

ITEM CARD

Attachment No. 1 into Regulation No 3/07/2020
of 13 July 2020 *on the model card*
subject at the Higher School of Management
in Warsaw

I. GENERAL BASIC INFORMATION ABOUT THE SUBJECT (MODULE)										
ITEM NAME MATHEMATICS / Maths										
Name of the organizational unit leading the course:		Faculty of Management and Technical Sciences								
Name of the field of study, level of education:		Management I degree								
Learning profile:		General academic								
Name of the specialty:		-								
Type of learning module:		Primary								
Year/Semester:		And year/sem. And								
Person coordinating the subject:		Prof. Jan Rusinek								
Prerequisites (resulting from the succession of items):		Mathematical knowledge at the secondary school level								
II. FORMS OF CLASSES AND NUMBER OF HOURS										
	Lecture	Exercise	Seminar	Laboratory	Workshop	Project	Seminar	Consultation	Exam/Passing	Total hours
Full-time studies	36	30								66
Part-time studies	30	15								45
III. METHODS OF TEACHING ACTIVITIES										
Forms of classes			Didactic methods							
Lecture			Oral form of lecture, presentation of materials on the projector, solving examples at the blackboard							
Practiceda			Presentation of materials on the projector, solving examples at the blackboard, homework at the board. Presentation and analysis of solved tasks, work in groups. Solving tasks with the help of a computer.							
IV. OBJECTIVE LEARNING OUTCOMES IN RELATION TO LEARNING OUTCOMES FOR THE FIELD OF STUDY AND AREAS										
Lp.	Description of the learning outcomes in question								Directional effect reference	
Knowledge:										
1	Knows and understands in depth the applications of differential and integral calculus, the elements of matrix calculus and its application								P6S_WG Z01_W01, Z01_W11	
Abilities:										
1	The student is able to build a mathematical model of selected economic problems								P6S_UW P6S_UK Z01_U01, Z01_U06, Z01_U09,	

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2	The student can set boundaries of the most important strings	P6S_UW P6S_UK Z01_U01, Z01_U06, Z01_U09,
3	The student is able to use differential and integral calculus and matrix calculus to solve problems	P6S_UW P6S_UK Z01_U01, Z01_U06, Z01_U09,
Social competences:		
1	The student is ready to educate themselves and expand their knowledge of mathematics and appreciates the importance of mathematics in management and quality sciences	P6S_KK Z01_K01
V. CURRICULAR CONTENT (LEARNING)		
Lp.	Lecture:	Reference to the learning outcomes in question
1	Preliminary concepts. Elements of mathematical logic and calculus of sets.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
2	Functions, ascending and descending functions, elementary functions (linear, quadratic, polynomial, power function, exponential and logarithmic functions, trigonometric functions, examples of problems leading to specific functions.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
3	Sequences, arithmetic and geometric sequences (simple and compound percentage), boundaries of basic sequences.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, , Z01_U09, Z01_K01,
4	Continuous functions, continuity of elementary functions, Darboux property of continuous functions, approximate solving of equations (including market equilibrium equations).	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01, Z01_K02
5	Derivative of functions, geometric, physical and economic interpretation of the derivative, flexibility of functions, derivatives of elementary functions, accounting formulas, derivatives of higher orders.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01, Z01_K02

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6	Application of calculus. Determination of local extremes, determination of the value of the largest and smallest function in the interval, determination of the monotonicity intervals of functions, study of convexity and concavity of functions, sketching graphs of functions.	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
7	Elements of calculus. Indefinite integral and marked. Accounting formulas (integration by parts and by substitution), interpretations of the integral.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
8	Elements of matrix calculus. Actions on matrices, determinant of the square matrix, inverse matrix. Solving systems of linear equations, model of Leontief inputs and results.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
9	Multivariable functions. Partial derivatives, determination of the largest and smallest value of functions of many variables, method of least squares.	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
Lp.	Exercises/workshops:	Reference to the learning outcomes in question
1	Preliminary concepts. Elements of mathematical logic and calculus of sets.	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
2	Functions, ascending and descending functions, elementary functions (linear, quadratic, polynomial, power function, exponential and logarithmic functions, trigonometric functions, examples of problems leading to specific functions.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
3	Sequences, arithmetic and geometric sequences (simple and compound percentage), boundaries of basic sequences.	Z01_W01, Z01_W11 Z01_U01, Z01_U06, Z01_U09,
4	Continuous functions, continuity of elementary functions, Darboux property of continuous functions, approximate solving of equations (including market equilibrium equations).	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
5	Derivative of functions, geometric, physical and economic interpretation of the derivative, flexibility of functions, derivatives of elementary functions, accounting formulas, derivatives of higher orders.	Z01_W01, Z01_W11

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		Z01_U01, Z01_U06, Z01_U09, Z01_K01,
6	Application of calculus. Determination of local extremes, determination of the value of the largest and smallest function in the interval, determination of the monotonicity intervals of functions, study of convexity and concavity of functions, sketching graphs of functions.	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
7	Elements of calculus. Indefinite integral and marked. Accounting formulas (integration by parts and by substitution), interpretations of the integral.	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
8	Elements of matrix calculus. Actions on matrices, determinant of the square matrix, inverse matrix. Solving systems of linear equations, model of Leontief inputs and results.	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,
9	Multivariable functions. Partial derivatives, determination of the largest and smallest value of functions of many variables, method of least squares.	Z01_W01 Z01_W11 Z01_U01, Z01_U06, Z01_U09, Z01_K01,

VI. METHODS OF ASSESSMENT OF LEARNING OUTCOMES

Learning outcomes	Verification method	Form of classes in which EUS is verified (Learning outcome)
Knowledge:		
Z01_W01, Z01_W11	Written test, final papers, checking knowledge "at the board" when solving tasks.	Lecture, exercises
Abilities:		
Z01_U01, Z01_U06, Z01_U09,	Written test, final papers, checking knowledge "at the board" when solving tasks.	Lecture, exercises
Social competences:		
Z01_K01,	Discussions during lectures and exercises.	Lecture, exercises

VII. CRITERIA FOR ASSESSING ACHIEVED LEARNING OUTCOMES

Learning outcomes	Unsatisfactory assessment	Grade range 3.0-3.5	Grade range 4.0-4.5	Very good rating
	The student does not know and does not understand/cannot/is not	The student knows and understands / can / is ready:	The student knows and understands / can / is ready:	The student knows and understands / can / is ready:

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	ready:			
For each of the learning outcomes identified for the Knowledge, Skills and Competences module	The student obtains less than 50% max. the number of points for a given effect	The student gets from 50 to 59% max. the number of points for a given effect on a grade of 3 and The student gets from 60 to 69% max. the number of points for a given effect per grade 3.5	The student gets from 70 to 79% max. the number of points for a given effect per grade 4, and The student obtains from 80 to 89% max. the number of points for a given effect per rating 4.5	The student obtains more than 89% max. the number of points for a given effect

VIII. STUDENT'S WORKLOAD – NUMBER OF HOURS AND BALANCE OF ECTS CREDITS

Type of activity ECTS	Student load	
	Studies Stationary	Part-time studies
Participation in didactic activities (lectures, exercises, tutorials, project, laboratories, workshops, seminars) – SUM of hours – from point II	66	45
Exam/Passing		
Participation in the consultation	4	2
Project / Essay	5	18
Independent preparation for didactic classes	25	30
Preparing to pass a teaching class	25	30
Total student workload (25h = 1 ECTS) TOTAL hours/ECTS	5 ECTS credit/ 125 h	5 ECTS credit/ 125 h
Student load in classes in direct contact with the teacher	66	45
Student load in practical classes		
Student load in practical vocational preparation classes		
Student load in research preparation classes		

IX. LITERATURE AND OTHER DIDACTIC MATERIALS

Basic literature:

1. Mathematics. Textbook for students of economics (ebook), Dorota Pekasiewicz University of Lodz Press 2018

Supplementary literature:

1. A. Chiang, "Fundamentals of Mathematical Economics", Warsaw University of Technology 1994.
2. J. Piszczala, "Mathematics and its application in economic sciences". Poznań University of Economics Press, 1995
3. J. Rusinek, "Mathematics for management students", 2007. Edition 2 corrected and supplemented – electronic version :<http://www.rusinek.wsm.warszawa.pl/zarzadzanieI/sxp.pdf>
4. "Mathematics for extramural and evening economic studies" collective work, Ofic. Ed. Warsaw School of Economics 1999.

Other teaching materials:

<http://www.rusinek.wsm.warszawa.pl/zarzadzanieI/przyegzmat.pdf> – sample exam in mathematics