SYLLABUS

1. Information on academic programme

1.1. University	**"1 Decembrie 1918"**
1.2. Faculty	**Faculty Of Sciences**
1.3. Department	**Economic Science and Business Administration**
1.4. Field of Study	**Business Administration**
1.5. Cycle of Study	**Undergraduate**
1.6. Academic programme / Qualification	**Business Administration**

2. Information of Course Matter

2.1. **Course**		**Mathematics Applied to Economics**		2.2. **Code**		**BA112**
2.3. **Course Leader/** Seminar Tutor		ALDEA MIHAELA				
2.4. Seminar Tutor		Aldea Mihaela				
2.5. Academic Year	**I**	2.6. Semester **I**	2.7. Type of Evaluation (E – final exam/C- examination /VP)	**E**	2.8. Type of course (**C**– Compulsory, **Op** – optional, **F** - Facultative)	**F**

3. Course Structure (Weekly number of hours)

3.1. Weekly number of hours	**4**	3.2. course	*2*	3.3. seminar, laboratory	*2*
3.4. Total number of hours in the curriculum	**56**	3.5. course	*28*	3.6. seminar, laboratory	*28*
Allocation of time:					Hours
Individual study of readers					*21*
Documentation (library)					*20*
Home assignments, Essays, Portfolios					*21*
Tutorials					*-*
Assessment (examinations)					*4*
Other activities…….					*28*

3.7 Total number of hours for individual study	**94**
3.8 Total number of hours in the curriculum	**56**
3.9 Total number of hours per semester	**150**
3.10 Number of ECTS	**6**

3. Prerequisites (*where applicable*)

4.1. curriculum-based	
4.2. competence-based	

4. **Requisites** (*where applicable*)

5.1. course-related	- classroom endowed with video projector / board
5.2. seminar/laboratory-based	- classroom endowed with video projector / board

5. Specific competences to be aquired (chosen by the course leader from the programme general competences grid)

Professional competences	**C1.** Adequate use of the concepts, theories, methods and instruments of financial type in public and private entities/organisations **C2.** Data collecting, analysis and interpretation, and items of information about economic and financial problems **C3**. Budget planning and implementation at the level of public and private entities/organisations
Transversal competences	**-**

6. Course objectives (as per the programme specific competences grid)

7.1 General objectives of the course	On the one hand, the aim of the discipline is to provide students with the capacity to anayse and decide in a logical and rigorous mode, and on the other hand, to contribute to the future economists'multidisciplinary trainig. This is the reason why the course content aims to the students' familiarization with the concepts and mathematical modelling technique applied to the economic phenomena, the business plan placement in mathematical context and its solving with mathematical programming methods, the formulation of mathematical models for deferred payments and credits, as well as loan reimbursement, and the optimization of certain financial operations
7.2 Specific objectives of the course	- To characterise the concept of mathematical model for an economic process; - To distinguish between various types of models (physical, abstract, deterministic, stochastic, linear, non-linear models, etc); - To know the main stages in drawing up of a mathematical model (the analysis of economic problem, formalization of the realtions between the elements of a problem, model building, model solving, i.e. solution establishment, analysis, interpretation, validation and implementation); - To determine the algoritm for dual problem elaboration; - To identify the method (methods) for solving PPLs (simplex method, transport method,...); - To distinguish between algorithms for PPL solving; - To describe the algorithms for PPL solving in post-optimization situations (free term changes in restrictions – changes in the quantity of the available resources, changes in the coefficients of the objective function – price and unitary profit changes, modification of the technological coefficients, etc.); - To characterise the algorithm for PPL solving in whole numbers; - To determine the special cases of the transport problems

	• To recognize and use mathematical models associated with the following types of operations: - simple and compound interest; valorification and updating; simple interest paid in advance; - loan amortization; annuities.

7. Course contents

8.1 Course (learning units)	Teaching methods	Remarks
Solving linear programming problems Algebraic and geometrical method	Lecture, discussions	
Simplex algorithm Particular cases: the infinite case, the degenerate case, multiple solution case	Lecture, discussions	
Duality. Dual simplex Couple of dual problems - symmetrical form	Lecture, discussions	
Re-optimization of linear programming problems Changes in vector c, column vector from matrix A, free term vectors	Lecture, discussions	
Parametric linear programming Linear dependency of a vector C parameter, and free term vector	Lecture, discussions	
Transport problems Particular cases: degenerate solution, multiple solution case	Lecture, discussions	
Transport problem re-optimization Modification of: the coefficient matrix, what is available and/or what is needed	Lecture, discussions	
Parametric transport problems. Linear vector dependency: of the coefficient matrix, what is available and/or what is needed	Lecture, discussions	
Special transport problems Problems with: imposed solution, restricted routes, grouped offer or demand	Lecture, discussions	
Simple interest Unitary interest, fructification, updating factor, medium values	Lecture, discussions	
Compound interest Gobal fructification/updating factor, initial/final sum	Lecture, discussions	
Annual deferred payment (annuities) Anticipated or posticipated payment	Lecture, discussions	
Credit and loan reimbursement Equivalent loan systems	Lecture, discussions	
Direct and indirect amortizations	Lecture, discussions	

8.2 References
1. P. Blaga , A. Mureşan - *Matematici aplicate în economie,* vol. I, Cluj-Napoca, 1993, 1996
2. D. Baz , V. Butescu , N. Stremţan - *Matematici superioare*, Bucharest, 1994
3. Gh. Cenuşă (coord.) – *Matematici pentru economişti*, Bucharest, 2002

4. Gh. Cenuşă, A. Filip - *Matematica pentru economişti*, Cision Publishing House, Bucharest, 2005
5. L. Căbulea - *Matematici aplicate în economie*, Dacia Publishing House, Cluj-Napoca, 2002
6. L. Căbulea – *Cercetări Operaţionale*, Dacia Publishing House, Cluj-Napoca, 2002
7. O. Popescu, I. Radomir – *Matematici pentru economişti*, Blue (Albastra) Publishing House, Cluj-Napoca, 2005
8. I. Purcaru – *Matematici generale si elemente de optimizare*, Economic Publishing House, Bucharest, 1998

Seminars-laboratories	Teaching methods	
Geometrical method	Exercises, problems, debates	
Algebraic method	Exercises, problems, debates	
Simpex algorithm Particular cases: the infinite case, the degenerate case, multiple solution case	Exercises, problems, debates	
Duality. Dual simplex Couple of dual problems - symmetrical form	Exercises, problems, debates	
Re-optimization of linear programming problems Changes in vector c, column vector from matrix A, free term vectors	Exercises, problems, debates	
Parametric linear programming Linear dependency of a vector C parameter, of the free term vector	Exercises, problems, debates	
Transport problems Particular cases: degenerate solution, multiple solution case	Exercises, problems, debates	
Transport problem re-optimization Modification of: the coefficient matrix, what is available and/or what is needed	Exercises, problems, debates	
Parametric transport problems. Linear vector dependency: of the coefficient matrix, what is available and/or what is needed	Exercises, problems, debates	
Special transport problems Problems with: imposed solution, restricted routes, grouped offer or demand	Exercises, problems, debates	
Simple interest Unitary rate, fructification, updating factor, medium values	Exercises, problems, debates	
Simple interest Unitary rate, fructification, updating factor, medium values	Exercises, problems, debates	
Compound interest Gobal fructification/updating factor, initial/final sum	Exercises, problems, debates	
Annual deferred payment (annuities) Anticipated or posticipated payment	Exercises, problems, debates	
Credit and loan reimbursement Direct and indirect methods	Exercises, problems, debates	

References
1. P. Blaga , A. Mureşan - *Matematici aplicate în economie,* vol. I , Cluj-Napoca, 1993, 1996
2. D. Baz , V. Butescu , N. Stremţan - *Matematici superioare* , Bucharest, 1994
3. Gh. Cenuşă (coord.) – *Matematici pentru economişti*, Bucharest, 2002
4. Gh. Cenuşă, A. Filip - *Matematica pentru economişti*, Cision Publishing House, Bucharest, 2005
5. L. Căbulea - *Matematici aplicate în economie*, Dacia Publishing House, Cluj-Napoca, 2002

6. L. Căbulea – *Cercetări Operaţionale*, Dacia Publishing House, Cluj-Napoca, 2002
7. O. Popescu, I. Radomir – *Matematici pentru economişti*, Blue Publishing House (Albastră), Cluj-Napoca, 2005
8. I. Purcaru – *Matematici Generale Şi Elemente De Optimizare*, Economic Publishing House, Bucharest, 1998

1. **Corroboration of course contents with the expectations of the epistemic community's significant representatives, professional associations and employers in the field of the academic programme**

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2. **Assessment**

Activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	*Final evaluation*	*Written paper*	50%
	-	-	-
10.5 Seminar/laboratory	*Continuous assessment*	*Assessment test*	50%
	-		-
10.6 Minimum performance standard:			

Remarks: …………………..

Submission date   Course leader signature   Seminar tutor signature

__   ___Lecturer Aldea Mihaela Ph. D.   Lecturer Aldea Mihaela Ph. D.

             Date of approval by Department members   Department director signature

                     _____   Lecturer Muntean Andreea, Ph.D.__