Syllabus
Course Program

Financial Engineering

Specialty
072 – Finance, banking, insurance and stock market

Institute
Institute of Management Economics and International Business

Educational program
Finance and Banking

Chair
Accounting and finance (205)

Level of education
Master's degree

Type of discipline
Profile trainingi

Semester
2

Language of teaching
English

Lecturers and course developer

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Doctor of Economics, Professor, Professor of the Department of Accounting and Finance (NTU "KhPI")

Author of more than 250 scientific and educational publications.
Leading lecturer in the courses: "International Stock Market, Blockchain Technologies and Crypto Trading, Financial Management.
Learn more about the teacher on the department's website

General information

Summary

The course aims to provide knowledge of the basics of modern strategies, financial instruments, financial market information technologies, their practical use, knowledge of strategic, analytical, software and hardware features of professional participants, investors and hedgers in the financial market

Course objectives and goals

Developing students' theoretical knowledge and practical skills in the use of modern financial technologies, implementation of financial innovations and financial engineering tools.

Format of classes

Lectures, practical classes, consultations. Final control - exam.

Competences

GC1. Ability to think abstractly, analyze and synthesize.
GC 3. Ability to conduct research at the appropriate level.
GC 5. Ability to make informed decisions.
SC1. Ability to use the fundamental laws of development of finance, banking and insurance in combination with research and management tools for professional and scientific activities.
SC2. Ability to use theoretical and methodological tools for diagnosing and modeling the financial activities of business entities.

SC3. Ability to apply management skills in the field of finance, banking and insurance.
SC4. Ability to evaluate the effectiveness of scientific, analytical and methodological tools to justify management decisions in the field of finance, banking and insurance.
SC7. Ability to search, use and interpret information necessary for solving professional and scientific problems in the field of finance, banking and insurance
SC8. Ability to apply innovative approaches in finance, banking and insurance

Special (professional) competencies in the elective block 03 "Stock market and crypto trading" (defined by the higher education institution)
SC3. Ability to form complex financial products with an assessment of the risks of their introduction and operation in the context of globalization and internationalization of international stock markets, taking into account structural changes associated with the introduction of innovative financial technologies..

Learning outcomes

PL02. Know, at the same time as new ones, the basic concepts and methodology of scientific knowledge in the field of finance, banking and insurance.
PL04. Collect, collect, systematize and analyze information necessary for advanced professional and scientific tasks in the field of finance, banking and insurance.
PL08. Consider establishing innovative approaches in the field of finance, banking, insurance and their management.
PL12. Encourage the selection of options for management decisions in the financial, banking and insurance sectors and evaluate their effectiveness in relation to the objectives, regulatory and ethical aspects

Program learning outcomes for elective block 03 "Stock market and crypto trading" (defined by the higher education institution)
PL3. Ability to develop complex financial instruments, analyze the benefits and risks of their implementation in the context of the implementation of innovative financial technologies in the international financial market and assess the opportunities and threats of arbitrage operations.

Student workload

The total scope of the discipline is 120 hours. (4 ECTS credits): lectures – 32 hours, practical activities – 16 hours, self-study – 72 hours.

Course prerequisite

"Financial Management, "Management Information Systems in the Financial and Accounting Sphere".

Features of the course, teaching and learning methods, and technologies

Lectures are conducted interactively using multimedia technologies. Practical classes use a project-based approach to learning, game methods

Program of educational discipline

Topics of lectures

Topic 1: The essence of financial engineering and the reasons for its emergence in the financial market
The concept of financial engineering. Reasons for the emergence of financial engineering. Areas of application of financial engineers.
Topic 2 Financial engineering tools
The concept of financial instruments. Classification of financial instruments. Development of new financial instruments
Topic 3. Forward as a contractual financial instrument
Main characteristics of a forward contract. Types of forward contracts. Forward cross-rates. Costs of a forward contract. Interest rate forwards. Forward on the future interest rate (FRA) and forward currency agreement expansion (FXA contract)
Topic 4. Futures contract - a financial instrument of exchange trading
Characteristics of a futures contract. Margin in futures trading and the essence of exchange clearing. Types of financial contracts
Topic 5. Options and swaps as financial instruments

Characteristics of option contracts. Single-period options. Multi-period options: caps, floats, collars, puts, swaps and compound options

Topic 6. Financial instruments with fixed income

Financial instruments with a fixed rate of return. Financial instruments with a variable rate of return. Securities with zero coupon

Topic 7. Equity financial instruments

Equity-related securities. Stock options, warrants, subscription rights, depositary receipts, stock index contracts. Procedures for the placement of shares

Topic 8: Hybrid financial instruments

Structured financial products (instruments). Types of hybrid financial instruments. Hybrid of currency and commodity instruments

Topic 9. Exotic financial instruments

Weather derivatives. Contracts for economic data. Investment contracts

Topic 10. Synthetic financial instruments

Structured products and synthetic instruments. Synthesis of derivative financial instruments. Synthetic stocks and bonds

Topic 11. Business value management and financial engineering technologies

Cost, value and price in financial engineering. Concepts of value management in the financial engineering system. Indicators of value management of the organization and methods of their determination

Topic 12: Risk management as a technology of financial engineering

Modern theories of risk management. International standards of risk management. Formation of integrated risk management systems.

Topics of practical classes

Topic 1. Topic 1: The essence of financial engineering and financial innovation

The concept of financial engineering and financial innovation. Classification of financial engineering and innovation tools. Foreign experience and regulation of financial innovations

Topic 2 Forward as a financial engineering tool

Main characteristics of a forward contract. Types of forward contracts. Forward on the future interest rate (FRA) and forward currency agreement (FXA contract)

Topic 3. Futures contract as a financial engineering tool

Characteristics of a futures contract. Margin in futures trading and the essence of exchange clearing. Delivery procedure under futures contracts.

Topic 4. Option as a financial engineering tool

Characteristics of option contracts. Single-period options. Multi-period options: caps, floats, collars, puts, swaps and compound options

Topic 5. Swap as a financial engineering tool

The essence and characteristics of a swap. History of the swap market. Types of swaps. Risks of concluding swap transactions.

Topic 6. Electronic trading and program trading

The main systems of electronic exchange and over-the-counter trading. Internet trading. Program trading

Topic 7. Financial and innovative technologies in the field of finance

Financial technologies: essence, classification, development trends. The use of financial technologies in the banking sector. Non-banking financial technologies and innovations

Topic 8: Cryptocurrencies and blockchain technologies

The essence and features of cryptocurrencies. Features of cryptocurrency regulation. Prospects and threats of using cryptocurrencies and blockchain technology

Topics of laboratory works

Laboratory works within the discipline are not provided .

Self-study

The course involves completing an individual assignment - an essay on the problematic issues of the course. The result of the essay is formalized in a written report and a presentation is prepared. Students are also recommended additional materials (videos, articles) for independent study and analysis.

Course materials and recommended reading

Basic literature:
Velychkin VO Financial engineering: a textbook / VO Velychkin, MV Tymoshenko - Dnipro: University of Customs and Finance, 2019. 124 p.
2. Povid T.M., Advokatova N.O., Financial engineering: world trends and domestic realities. "Tavriyskiy naukovyi vestnik. Series: Economics". Issue 1, 2020. C. 214-220
3. Financial engineering tools for a comprehensive assessment of the financial condition of enterprises. Economy and state. 2022. No. 1. P. 39-44. DOI: 10.32702/2306-6806.2022.1.39
4. Khvostenko V. S. Financial engineering. textbook. Kharkiv: KhNUE named after S. Kuznets, 2020. 120 p.
5. Kvasnytska R.S., Diachuk D.I. (2020) Content paradyhma ta suchasni tendentsii rozvytku bankivskykh innovatsii v Ukraini [Content paradigm and modern trends in the development of banking innovations in Ukraine Infrastruktura rynku, vol. 39, pp. 328-333].
.Additional literature:
1. Khalatur S., Radzevicius G., Velychko L., Fesenko V., Kriuchko L. Global deoffshorization and its impact on the national and regional economies of eastern european countries. Problems and Perspectives in Management 2019. No 17 (3). P. 293–305. URL: http://dx.doi.org/10.21511/ppm.17(3).2019.24
2. Khalatur S., Vinichenko I., Volovyk D. Deveopment of modern business processes and outsourcing activities. Baltic Journal of Economic Studies. 2021. No 7 (3). P. 195–202. DOI: https://doi.org/10.30525/2256-0742/2021-7-3-195-202
3. Khalatur, S., Dubovych, O. Financial Engineering of Green Finance as an Element of Environmental Innovation Management. Marketing and Management of Innovations. 2022. No 1. P. 232–246. DOI: https://doi.org/10.21272/mmi.2022.1-17
3. Khalatur S., Pavlova H., Vasilieva L., Karamushka D., Danileviča A. (). Innovation management as basis of digitalization trends and security of financial sector. Entrepreneurship and Sustainability 2022. Vol. 9(4). P. 56–76. DOI: http://doi.org/10.9770/jesi.2022.9.4(3)

Assessment and grading

Criteria for assessment of student performance, and the final score structure

100% of the final grade consists of the results of the assessment in the form of: a final test - 40%; completion of an individual calculation task - 30%; completion of independent work of the student on each of the topics covered in the discipline - 30%.
The exam is written and includes:
2 theoretical tasks of different levels of complexity, and 1 case study.

Grading scale

Total points	National	ECTS
90–100	Excellent	A
82–89	Good	B
75–81	Good	C
64–74	Satisfactory	D
60–63	Satisfactory	E
35–59	Unsatisfactory (requires additional learning)	FX
1–34	Unsatisfactory (requires repetition of the course)	F

Norms of academic integrity and course policy

The student must adhere to the Code of Ethics of Academic Relations and Integrity of NTU "KhPI": to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.
Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU "KhPI" are available on the website: http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/

Approval

Approved by	Date, signature	Head of the department Oleksandr MANOYLENKO
	Date, signature	Guarantor of the educational program Tetiana NAZAROVA