

## 4. Mathematics

<b>1. Module Title</b>	<b>Mathematics</b>	<b>2. Module Code</b>	
<b>3. Academic Year, Semester, Module Status</b>	2021-2022 Fall semester, Full-time		
<b>4. Aims and Learning Outcomes</b>	The goal of this course is to make students familiar with basic mathematical tools used in economy and business. Topics include sets, functions of one and several variables, matrix algebra, introduction to the derivative and integral. Some basic connections with economics will be presented, e.g. the production function, the logistic function, the Leontief input-output model, consumer surplus, etc.		
<b>Knowledge</b>	<b>Effect Code</b>		<b>Assessment</b>
	<b>Subject</b>	<b>Field</b>	
1. Utilize economic applications of the derivative such as marginal analysis and elasticity of demand.		K_W02	Two in-class exams.
2. Apply the concept of the definite and indefinite integral, have mastered basic techniques of integration such as substitution and integration by parts.		K_W04	Two in-class exams.
<b>Skills</b>	<b>Effect Code</b>		<b>Assessment</b>
	<b>Subject</b>	<b>Field</b>	
1. Perform matrix operations, reduce matrices to row echelon form, solve systems of linear equations, use the Leontief input-output model to solve managerial problems.		K_U02	Two in-class exams and final project.
2. Utilize functions, continuity and limit, sketch graphs of elementary functions, such as polynomial, trigonometric and exponential functions.		K_U03	Two in-class exams and final project.
3. Calculate the derivatives of a function, geometric and physical interpretations of the derivative, calculate and apply derivatives to find extreme points.		K_U05	Two in-class exams and final project.
4. Utilize the notions of a partial derivative of a function of several variables, gradient, level curves, extreme points and constrained extreme points.		K_U04	Two in-class exams and final project.
<b>Social Competencies</b>	<b>Effect Code</b>		<b>Assessment</b>
	<b>Subject</b>	<b>Field</b>	
1. Recognise the role of mathematics in personal, social and global issues relating to everyday life.		K_K01	Final project.
<b>5. Module Coordinator</b>	<b>Name</b>		<b>E-mail</b>
	dr Krzysztof Beck		beckkrzysztof@gmail.com

<b>6. Lecturer</b>	<b>Name</b>	<b>E-mail</b>	
	dr Krzysztof Beck	beckkrzysztof@gmail.com	
	mgr Deepanshu Lakhwan	lakhwandeeepanshu@gmail.com	
<b>7. Module Level</b>	<b>Masters</b>	<b>Bachelors</b>	
		x	
<b>8. Year and Programme</b>	<b>Year</b>	<b>Programme</b>	
	1	BA in Management	
<b>9. Module Content</b>			
<b>#</b>	<b>Topics Discussed</b>	<b>Hours</b>	
<b>Seminar</b>			
1.	Basic logics, sets	2h	
2.	Matrix algebra and systems of linear equations	10h	
3.	Functions, limits, and continuity	5h	
4.	Derivative of a function of one and several variables, and its connection with extreme points	9h	
5.	Introduction to integration	4h	
<b>Workshop</b>			
1.	Basic logics, sets	2h	
2.	Matrix algebra and systems of linear equations	10h	
3.	Functions, limits, and continuity	5h	
4.	Derivative of a function of one and several variables, and its connection with extreme points	9h	
5.	Introduction to integration	4h	
<b>10. Individual Student's Work</b>			
<b>#</b>	<b>Description</b>	<b>Hours</b>	
	Solving problem at home.	50	
<b>11. Assessment Methods</b>	Coursework (100%): 1. two in-class exams (each worth 30%), 2. final project (40%).		
<b>12. Assessment Criteria</b>	In order to pass the course student should score at least grade 3.0 (50%) as the total grade for semester. Scoring translates into grades as follows: 50 - 59 points - grade 3 60 - 69 points - grade 3.5 70 - 79 points - grade 4 80 - 89 points - grade 4.5 90 - 98 points - grade 5 98-100 points - grade 5.5 In the case of exceptional student achievements, the lecturer can award a 5.5 mark with fewer points.		
<b>13. ECTS Credits</b>	5		
		<b>Hours</b>	<b>ECTS</b>
<b>Contact Hours</b>			
	Workshop	30	1,2

	Seminar	30	1,2
	Consultation	15	0,6
	<b>Other Kind of Student's Activity</b>		
	Individual Student's Work	50	2
	<b>SUMM</b>	125	5
<b>14. Required Readings</b>	1. Chiang, K. Wainwright <i>Fundamental Methods of Mathematical Economics</i> McGraw-Hill, 4th Edition (2005)		
<b>15. Recommended Readings</b>	1. S. Warner, S. R. Costenoble <i>Finite Mathematics and Applied Calculus</i> Cengage Learning, 7th edition (2017)		
<b>16. Place where module is run</b>	LU campus		
<b>17. Other</b>			