Mathematics

Signature
110491-0803

Lecturer
PhD Rafał Łochowski

Course type
Obligatory course

Contact hours

<table>
<thead>
<tr>
<th></th>
<th>Stationary</th>
<th>Sat. - Sun.</th>
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<tbody>
<tr>
<td>Total:</td>
<td>75</td>
<td>40</td>
</tr>
<tr>
<td>Lecture</td>
<td>30</td>
<td>16</td>
</tr>
<tr>
<td>Classes</td>
<td>45</td>
<td>24</td>
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Syllabus
The course "Mathematics" is given in the first semester of undergraduate studies and comprises of lectures and recitations.

Students are assumed to possess mathematical background at the level required at the Polish Matura Mathematics Examination at Extended Level.

The curriculum of "Mathematics" covers univariate function theory, basics of differential and integral calculus as well as selected topics in linear algebra and bivariate functions.

The purpose of the course
The course provides fundamental mathematical knowledge and skills necessary to study modern economics, statistics and econometrics and other subjects requiring rigorous economical approach based on optimizing decision process.

Selection criteria
Application order

Final grade
Traditional (written form) exam
100% (=30 points)
+ max. 13% (= 4 points) of additional points obtained from colloquia
16 – 18 points dst (satisfactory)
19 – 21 points dst+
22 – 24 points db (good)  
25 – 27 points db+  
28 – 30 points bdb (very good)  

100% (= 30 points)  
(need to pass to be allowed to take the exam)  
Two colloquia, each for 30 points, then divided by two.  
16 – 18 points dst (satisfactory)  
19 – 21 points dst+  
22 – 24 points db (good)  
25 – 27 points db+  
28 – 30 points bdb (very good)

Basic textbooks  
Stewart James: Calculus Early Transcendentals, 2011, Brooks/Cole, Belmont CA,USA;  
Howard Anton, Chris Rorres: Elementary Linear Algebra with Suplemental Applications, 2010, Clarence Center Inc, Denver MA.

Additional textbooks  

Publications of the lecturer related to the content of the course  

Course plan  
1 Sequences. Arithmetic and geometric sequences. Partial sum of arithmetic and geometric series.  
2 Sequence limits. Factorials. The number e.  
Vertical and horizontal asymptotes.  
5 Monotonicity and extrema of a differentiable function. Computing local and global extrema.  
Colloquium (Test) (November 23rd or November 30th)  
7 Indefinite integral, basic integral calculus formulas.
8 Definite integral and area.

9 Vectors and linear combinations of vectors.
   Linear dependence and independence of vectors. Equations of line and plane.


   Cofactors and inverse matrices. Cramer's rule.

12 Linear system. Row elementary operations - equivalent matrices. Solving linear system by elementary operations.
   General solutions. Basis solutions.

   Colloquium (Test) (probable date - January 11th 2017)

13 Functions of two variables. Domains and level curves. First order partial derivatives.

14 Second order partial derivatives. Local extrema.

Exam

Course outcomes

Knowledge: To see real life (for example in engineering and economics) applications of derivatives, integrals and systems of linear equations.

Skills: To use derivatives, integrals and systems of linear equations in simple applied problems.

Competences: Discovery of relations among physical or economic variables.