end of the course.</td></tr>
</table>

The course syllabus was developed by Doctor of Economic Sciences and Professor Nazar Demchyshak.

APPENDIX
Scheme of the course

Week/ hour	Topic, plan, short theses	Form of activity (class) lecture, self-work, discussion, group work)	Materials	Literature. Resources on the Internet	Assignment, hours	Deadline
1 / 2 h	**Topic 1. Finance in the digital economy** 1. The essence of the digital economy. 2. Components of the digital economy. 3. Innovations of the digital economy. 4. Finance in the digital economy. 5. Financial innovations in Ukraine and the world.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources: 27-33	Preparation for classroom classes (studying lecture material; studying individual topics or issues that are provided for independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 7 h	**1-2 week**
2 / 2 h		Practice session: discussion, group work				

3 / 2 h	**Topic 2. Digital finance.** 1. Economic content of digital finance. 2. Digital finance as the basis for the development of the financial sector of the national economy. 3. Virtual assets and cyber risks. 4. Classification and use of tokens.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources: 27-33	Preparation for classroom classes (studying lecture material; studying individual topics or issues that are provided for independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 7 h	**3-4 week**
4 / 2 h		Practice session: discussion, group work				
5 / 2 h	**Topic 3. Financial technologies: global aspects of development.** 1. The essence and specifics of the use of financial technologies.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources:	Preparation for classroom classes (studying lecture material; studying individual topics or	

6 / 2 h	2. Classification of FinTech. 3. Formation of the global FinTech market. 4. The role of FinTech in the socio-economic development of individual countries.	Practice session: discussion, group work		27-33	issues that are provided for independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 7 h	**5-6 week**
7 / 2 h	**Topic 4. Financial technologies in Ukraine.** 1. Prerequisites for the development of the FinTech market in Ukraine.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources: 27-33	Preparation for classroom classes (studying lecture material; studying individual topics or issues that are provided for	

8 / 2 h	2. Institutional features of the implementation of financial innovations. 3. The role of the business and public sectors in expanding the scope of financial technologies. 4. Integration of the domestic FinTech market into the global digital space.	Practice session: discussion, group work			independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 7 h	**7-8 week**
9 / 2 h	**Topic 5. Crowd technologies in the digital economy.** 1. The essential characteristics of crowd technologies and the scope of their application. 2. Crowdfunding platforms. 3. Crowdinvesting and crowdlending. 4. Crowdsourcing in Ukraine and the world. 5. Digital culture and financial literacy as the basis for expanding the use of new technologies.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources: 27-33	Preparation for classroom classes (studying lecture material; studying individual topics or issues that are provided for independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 7 h	**9-10 week**
10 / 2 h		Practice session: discussion, group work				

11 / 2 h	**Topic 6. Digital financial services. Digitalization of the tax administration system.** 1. The concept and role of digital financial services. 2. Innovative services in the digital economy. 3. State support for the development of digital financial services. Unification of approaches to the provision of financial services. 4. Digitalization of the tax administration system and its role for businesses. 5. Problems of protecting consumers of financial services and payment security.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources: 27-33	Preparation for classroom classes (studying lecture material; studying individual topics or issues that are provided for independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 7 h	**11-12 week**
12 / 2 h		Practice session: discussion, group work				
13 / 2 h	**Topic 7. Financial engineering.** 1. The essence of financial engineering. 2. Scope of application and benefits of new financial instruments.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources: 27-33	Preparation for classroom classes (studying lecture material; studying individual topics or issues that are provided for	

14 / 2 h	3. Innovative approaches to business management and marketing. 4. The use of modern financial instruments in the context of the formation of the digital economy of Ukraine.	Practice session: discussion, group work			independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 7 h	**13-14 week**
15 / 2 h	**Topic 8. The role of financial inclusion in the development of digital technologies.** 1. The essence of financial inclusion, its types and risks. 2. Increasing the level of inclusion as a basis for digitalization. 3. The role of digital literacy in modern society. 4. Expanding the use of financial technologies and services as a result of financial inclusion. 5. Promoting financial inclusion in Ukraine.	Lecture	Presentation, Guidelines	Literature: 1-26. Information resources: 27-33	Preparation for classroom classes (studying lecture material; studying individual topics or issues that are provided for independent study and preparing reports and presentations; completion of homework, including individual assignments; preparation for practical classes; preparation for tests and other forms of current control) 9 h	
16 / 2 h		Practice session: discussion, group work				**15-16 week**