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# Course Package “Financial and Actuarial Calculations at the National and International Level”

<b>Work Package</b>	WP3: Development of Course Materials for the Reformed MA Programmes, Deliverable 3.1
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## Document History

Version	Date	Author(s)	Description
1	15.12.2018	Andrei Mulic	First draft of WP3 output - Development of Course Materials for the Reformed MA Programmes
2	04.02.2019	Andrei Mulic	Final version of WP3 output - Development of Course Materials for the Reformed MA Programmes

### **Disclaimer:**

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**Content**

- 1. General information about the course..... 4
- 2. Learning outcomes of the course ..... 5
- 3. Syllabus of the course ..... 7
- 4. Teaching methodology of the course..... 9
- 5. Labour market relevance of the course .....10
- 6. Assessment and grading .....11
- 7. References.....12
- 8. Course assignments.....13
  - 8.1 Assignment 1 .....13
  - 8.2 Assignment 2 .....14
- Annex: Presentation slides .....15

## 1. General information about the course

Explanation: Please fill in the table below.

<b>Title of the course (as specified in the reformed curriculum)</b>	Financial and Actuarial Calculations at the National and International Level
<b>Name of the teacher</b>	Andrei Mulic
<b>Novelty of the course (please select as appropriate)</b>	This course is an updated and revised version of a course which already existed in the curriculum
<b>Year of the course in the curriculum</b>	YEAR the 1st
<b>Semester of the course in the curriculum</b>	The 2nd semester
<b>Language of instruction of the course</b>	Romanian/ Russian/ English
<b>Number of ECTS credits</b>	7

## 2. Learning outcomes of the course

Explanation: Please specify the learning outcomes of the course.

### **Transversal competencies (General knowledge, skills or competences):**

TC2. Self-assessment from the perspective of quality concerns, adaptation to new situations / conditions, openness to novelty and assuming responsibilities, roles and functions of leading the work of professional groups or entities;

TC3. Identifying personal development opportunities to diversify and enrich professional skills, digital (IT) and financial calculation

TC4. Communication in a foreign language (English) for professional purposes

### **Professional competencies:**

PC 1: Advanced use of national and international accounting standards and accounting techniques, national and international tax law and practice, and interdisciplinary approach to economic operations to provide financial, tax and investment consulting services;

PC 2: Creation, autonomously and in group, design and implementing of strategies, programs and complex regarding business management using theoretical and practical knowledge

PC 3: Identifying and using modern techniques and methods of financial management, financial reporting and diagnosing the economic and financial situation of the enterprises

PC 4: Elaboration of reports and financial statements at the level of enterprises and financial groups; drawing up projects, budgets, forecasts and other complex professional approaches based on concepts, theories and economic methods assimilated in the public and private domains;

PC 5. Advanced use of knowledge in the field of investment and taxation for the design, development and implementation of strategies, policies, procedures, financial-accounting management systems in public and private entities.

### **Learning outcomes:**

- Applying in practice concepts and basic principles to financial and actuarial calculation ;
- Creating and implementing the plan for the optimal distribution of available financial funds;
- Evaluating critical of the valuation methods of financial instruments, assets and liabilities elements and Gordon-Shapiro and Bates Models;
- Integrating of staggered payments and different types of annuities in different loan depreciation models and accumulating financial funds methods;

- Applying and critiquing of the methods for solving the deterministic investment problems;
- Evaluating of the cost of short-term and long-term credits using simple or compound interest techniques;
- Integrating of the elements of actuarial mathematics in insurance operations.

### 3. Syllabus of the course

Explanation: Please provide a detailed syllabus of the course (broken down in weeks) – maximum 2 pages

**Title of the course:** Financial and Actuarial Calculations at the National and International Level

**Semester:** II

**Number of ECTS credits:** 7

**Language of instruction:** Romanian/ Russian/ English

**Type of course:** optional

**Teaching methodology:**

A. Methods of communication:

- Oral communication methods: Expositive (affirmative) and interrogatory (conversational, dialog);

- communication methods based on internal language: personal reflection;

- written communication methods: reading;

B. Methods of Exploring Reality:

a) direct - direct exploration: systematic and independent observation;

b) Middle-indirect exploration: demonstration, modeling;

C. Methods based on action (operational or practical):

- methods based on real / genuine action: exercise, case study, project or theme research-action, practical work;

simulation / fiction based methods: gaming, drama, learning through dramatization, learning on simulators;

- scheduled training.

➤ Interactive-creative learning

➤ Brainstorming

➤ MoodleUSM.md (<http://moodle.usm.md/moodle/>)

➤ Blended learning,

➤ E-learning,

**Learning outcomes:**

- Applying in practice concepts and basic principles to financial and actuarial calculation ;
- Creating and implementing the plan for the optimal distribution of available financial funds;
- Evaluating critical of the valuation methods of financial instruments, assets and liabilities elements and Gordon-Shapiro and Bates Models;
- Integrating of staggered payments and different types of annuities in different loan depreciation models and accumulating financial funds methods;
- Applying and critiquing of the methods for solving the deterministic investment problems;
- Evaluating of the cost of short-term and long-term credits using simple or compound interest techniques;
- Integrating of the elements of actuarial mathematics in insurance operations.

**Brief summary of course contents:**

Discipline Financial and Actuarial Calculations at the National and International Level pursue the goal of shaping and / or developing professional skills to substantiate the best (optimal) investment and funding decisions requires that each enterprise, in each financial exercise, assesses by both mathematical methods both efforts and expected financial results, to minimize risks and maximize profits (benefits). These financial operations also concern financial institutions, banks, stock exchanges, companies, insurance companies, commercial companies or stock companies as well as private individuals. Both and others can place some money or make certain loans for industrial, agricultural, social and cultural investments and are therefore interested in choosing the best financial placement.

**Main references and reading:**

1. Octavian Popescu ș. a. Matematici aplicate în economie, Editura Didactică și Pedagogică, voi. II. București, 2003.
2. Ion Purcaru. Matematici financiare, voi. I și II, Editura Economică, București, 1992,1993.
3. Pavel Cížek, Wolfgang Härdle, Rafał Weron «Statistical Tools for Finance and Insurance» Springer Berlin Heidelberg New York, ISBN 3-540-22189-1
4. E. M. Четыркин. Методы финансовых и коммерческих расчётов. М., 2015.

**Form of assessment:**

Current evaluation will be performed through:

2 control papers – written tests;

Elaboration and submission of the product of individual work (individual or group project/ solution of tasks within the framework of the project) ;

Assessment as a result of seminars attending

Final assessment – written exam, which includes 2 subjects from the course studied. Each subject of the test includes tasks to: a) knowledge; b) application; c) integration.

The overall score will be determined as a weighted average in the following way:

Current evaluation, including the product of individual work – 60%;

Final evaluation – 40%

**Teacher(s) of the course:** Mulic Andrei, associate professor

**ADMINISTRATION OF THE DISCIPLINE**

Code of discipline of the study plan	Title of the course	Responsible for discipline	Semester	Total hours				Assessment	Number of ECTS credits	
				Total	inclusive					
					C	S	L			IW
<b>S.02.A.07</b>	FAC	Mulic A.	2	<b>210</b>	30	30		<b>150</b>	ex.	7

**ORIENTAL TIMETABLE AND ORIENTAL DISTRIBUTION OF HOURS**

Nr	Content units	Number of hours per week		
		Lecture	Seminars	Individual Work
1.	The cost of international and national short-term credit.	4	4	15
2.	The cost of long-term credit at the national level. Compound interest	4	4	15
3.	Staggered payments (rent)	6	6	15
4.	Repayment of credits in national banking sistem	2	2	15
5.	Financial placement in shares on the international securities market	4	4	10
6.	Deterministic international investment problems	4	4	10
7.	Elements of actuarial mathematics. Using Spreadsheet software (Excel), SAP or related software in actuarial calculation.	6	6	15
<b>Total</b>		<b>30</b>	<b>30</b>	<b>150</b>



## 4. Teaching methodology of the course

Explanation: Please explain the teaching methodology and pedagogical approaches of the course – maximum ½ page

In the teaching of the discipline are mainly used interactive methods: problem-solving, case study, heuristic methods by which the student is stimulated to find solutions through the outcome of his own learning activity, interactive-creative learning, brainstorming, blended learning, E-learning MoodleUSM.md (<http://moodle.usm.md/moodle/>), but also traditional methods like: description, explanation of economic phenomena and processes, graphic representations, comparison,

The forms of organizing the training at discipline are made up of lectures, seminars, guiding the individual activity, extra-curricular activity of financial education. In the lectures are taught the basic concepts of the themes of the discipline, the principles of performing financial and actuarial calculations in specialized financial institutions, the functions, methods and tools used in the management of the financial processes, etc. The purpose of the seminars is to examine the most complicated concepts, to solve problems related to the topics studied, to discuss case studies. In the course of the seminar, students are tested on the students' level of learning, the presentation of the individual work.

Individual work involves preparing for the seminars in accordance with the objectives set in the syllabus, studying the legislative and normative framework related to the respective themes, solving, problem-solving, execution of research projects or case studies.

If necessary, the student has the possibility to get a personal teacher's consultation.

## 5. Labour market relevance of the course

Explanation: Please explain the labour market relevance of the course (linked to findings of WP1) – maximum ½ page

Based on the analysis results from WP 1 (Annex 1B, Figure 16-18) the most important FINANCE - specific skills and competencies of current employees - Level of the MA graduates is: Budgeting and financial planning, IT and math skills. Features of this specialty consist in the need for students to develop knowledge and skills in the field of financial calculation. The peculiarities of the orientation of these competencies allow uniting financial and accounting activities and creating universal specialists for the national economy, which certainly will provide them with undoubted advantages in the job placement.

Understanding labour market trends is key to designing effective education for future job. Global and regional employment estimates and projections trace the potential of different regions in the world to absorb an ever growing global labour force.

The peculiarities of national economy based on small and medium enterprises leads to the need to prepare financial specialists with a large range of skills and abilities. According to the Classification of Occupations in Moldova, discipline Financial and Actuarial Calculations at the National and International Level, will create the specialists for following occupational posts: 1120 Directors-General, Executive Directors and Assignees, 1211 Financial heads, 1213 Heads in the field of economic and planning policies, 1346 Heads of units providing financial and insurance services, 2412 Financial and investment specialists and consultants, 4312 Officials in the field of statistics, finance and insurance. More than that, the internalization of economic relations requires economic entities to be more competitive on international markets, that is why it is important to adapt the teaching process to new international trends in financial calculation. Developing course units (modules) to course Financial and Actuarial Calculations at the National and International Level in partnership with labor market representatives, analysis of real case studies offered by companies and recommending solutions to some problems in practice national companies.

## 6. Assessment and grading

Explanation: Please explain the form of assessment of the course – maximum ½ page

In order to evaluate the learning outcomes within the discipline, it is done:

1. Current evaluation - is conducted throughout the semester during courses, seminars, consultations. They are also rated on a scale of 1 to 10 compulsory semesters, which take place in pre-established periods in the annual academic calendar. The weight of the current assessment is 60% of the final grade.

2. Final assessment - is done through the written exam, using the institutional test, consisting of 2 subjects of tasks on 3 levels with different degree of complexity (knowledge, applied, integration). The weight of the mark on the exam is 40% of the final grade in the discipline.

3. Evaluation of the product of individual work - is done outside direct contact hours: at counselling hours or in the sessions of the student's academic seminar.

a) The final grade in the discipline is calculated according to the MSU Academic Performance Evaluation Regulation: Semester grade (60%) + Examination note (40%)

- The semester assessment is determined based on the components that make up the current evaluation:

$$\text{Semester assessment} = \frac{T_1 + T_2 + \frac{MEC + LI}{2}}{3}$$

T1 - mandatory Test 1.

T2 - - mandatory Test 2.

MEC - the average of the current assessment, is calculated as a simple arithmetic mean of grades accumulated in seminars and courses.

LI -not granted for the final product presented for the individual work carried out.

- Final exam (final assessment) - 40%;

b) Minimum requirements for promotion

- Obtaining the minimum promotion mark for the discipline (semester note);
- Obtaining the minimum mark for promotion at the course exam;
- elaboration, presentation and support of individual work;

## 7. References

Explanation: Please provide the main references and recommended reading for the course – maximum 1 page

1. Brigham, Joel F. Houston, Colin Drury «Managerial Finance 2<sup>nd</sup> Edition» IBMMS Regular and Fast-Track Programmes Eugen F. United Kindom Ashford Colour Press 2018, ISBN 978-1-4737-5666-3
2. Corelli, Analytical Corporate Finance (Springer Texts in Business and Economics), 2nd ed. 2018, Springer, ISBN 978-3-319-95761-6
3. David Hillier, Iain Clacher, Stephen Ross, Randolph Westerfield, Bradford Jordan «Fundamentals of corporate finance: Third European Edition» McGraw-Hill Education London, 2017, ISBN 978-1-259-25333-1
4. Girasa, Regulation of Cryptocurrencies and Blockchain Technologies (Palgrave Studies in Financial Services Technology) Palgrave Macmillan, London, 2018, ISBN 978-3-319-78508-0
5. Mulic Andrei, Constantinescu Vladislav, Development of a strategy for financing investment projects of enterprises in the conditions of the Republic of Moldova The Scientific Annals of the State University of Moldova Volume IV Chisinau 2006 p. 242 - 248 ISBN 978-9975-70-025-2
6. Pavel Cížek, Wolfgang Härdle, Rafał Weron «Statistical Tools for Finance and Insurance» Springer Berlin Heidelberg New York, 2017, ISBN 3-540-22189-1
7. Pozzoli/Paolone, Corporate Financial Distress (Springer Briefs in Finance) Springer, London, 2017 ISBN 978-3-319-67354-7
8. Richard A. Brealey, Stewart C. Myers, Franklin Allen, «Principles of corporate finance 12<sup>th</sup> edition», McGraw-Hill Education London, 2017, ISBN-13 9780077178239
9. Römănu, Analytical Finance: Volume I-II Palgrave Macmillan, London, 2017, ISBN 978-3-319-34026-5
10. Victor Dragotă, Laura Obreja Braşoveanu, Ingrid-Mihaela Dragotă «Management financiar, ediția a doua». Volumul II - Management financiar strategic Bucuresti, Economica, 2016 ISBN 978-973-709-615-9
11. Ion Stancu, Laura Obreja Braşoveanu, Andrei Tudor Stancu, Finanțe corporative. Volumul 1 -Analiza și planificarea financiară Bucuresti, Economica, 2015, ISBN 978-973-709-753-8
12. Constantin Anghelache, Mădălina Gabriela Anghel, «Modelare economică. Concepte, teorie și studii de caz», Bucuresti, Economica, 2014, ISBN 978-973-709-629-6
13. Constantin Anghelache, Mădălina Gabriela Anghel «Bazele statisticii economice. Concepte teoretice și studii de caz», Bucuresti, Economica, 2016 ISBN 978-973-709-779-8
14. Octavian Popescu ș. a. *Matematici aplicate în economie, Editura Didactică și Pedagogică*, voi. II. București, 2013.
15. Миронкина Ю.Н., Звезда Н.В., Скорик М.А., Иванова Л.В. «Актуарные расчёты» Часть 1-2. Учебник и практикум для бакалавриата и магистратуры М.:Издательство Юрайт, 2018, ISBN 978-5-534-03548-3
16. Копнова Е.Д. «Финансовая математика», Учебник и практикум для бакалавриата и магистратуры М.:Издательство Юрайт, 2018, ISBN 978-5-534-00620-9
17. Румянцева Е.Е. «Финансовый менеджмент». Учебник и практикум для бакалавриата и магистратуры М.:Издательство Юрайт, 2018, ISBN 978-5-534-00237-9

## 8. Course assignments

Explanation: Please provide two assignments for the course (e.g. group work, project, essay, case study, homework).

### 8.1 Assignment 1

**STATE UNIVERSITY OF MOLDOVA**  
**Finance and Banking Department**

*Approved* \_\_\_\_\_  
*Department head*  
*Dr.conf.univ Ștefaniuc Olga*

**group work/ case study/homework on discipline "Financial and Actuarial Calculations"**  
**Year I Master**

- 1) Define the concept of interest (2)
- 2) Classification of staggered payments (2)
- 3) Determine, on an equal basis with interest (using EXCEL spreadsheet), the average amount, the average percentage, the common maturity and the average maturity in the case of the following loans of «WETRADE» LLC for the purpose of accumulation:  
30000 u.m, with an annual percentage of 12%, over 180 days;  
40000 u.m., with an annual percentage of 15%, over 250 days;  
20000 u.m., with an annual percentage of 20%, over 200 days. (3)
- 4) Place the amount of 75,000 u.m. under compound interest rate for 5 years (2012-2018) with the successive annual percentages of (using the Internet, it is necessary to find data on the average interest deposit rate in the banking system of Republic of Moldova, for the specified period). Find the final amount (capitalized capital) and the related interest. (3)
- 5) A client of the MOLDINCONBANK wishes to know what the amount should be deposited annually for 10 years under a compound interest rate with the annual percentage  $p = 12\%$  so that he and his followers can perpetually withdraws at every beginning of the semester 15,000 (3)
- 6) JSC «Cricova» debt of 250000 u.m. contracted today will be reimbursed, over three years, through the equal annuity targets, for 4 years and an average annual percentage  $p = 8\%$  for all 7 years. Draw up the repayment plan for the loan. (3)

**The scale of assessment**

<b>Points</b>	<b>5 – 6</b>	<b>7 – 8</b>	<b>9 – 10</b>	<b>11 – 12</b>	<b>13 – 14</b>	<b>15 – 16</b>
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Note	5	6	7	8	9	10
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## 8.2 Assignment 2

**STATE UNIVERSITY OF MOLDOVA**  
**Finance and Banking Department**

*Approved* \_\_\_\_\_

*Department head*

*Dr.conf.univ Ștefaniuc Olga*

**Test on discipline "Financial and Actuarial Calculations" Year I Master**

### VARIANT 1

#### Topic I Deterministic investment problems

**I. Level of knowledge** **3 p.**

1.1. Describe the process of determining the optimal replacement time for equipment

**II. At the application level** **5 p.**

1.2. Compare the method of global profitability to the net benefit (accounting) method

**III. At the level of integration** **7 p.**

1.3. «AgroProfi» LLC, which has an annual investment budget of 396,000 u.m., seeks to make a placement as profitable as possible. For this purpose, some of the following seven investment projects should be selected (using EXCEL spreadsheet), the cost of which is, and the coefficients of profitability C (Ps) is estimated to be: (76,000; 1,16), (56,000; 1,13) (90000, 1.2), (71000, 1.11), (48000, 1.1), (69000, 1.17), (75000, 1.18).

#### Topic II. Staggered payments (rent)

**I. Level of knowledge** **3 p.**

1.1. Define the concept of annuity.

**II. At the application level** **5 p.**

1.2. Classify staggered payments

**III. At the level of integration** **7 p.**

1.3. At the end of each of three consecutive years (2016, 2017, 2018), the same amount equal to 6500 lei will be deposited into a deposit account with a corresponding annual interest (using the Internet, it is necessary to find data on the interest rate for the specified period on commercial bank deposits VICTORIABANK). Determine the final and current cost of the operation.

#### The scale of assessment

Points	6 – 8	9 – 11	12 – 18	19 – 25	26 – 28	29 – 30
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<b>Note</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
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Responsible Professor: Dr. associate prof. Mulic A. \_\_\_\_\_ \ \_\_\_\_\_ 2019

### **Annex: Presentation slides**

Explanation: Please provide presentation slides for your course (this can be done in a separate document, e.g. Power Point (Minimum: 25 slides))