Basic information about the subject (independent of the cycle)

Module name	**Mathematics for economics**
Erasmus code	
ISCED code	
Language of instruction	English
Website	http://ekonomia.kampus.umcs.lublin.pl
Prerequisites	High school course in mathematics.
ECTS points hour equivalents	Contact hours (work with an academic teacher) Total number of hours with an academic teacher: **30h** Number of ECTS points with an academic teacher: 2ECTS Non-contact hours (students' own work) Total number of non-contact hours: 60h Number of ECTS points for non-contact hours: 4 ECTS Total number of ECTS points for the module: **6 ECTS**
Verification methods	Essay, paper, classroom activities, classroom discussion.
Description	This course is an important part of the undergraduate stage in education for future economists. It's also useful for graduate students who would like to gain knowledge and skills in an important part of math. It gives students skills for implementation of the mathematical knowledge and expertise to the problems of economics. Its prerequisites are both the knowledge of the single variable calculus and the foundations of linear algebra including operations on matrices and the general theory of systems of simultaneous equations. Some knowledge of vector spaces would be beneficial for a student. The course covers several variable calculus, both constrained and unconstrained optimization. The course is aimed at teaching students to master comparative statics problems, optimization problems using the acquired mathematical tools. Home assignments will be provided on a weekly basis. The objective of the course is to acquire the students' knowledge in the field of mathematics and to make them ready to analyze simulated as well as real economic situations. Students learn how to use and apply mathematics by working with concrete examples and exercises. Moreover this course is aimed at showing what constitutes a solid proof. The ability to present proofs can be trained and improved and in that respect the course is helpful. It will be shown

	that math is not reduced just to “cookbook recipes”. On the contrary the deep knowledge of math concepts helps to understand real life situations.
Reading list	Any good book in mathematics should be useful. Our main reference will be 1. Hoy, M., Livernois, J., McKenna, C., Rees, R., & Stengos, T. (2011). *Mathematics for economics*. MIT press.

A list of topics	1. The basics of the set theory. Functions in Rn 2. Differentiation 3. Implicit Function Theorems and their applications. 4. Unconstrained and constrained optimization. 5. Matrix
Educational outcomes	Having successfully completed this module you will be able to: • Solve unconstrained optimization problems involving functions of single and multiple variables. • Solve simultaneous equations. • Use the Lagrange multiplier method to solve constrained optimization problems involving functions of single and multiple variables. • Distinguish the types of stationary points. • Perform basic integration. • Calculate arc and point elasticity. • Solve problems involving variables that discretely and continuously grow over time, and compute present discounted values, future compounded values, and rates of growth. • Manipulate exponential and logarithmic functions and solve problems involving such functions. • Perform basic matrix operations, including addition and subtraction, scalar multiplication, matrix multiplication, and transposition. • Find the inverse of a matrix.
Teaching methods	Lectures including multimodal presentations, Case studies, Work in computer laboratories Mathematics learned through reading the book, hearing the lectures, and doing the homework. If a student is not doing the reading, then he is more likely to have more difficulty following and comprehending the lectures.

Assessment methods	1. **General requirements:** Students are requested to complete required readings and prepare for lectures before attending. Three hours of outside self-study is recommended for each hour of class and counseling time. 2. **Lecture attendance:** Students have to arrive on time to class, stay the entirety of the class and keep absences to a minimum. I expect to be informed beforehand if you need to miss a class. To encourage this policy, a student who is not present in class more than one time will not be grade for course based on "collection of the points" but based on final exam. 3. **Counseling:** Individual or small group volunteer access to the lecture. It is the responsibility of the student to seek help and ask questions when concepts presented in lecture or the textbook are not clear. However, if the student encounters the decline in scores, a counseling meeting may be initiated by the lecturer. 4. **Exams:** A series of short exercises are required to make up the total course grade – only for the students who attended the classes (one absence is acceptable). These exercises would be available for students during the whole course: lecture and e-learning module. Student collects the points which will be given for solving exercises, and at the end of course an appropriate grade would be given. Grades for course are setup according to the following scale: **Points** / **Grade** Below 50 / 2.0 / F (Fail) 50 - 60 / 3.0 / E (Sufficient) 61 - 70 / 3.5 / D (Satisfactory) 71 - 80 / 4.0 / C (Good) 81 - 90 / 4.5 / B (Very good) 91 - 100 / 5/ A (Excellent) Students who fail to collect a sufficient number of points or for those who has more than one absence, can attempt one time to pass that exam (counseling meetings), however there will be no "makeup" of exams if students receive grade 3.0 / E (Sufficient) or higher. Cheating is not acceptable in any form. Any evidence of cheating in exams will lead to annulling the grade and disciplinary procedure. Exams may include material from all reading assignments, all lectures, and all assignments. Grades for exam are setup according to the following scale:

%	Grade
Below 50	2.0 / F (Fail)
50 - 60	3.0 / E (Sufficient)
61 - 70	3.5 / D (Satisfactory)
71 - 80	4.0 / C (Good)
81 - 90	4.5 / B (Very good)
91 - 100	5.0 / A (Excellent)

Student who gets 2.0 (Fail) as finale course grade can attempt two times to pass the extra final exam, but there will be no makeup of that exam if student receive grade 3.0 (Sufficient) or higher.

If student is not present for an exam, the missed grade will be dropped from the averaging process. If student miss in excess of one exam, a grade of 2.0 will be recorded for the second missed exam and averaged into the final grade.

5. **Course changes:** This course syllabus provides a general plan for the course. The instructor reserves the right to make changes to the syllabus; including: assignments (projects), timetable, and examinations, etc., in order to accommodate the needs of the class as a whole and fulfill the goals and objectives of the course. If changes are necessitated during the term of the course, the instructor will immediately notify students of such changes by e-mail communication and/or announcement in class.