COURSE DESCRIPTION

1. Information about the programme

1.1 Institution of higher education	**Alexandru Ioan Cuza University of Iasi**
1.2 Faculty	**Faculty of Economics and Business Administration**
1.3 Department	**Department of Finance, Money and Public Administration**
1.4 Field of study	**Finance**
1.5 Level	**Master**
1.6 Study programme/ Qualification	**Finance and Risk Management**

2. Information about the course

2.1 Course name			**Probability and Statistics for Finance**				
2.2 Course coordinator			**Prof. Danut Jemna, PhD**				
2.3 Seminar coordinator			**Prof. Danut Jemna, PhD**				
2.4 Year of study	**1**	**2.5** Semester	**1**	**2.6** Type of assessment	**EVP**	**2.7** Course status	**E**

** C – Compulsory / E - Elective*

3. Total estimated time (hours alloted to teaching activities per semester)

3.1 Number of hours per week	**3**	of which: **3.2 l**ecture	**2**	**3.3** seminar/lab	**1**
3.4 Number of hours in the curriculum	**42**	of which: **3.5 l**ecture	**28**	**3.6** seminar/lab	**14**

Time distribution	hrs
Study of the textbook, coursebook, bibliography and lecture notes	**28**
Additional research in the library, online and on the field	**12**
Preparation of seminars/labs, homework, projects, portfolios and essays	**35**
Tutorials	**6**
Assessment	**2**
Other activities.....	**-**

3.7 Total number of self-study hours	**83**
3.8 Total number of hours per semester	**125**
3.9 Number of credits	**5**

4. Prerequisites (if applicable)

4.1 Curriculum-based	**-**
4.2 Competence-based	**-**

5. Conditions (if applicable)

5.1 For lectures	Attendance at classes is recommended.
5.2 For seminars / labs	Attendance at seminaries is mandatory at least 60% of the total

6. Specific competencies

Professional competencies	**C1.** Analysis of the theoretical and practical aspects of financial markets, models, instruments that are used in the management of risks. **C2.** Adequate use of mathematical and statistical concepts, methods and techniques in assessing risks and performing independent research in finance. **C3.** Evaluation of the main risk factors for organizations and financial systems. **C4.** Implementing effective financial management and reporting within the business environment to ensure value creation. **C5.** Ensuring effective and appropriate governance and management of risk within an organization, in the context of an overall ethical framework.
Transversal competencies	**CT1.** Application of the professional ethical norms and values in decision-making and undertaking of complex professional tasks, independently or within a team. **CT2.** Human resources planning within a group or organization, in the context of awareness of own responsibility for professional outcomes. **CT3.** Assuming the need for continuous development to create prerequisites for career progression and adapt own professional and managerial competencies to the economic dynamics.

7. Course objectives (provided by the specific competencies grid)

7.1. Main objective	The course's main objective is to initiate students in the major quantitative methods used in financial analysis. There are presented issues of descriptive statistics, probability theory (probability, random variables and probability distributions), inferential statistics (estimation and hypothesis testing) and econometric modeling. The tools are presented in the perspective of their application for solving concrete problems of financial analysis such as estimation and testing of financial parameters, particularly the risk, explanation of financial relationship between variables, etc.
7.2. Specific objectives	On completion of the course, the students will be able to: ▪ calculate and interpret financial and statistics indicators using financial data ▪ describe financial phenomena using quantitative analysis ▪ use the R platform to analyse financial data ▪ explain and use the sampling research method ▪ interprets the results of quantitative analysis ▪ explain the nature of financial relationships between phenomena ▪ estimate and interpret a regression model using financial data

8. Content

8.1	**Lectures**	**Teaching methods**	**Observations** **(hours & readings)**
1.	Statistical Concepts and Basic Statistics Analysis	Interactive course, heuristic conversation, problem solving method	2 hrs: A (3), C(2)
2.	Financial indicators	Interactive course, heuristic conversation, problem solving method	1 h: C (1)
3.	Introduction in R	Interactive course, heuristic conversation, problem solving method	3 hrs: S(1), J(1)
4.	Probability Concepts	Interactive course, heuristic conversation, problem solving method	4 hrs: A (3), J(2), C(3)

5.	Common Probability Distributions	Interactive course, heuristic conversation, problem solving method	3 hrs: A (3), J (2), C(4)
6.	Sampling and Estimation	Interactive course, heuristic conversation, problem solving method	3 hrs: A (3), C(5)
7.	Hypothesis Testing	Interactive course, heuristic conversation, problem solving method	4 hrs: A (3), C(6)
8.	Regression analysis	Interactive course, heuristic conversation, problem solving method	6 hrs: A (5), C(7)
9.	Conclusions	Interactive course, heuristic conversation, problem solving method	2 hrs

Bibliography

Main readings:

- Alexander, C., *Quantitative Methods in Finance*, John Wiley & Sons Ltd, 2008 (A)
- Brooks, C., *Introductory Econometrics for Finance*, Cambridge University Press, 2008 (B)
- CFA, *Quantitative Investment Analysis,* Wiley, 2020 (C)
- Jemna, D., *Econometrie cu aplicatii in R*, Editura Universitatii "Al.I. Cuza" Iasi, 2017 (J)
- Stowell, S., *Using R for Statistics,* Apress, 2014 (S)
- Teall, J.L., Quantitative Methods for Finance and Investments, Blackwell Publishing, 2002 (T)
- https://cran.r-project.org/ (R)

Additional readings:

Other readings such as cases, simulations, journal papers, press articles will be provided periodically throughout the course via FEAA eLearning platform, e-mail or handed-in in class.

8.2	**Seminars / Labs**	**Teaching methods**	**Observations (hours & readings)**
1.	Introduction in R	Interactive teaching methods, case study method, Working in R	1 hrs: S(1-4), (R)
2	Descriptive statistics analysis using real data from Finance	Interactive teaching methods, case study method, Working in R	1 hrs: S(5), C(1,2)
3.	Calculation of probability for discrete and continuous random variables. Exemplifying operations with events and calculation of probabilities	Interactive teaching methods, case study method, Working in R	2 hrs: A (3), J (2), S(7), C(3,4)
4.	Exemplifying the calculation of probabilities by use of cumulative distribution function (CDF)	Interactive teaching methods, case study method, Working in R	1 hrs: A (3), J (2), S(7), C(3,4)
5.	Exemplifying the possibilities of obtaining samples for various survey methods. Clarifying the concepts of statistical inference	Interactive teaching methods, case study method, Working in R	2 hrs: A (3), S(4,6), C(5)
6.	Point estimates and confidence intervals of various parameters	Interactive teaching methods, case study method, Working in R	2 hrs: A (3), S(10), C(5)
7.	Statistical tests for one or more parameters	Interactive teaching methods, case study method, Working in R	2 hrs: A (3), S(10), C(6)
8	Estimate regression models using financial data	Interactive teaching methods, case study method, Working in R	2 hrs: (R), A(5), C(7)
9.	Final review	Interactive teaching methods	1 h

Bibliography
- Alexander, C., *Quantitative Methods in Finance*, John Wiley & Sons Ltd, 2008 (A)
- Brooks, C., *Introductory Econometrics for Finance*, Cambridge University Press, 2008 (B)
- Jemna, D., *Econometrie cu aplicatii in R*, Editura Universitatii "Al.I. Cuza" Iasi, 2017 (J)
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- Teall, J.L., Quantitative Methods for Finance and Investments, Blackwell Publishing, 2002 (T)
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9. Corroboration of the course content with the expectations of community representatives, professional associations and representative employers from the programme's related field

This course provides students with the core knowledge, skills, and abilities that are generally accepted and applied by finance and investments professionals throughout the world. Topics are selected in accordance to the requirements of Charted Financial Analyst (CFA) and Professional Risk Manager (PRM) world-leading certifications for finance and risk management, to offer the adequate preparation for CFA and PRM exams.
The course content is correlated to that of similar courses taught at renowned universities and is continuously updated based on the feedback of students and alumni.
Moreover, this is a student-centered course that follows the best practices of learning and teaching in undergraduate education through the adoption of a variety of active-learning instructional methods.

10. Assessment

Type of activity	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in final grade (%)
10.4 Lectures	- Ability to evaluate a financial problem and to find appropriate quantitative method - The accuracy with which the methods are applied to quantitative evaluation of the issues listed in the tests	partial Assessment two tests	80%
10.5 Seminars/ Labs	- The ability to use quantitative methods for specific problems in the financial field using real data - Creativity, interactivity and involvement in solving the proposed exercices	Homework Individual work and participation in the seminar	20%
10.6 Minimum performance standard			
- Demonstrate the ability to understand, and use the main methods of quantitative analysis used in finance. - Competence to analyze financial data using R. - Carrying out at least 2 of the 3 homework. - The minimum grade 5 for each of 2 partial assessment tests. - The minimum grade 5 for the final score, calculated as follows: P = HW * 0.2 + 0.4 * T1 + T2 * 0.4, where P is the final grade, HW is homework, T1 and T2 are the partial tests.			

Date	Course Coordinator	Seminar Coordinator
09.09.2023	Prof. dr. Danut Jemna	Prof. dr. Danut Jemna

Date of approval	Head of Department
21.09.2023	Prof. dr. Ovidiu Stoica