"Approved"
Head of the Department of Finance
and Accounting
Ph.D. in Economics, Associate
Professor Afaq Hasanova
Protocol №   , _____ 2025

SYLLABUS

General Information	Department	Finance and Accounting
	Faculty	School of Economics and Business
	Specialization, Code	Financial Control and Audit
	Group №	403/3 MN
	Level of Education	☐ Undergraduate * Graduate
	Mode of Study	Full-time
	Academic Year / Semester	2024/2025 / 2nd Semester
	Teaching Year	2024/2025
	Semester	☐ Fall * Spring
Course Information	Course Title, Code	Mathematical Support in Modern Analysis of Financial and Money Markets
	Number of Credits	8
	Teaching Load (hours)	60
	Teaching Methods	* Lecture * Seminar ☐ Laboratory
	Language of Instruction	* Azerbaijani ☐ English ☐ Russian
	Course Type	☐ Compulsory ☐ Elective
	Prerequisite Course/Code	
Instructor Information	Academic Degree, Title, Name:	Ph.D. in Economics – Ashraf Abulfaz oglu Hasanov
	Email:	ashraf1951@mail.ru
	Contact Number	+994 50 235 47 46
	Consultation Hours:	Thursday, 11:00
Course Description		The course "Mathematical Support in Modern Analysis of Financial and Money Markets" is aimed at training highly qualified specialists capable of responding adequately to the challenges of the global financial system. In recent years, decisions regarding the management of corporate finances are increasingly influenced by external factors. In an environment of intensifying competition, regulatory oversight of all participants in the financial and monetary markets is tightening, the variety of financial and monetary instruments is increasing, and the complexity of evaluating and managing market operations is growing. These dynamics, especially in rapidly developing economies, underscore the importance of analyzing financial and money markets amid recurring global financial crises. Current market conditions are characterized by financial globalization and accelerated capital flows, which impose higher standards on the educational

	process and the preparedness of financial profile graduates for integration into global finance. Therefore, innovative, cognitive approaches that foster essential skills and competencies for future professional success are essential for both undergraduate and graduate education. The course introduces students to the theoretical and practical challenges of analyzing financial statements, utilizing economic and mathematical models to derive comprehensive conclusions and practical recommendations. Students will develop a systemic understanding of financial and monetary markets through applied mathematical tools, focusing on time value of money, capital cost, interest rate structures, discounting, annuity valuation, and financial equivalence.
Course Objectives	The objective of the course is to equip students with comprehensive knowledge in analyzing the financial and monetary reports of economic entities using both theoretical and applied mathematical methods. Students will learn to develop mathematical models for analyzing various financial reporting forms, enabling them to derive well-grounded conclusions and practical recommendations. The course promotes independent work by students and provides a comprehensive approach to evaluating an enterprise's efficiency and financial condition based on traditional accounting forms. It includes the analysis of new types of reports such as segment and consolidated financial statements. In particular, mathematical modeling supports complex financial analysis, uncovering investment attractiveness, opportunities for financial improvement, business activity, profitability, financial stability, liquidity, and comprehensive asset evaluation of enterprises. Through applied mathematics, students will explore the concept of the time value of money in companies, alternative returns, capital valuation, various types of interest rates, discounting and compounding processes, and annuity conversions. The aim is to foster a systematic approach to financial and monetary market operations by mastering the following: ➢ In-depth understanding of the essence, structure, types, and instruments of financial and monetary markets, including retrospective and operational analysis of participants at national and international levels; ➢ Classification of analytical methods and tools for financial and monetary markets, including tasks related to financial condition assessment and selection of information sources; ➢ Capability to evaluate and analyze risks in financial and monetary markets; ➢ Understanding of various types of interest rates and mastery of calculation methods; ➢ Analysis of the main characteristics of cash flows; ➢ Consideration of inflation in financial calculations; ➢ Assessment of equity capital value; ➢ Selection of appropriate discount rates; ➢ Evaluation of the efficiency of investment projects; ➢ Analysis of government regulation systems in financial and monetary markets.
Instructional Purpose of the	The instructional purpose of this course is to cover the branch of applied mathematics dealing with financial computations. Throughout the course, students will gain both theoretical knowledge and practical skills in

Course	applying mathematical methods to financial calculations, including: • Mastering contemporary methods of financial computation; • Understanding the main quantitative directions of financial analysis and the mathematical tools used in the process; • Considering various computational techniques; • Measuring the impact of individual factors on financial parameters and evaluating their interrelationships using mathematical models.
Professional Competencies	Upon successful completion of the course, students are expected to acquire the following professional competencies: 1. **PK-1**: Understand the essence, structure, types, and instruments of financial and monetary markets, and apply forecasting methods based on retrospective and operational analysis of market participants at both national and international levels. 2. **PK-2**: Grasp the fundamentals of selecting appropriate information sources, conducting calculations, and applying mathematical tools for analytical support in managerial decision-making within financial and monetary markets. 3. Understand the main procedures and methodologies for analyzing the interaction between credit, currency, and securities markets. 4. **PK-27**: Analyze the formation of a company's income, expenses, and operational results for use in analytical procedures. 5. **PK-4**: Calculate the final amount under multiple and continuous interest accrual methods. 6. **PK-4**: Apply discounting and interest retention methods effectively. 7. **PK-4**: Consider the impact of inflation on interest rates in financial calculations. 8. **PK-4, PK-7**: Apply annuity calculation methods. 9. **PK-4, PK-5, PK-8**: Use appropriate methods to calculate and discount the value of money and capital. 10. **PK-4**: Calculate and discount financial flows (annuities). 11. **PK-28**: Apply core accounting methods for financial risks and assess their impact on income valuation and the financial results of enterprise operations. 12. **PK-29**: Develop skills for calculating and accounting the effective interest rate. 13. **PK-22**: Adjust financial flows to either initial or final cost value. 14. **PK-27**: Calculate the profitability and yield of financial operations.
Learning Outcomes	• **TN-1 – Ability to explain the nature, functions, and classification of financial markets.** • **FTN-2 – Possession of knowledge about commercial, corporate, and government securities, and the ability to analyze them.** • **FTN-3 – Possession of knowledge about financial derivatives and the ability to explain their role and scope within the economy.**

	• **FTN-4 – Possession of knowledge about money, currency, gold, insurance, credit, stock exchange, and over-the-counter markets, and the ability to perform operations and analyze activities in these markets.** • **FTN-5 – Ability to understand the institutions of financial markets and to trade using financial market instruments.** • **FTN-6 – Ability to explain the risks associated with financial markets and interpret legislative documents related to financial market regulation.**
Course Requirements	☐ **Statistical data and methods** must reflect real-world economic and business conditions and ensure logical consistency and interrelation among them. ☐ Students are expected to actively engage in the learning process by reading aloud, verbalizing key concepts, studying independently, answering self-assessment questions honestly, solving assigned problems, and reviewing materials regularly.
Academic Integrity	**Academic integrity refers to ensuring the originality of submitted work and appropriately acknowledging the ideas or findings of others by citing their sources.** **Violations of academic integrity include:** 1. **Plagiarism – Presenting someone else's ideas, words, or work as your own without proper citation.** 2. **Cheating – Copying or using unauthorized assistance during assessments or assignments.** 3. **Self-plagiarism – Submitting, in whole or in part, a previously completed assignment, homework, or project in another course without proper attribution.** 4. **Fabrication – Citing non-existent sources or creating false data or information.** 5. **Ghostwriting – Preparing course materials or assignments on behalf of another student.** 6. **Unfair academic advantage – Behaviors aimed at gaining unjustified benefit (e.g., presenting a medical excuse without being ill, fabricating reasons to extend deadlines or for other academic privileges).** 7. **Exam impersonation – Taking an exam on behalf of another person or allowing someone else to take an exam in your place.**
Ethical Conduct	To demonstrate a high level of cultural and professional conduct in interpersonal relations.
Main Literature	1. ☐ S. Mammadov – *Finance*, Baku, 2017 2. ☐ E.Q. Orucov – *Elements of Financial Mathematics and Informatics*, Baku, 2017 3. ☐ A.M. Karimov et al. – *Finance*, Baku, 2018 4. ☐ N. Novruzov, Kh. Huseynov – *Finance*, Baku, 2018 5. ☐ Beyali Atashov – *Financial Markets: Textbook for Higher Education Institutions*, Baku, "Kooperasiya" Publishing House, 2016

	6. ☐ Abbasov A. – *Formation of the Financial Market in Azerbaijan*, Baku, 2018 7. ☐ Abbasov A. – *Formation and Development Prospects of the Securities Market*, Baku, 2017 8. ☐ Atashov B., Novruzov N., Ibrahimov E. – *Theory of Finance: Textbook*, Baku, 2018 9. ☐ Khudiyev N.N. – *Insurance Business*, Baku, 2018 10. ☐ Khankishiyev B.A. – *Fundamentals of Insurance Activities*, Baku, 2010
Supplementary Literature	1. ☐ Law of the Republic of Azerbaijan – *On Securities and Stock Exchange*, Baku, 2016 🔗 https://e-qanun.az/framework/7941 2. ☐ *On the State Finance of the Republic of Azerbaijan*, Compilation of Normative-Legal Documents, Baku, 2016 3. ☐ Charter of the Mortgage and Credit Guarantee Fund of the Republic of Azerbaijan 🔗 https://e-qanun.az/framework/37477 4. ☐ Law of the Republic of Azerbaijan – *On Mortgage*, Baku, April 15, 2005 🔗 https://e-qanun.az/framework/9902 5. ☐ Law of the Republic of Azerbaijan – *On Securities*, Baku, 1998 🔗 https://e-qanun.az/framework/7941 6. ☐ Law of the Republic of Azerbaijan – *On Investment Funds*, Baku, 1998 🔗 https://e-qanun.az/framework/20760 7. ☐ Law of the Republic of Azerbaijan – *On Precious Metals and Precious Stones*, Baku, 2005 🔗 https://e-qanun.az/framework/14435 8. ☐ *Money Market in Azerbaijan* 🔗 https://report.az/tag/pul-bazari/ 9. ☐ *Mathematical Support of Financial Decisions* 🔗 https://mkgtu.ru 10. ☐ V.V. Ugrozov, M.S. Al-Nator – *Mathematical Support of Financial Decisions: Methodological Guide* 🔗 PDF 11. ☐ *Financial Mathematics and Market Analysis* 🔗 https://magistratura.fa.ru/finansovyy-fakultet-37/finansovaya-matematika-i-analiz-rynkov-1/ 12. ☐ M. I. Stolbov – *Financial Market and Economic Growth: Problem Outline* 🔗 https://mgimo.ru/files/31989/31989.pdf

	13. ☐ Hansen E. – *Monetary Theory and Financial Policy*, Moscow: Delo, 2006 – 312 pages 🔗 http://www.ipr-ras.ru/old_site/articles/hansen-06.htm 14. ☐ Rajan R., Zingales L. – *The Great Reversals: The Politics of Financial Development in the 20th Century*, NBER Working Paper No. 8178, July 2002 🔗 https://www.oecd-ilibrary.org/docserver/371486741616.pdf 15. ☐ Roberts M., Setterfield M. – *What is Endogenous Growth Theory?*, University of London Working Paper, October 2005 🔗 https://www.semanticscholar.org/paper/What-is-Endogenous-Growth-Theory-Roberts-Setterfield 16. ☐ Romer D. – *Advanced Macroeconomics*, 3rd Edition, McGraw-Hill Irwin, 2006 🔗 https://www.amazon.com/Advanced-Macroeconomics-McGraw-Hill-Economics-David/dp/0073511374
Online Resources	1. https://www.stat.gov.az/source/finance/ 2. https://www.cbar.az/page-817/cybersecurity-strategy-in-financial-markets 3. https://www.cbar.az/page-798/financial-stability-report 4. https://www.bfb.az/az 5. https://www.imf.org/en/Home 6. https://www.worldbank.org/en/home 7. https://www.investopedia.com/terms/l/libor.asp 8. https://finance.yahoo.com/quote/GOLD/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer 9. https://znanium.ru/catalog/document?id=340895

Assessment: 100-Point Grading System	The final grade is calculated based on the total score accumulated from both continuous (ongoing) and interim (final exam) assessments.
	• **Ongoing Assessment** includes:
	   ○ **Seminars and Colloquiums**: 0–30 points
	   ○ **Independent Work**: 0–10 points
	   ○ **Attendance**: 0–10 points
	• **Interim Assessment** includes:
	   ○ **Final Examination**: 0–50 points
	In cases where the course also includes practical or laboratory sessions, an additional score of up to 10 points may be allocated for those components.
	Final Grade = Ongoing Assessment + Interim Assessment

Seminars and Colloquiums	Colloquiums are held three times per semester in accordance with the academic calendar. Each colloquium is evaluated on a scale of 0 to 10 points. Participation is mandatory. Students who do not attend a colloquium receive a score of 0.	0-30
Independent Work	**Formatting Requirements for Independent Work** • **Font and Size: Arial, 12 pt** • **Line Spacing: 1.5** • **Minimum Length: 3 pages** • **Submission Deadline: Two weeks before the end of the semester**	0-10
	Topics for Independent Work 1. The concept of mathematical support in the modern analysis of financial and monetary markets 2. The nature, subject, methodology, participants, and objects of financial and monetary markets 3. Mathematical model of the credit market 4. Financial operations 5. Simple interest 6. Compound interest 7. Profitability and its types 8. Profitability formulas 9. Cash flow models 10. Fisher model	
Attendance	For every 10% of total allocated instructional hours missed during the semester, 1 point will be deducted from the attendance score. Students who miss more than 25% of the total course hours will not be permitted to take the final exam.	0-10
Exam		0-50

Students' academic performance in the course is evaluated based on the total number of points accumulated during the semester, according to the following grading scale:
Grading Scale

Score Range	Letter Grade	Descriptor
91-100	A	Excellent
81-90	B	Very Good

71-80	C	Good
61-70	D	Satisfactory
51-60	E	Pass
Below 51	F	Fail

Calendar-Thematic Plan					
N	Date	Course Topics	Lecture	Seminar	Textbook/Assignments
1		**The concept of mathematical support in the modern analysis of financial and monetary markets** **The nature, subject, methodology, participants, and objects of financial and monetary markets**	2	2	• **S. S. Sabzaliyev** – *Finance and Accounting* (Dərslik_Maliyyə-Hesabat.pdf) *(Note: Source link appears to be a Chrome extension; official publication link recommended.)* • **V.V. Ugrozov, M.S. Al-Nator** – *Mathematical Support of Financial Decisions: Methodological Materials for the Discipline* 🔗 PDF document • **Financial Mathematics and Market Analysis** 🔗 https://magistratura.fa.ru/finansovyy-fakultet-37/finansovaya-matematika-i-analiz-rynkov-1/ • **M. I. Stolbov** – *Financial Market and Economic Growth: Problem Outline* 🔗 https://mgimo.ru/files/31989/31989.pdf • **E. Hansen** – *Monetary Theory and Financial Policy*, Moscow: Delo, 2006 – 312 pages 🔗 http://www.ipr-ras.ru/old_site/articles/hansen-06.htm • **Rajan, R. & Zingales, L.** – *The Great Reversals: The Politics of Financial Development in the 20th Century*, NBER Working Paper No. 8178, July 2002 🔗 OECD PDF
2		Mathematical Model of the Credit Market	2	2	☐ **S. S. Sabzaliyev** – *Finance and Accounting* (PDF: Derslik_Maliyyə-Hesabat.pdf) *(Original source: UNEC website — please use official PDF download link rather than browser extension)* ☐ **V.V. Ugrozov, M.S. Al-Nator** – *Mathematical Support of Financial*

					Decisions: Methodological Guide 🔗 Download PDF ☐ **Financial Mathematics and Market Analysis** 🔗 https://magistratura.fa.ru/finansovyy-fakultet-37/finansovaya-matematika-i-analiz-rynkov-1/
3		Financial Operations. Simple Interest	2	2	https://www.raiffeisen.ru/wiki/kak-rasschitat-procenty-po-vkladu/
4		Compound Interest and Future Value	2	2	https://www.raiffeisen.ru/wiki/kak-rasschitat-procenty-po-vkladu/
5		Profitability: Types and Formulas	2	2	https://skillbox.ru/media/management/rentabelnost-chto-eto-takoe-formula-vidy-izuchaem-klyuchevoy-finansovyy-pokazatel/
6		Cash Flow Models	2	2	https://fintablo.ru/money/vidy-denezhnyh-potokov
7		Baumol–Harris and Tobin Models	**2**	**2**	https://www.ejsr.org/files/arxiv/Jurnal_Nomre_16_2021/2.pdf
8		Yield Model of Securities	2	2	https://www.rbc.ru/quote/news/article/638f1c729a794740acfb6bab
9		**Fisher Model**	2	2	https://www.alt-invest.ru/lib/fisher_equation/
10		Risks: Classification and Evaluation	2	2	https://znanierussia.ru/articles/%D0%A0%D0%B8%D1%81%D0%BA
11		Investments and Harry Markowitz's Portfolio Theory	2	2	https://dzen.ru/a/Ygu52JwH7h48qpEM
12		Forecasting, Discounting, and DCF (Discounted Cash Flow)	2	2	https://ozenka-biznesa.narod.ru/Main/bsn_51.htm
13		Payback Models of Investment Projects	2	2	https://topfranchise.ru/stati/srok-okupaemosti-formula-i-metody-rascheta-primery/
14		Internal Rate of Return (IRR) Models for Investment Projects	2	2	https://www.profiz.ru/peo/10_2024/norma_dohodnosti/
15		Actuarial Concepts and Accounting Practices	2	2	https://e-qanun.az/framework/56049

Instructor: **Ashraf Hasanov**