COURSE GUIDE

Subject name	**Mathematics II**
Course of study	**Quality and Production Management**
The form of study	**Full-time**
Level of qualification	**First**
Year	**I**
Semester	**II**
The implementing entity	**Department of Statistics and Econometrics**
The person responsible for preparing	**dr Anna Wiśniewska-Sałek**
Profile	**General academic**
ECTS points	**4**

TYPE OF TEACHING – NUMBER OF HOURS PER SEMESTER

LECTURE	CLASS	LABORATORY	PROJECT	SEMINAR
30E	15	-	-	-

COURSE AIMS

C1. To introduce students with the basic methods of solving mathematical problems and mathematical formalization of management engineering problems.

C2. Acquisition of practical skills in problem solving and interpretation of results from the basics of linear algebra, probability calculus and linear programming.

ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of mathematics at the high school level.
2. Knowledge in the field of mathematics from the first semester.
3. Ability to work independently.

LEARNING OUTCOMES

EU1. The student has basic theoretical knowledge from selected branches of mathematics (lecture content).

EU2. Student is able to solve tasks in the field of linear algebra (advanced knowledge).

EU3. Student is able to solve tasks in the field of probability calculus.

EU4. The student is able to analyze tasks in the field of linear programming (advanced knowledge).

COURSE CONTENT

Type of teaching – LECTURE	Number of hours
W1. Mathematics - a reminder of the information.	2
W2-4. Matrix – operations (module 1).	6
W5-7. Matrix – matrix equation (module 2).	6
W8-9. Random variable (module 3).	4
W10-12. Foundations of linear programming (module 4).	6
W13-15. Foundations of linear programming – optimal solutions (module 5).	6
Type of teaching – CLASS	**Number of hours**
C1-3. Matrix – mathematical operations (solving tasks).	3
C4-6. Matrix – matrix equation (solving tasks).	3
C7. Colloquium - linear algebra.	1
C8-9. Random variable (solving tasks).	2
C10-11. Foundations of linear programming (solving tasks).	2
C12-14. Foundations of linear programming – optimal solutions (solving tasks).	3
C15. Colloquium - random variable, foundations of linear programming.	1

TEACHING TOOLS
1. Textbooks and scripts.
2. Presentation.
3. E-learning platform.

WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)
F1 Activity on the e-learning platform.
P1 Written test.
P2 Written exam.

STUDENT WORKLOAD

Form of activity	Average number of hours for realization of the activity	
	[h]	ECTS
Contact hours with the teacher	45	1.8
Preparation for classes	20	0.8
Exam	2	0.08
Preparation for tests	25	1
Consultation	8	0.32
TOTAL NUMBER OF HOURS / ECTS POINTS FOR THE COURSE	**100**	**4**

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS
Basic resources

1. Anholcer M. Mathematics in economics and management. Examples and exercises. Wyd. UE w Poznaniu, 2015.
2. Kucharska-Raczunas A. English for Mathematics for Students of Technical Studies. Wydaw. Politechniki Gdańskiej, 2015.
3. Chong E.K.P., Żak S.H. An Introduction to Optimization. John Wiley and Sons, Inc., New Jersey 2013.

Supplementary literature

1. Panek E. Mathematics in Economics. Wydaw. Uniwersytetu Ekonomicznego, Poznań 2009.
2. Wiśniewska-Sałek A., Nowakowska-Grunt J., Sałek R., Skowron-Grabowska B. The Use of Quantitative Methods in Managing the Process of Creation a Competitive Advantage in the Industrial Region. [in:] Proceedings of the 12th International Academic Conference. Prague, Czech Republic, 01-04 September, International Institute of Social and Economic Sciences (IISES), Prague 2014.

TEACHERS (NAME, SURNAME, E-MAIL ADDRESS)

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MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program	Course aims	Course content	Teaching tools	Ways of assessment
EU1	K_W01, K_U01, K_K05	C1, C2	W1-W15	1,2,3	F1, P2
EU2	K_W01, K_U01, K_K05	C1, C2	W2-W7, C1-C7	1,2,3	F1, P1, P2
EU3	K_W02, K_U09, K_K05	C1, C2	W8-W9, C8-C9, C15	1,2,3	F1, P1, P2
EU4	K_W05, K_U09, K_K05	C1, C2	W10-W15, C 10-	1,2,3	F1, P1, P2

			C15		

FORM OF ASSESSMENT – DETAILS

	grade 2	grade 3	grade 4	grade 5
EU1	The student has not sufficiently learned theoretical knowledge in the field of lectures.	The student has sufficiently learned theoretical knowledge in the field of lectures.	The student mastered sufficient theoretical knowledge in the field of lectures and can apply it in some problems.	The student has sufficiently learned theoretical knowledge in the field of lectures and is able to analyze problems by himself .
EU2	The student can not apply the learned practical knowledge to solve elementary problems of linear algebra.	The student can apply the learned practical knowledge to solve elementary problems of linear algebra.	The student can apply the learned practical knowledge to solve various problems of linear algebra.	The student can independently identify the problem and use the right method to solve various problems of linear algebra.
EU3	The student can not apply the learned practical knowledge to solve elementary problems of probability calculus.	The student can apply the learned practical knowledge to solve elementary problems of l probability calculus.	The student can apply the learned practical knowledge to solve various problems of probability calculus.	The student can independently identify the problem and use the right method to solve various problems of probability calculus.
EU4	The student can not apply the learned practical knowledge to solve elementary problems of linear programming.	The student can apply the learned practical knowledge to solve elementary problems of linear programming.	The student can apply the learned practical knowledge to solve various problems of linear programming.	The student can independently identify the problem and use the right method to solve various problems of linear programming.

ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE

1. Information where presentation of classes, instruction, subjects of seminars can be found, etc. - information is presented to students during classes
2. Information on the place where the classes take place - information available on the website of the Faculty of Management
3. Information on the date of classes (day of the week/hour) - information available on the website of the Faculty of Management.
4. Information on consultation hours (hours + place) - given to students during the first classes, information available on the website of the Faculty of Management