Methodology basics sub-module
ECTS range: 29
Courses: 1) Learning and research methodology; 2) Business Communication; 3) Calculus; 4) Applied mathematics; 5) Business informatics; 6) Business statistics

(3.) Course: Calculus	**ECTS: 5**
Compulsory	
Ratio of theory – practice, %: 50-50%	
Type of lesson: lecture / seminar and number of lessons in semester of teaching: 30+30 ***Language of instruction: English*** **Specific techniques or methods in teaching** (if any e.g. specific software): Excel, Geogebra, Online tools: https://www.mathxplain.com	
Type of examination and course mark: colloquium Further methods of examination or mid/end term testing (e.g. project works): mid term examination	
Semester: 1	
Preconditions of the course: -	

Description of course content:

Objectives:
To Understand the basics of Calculus (Real Analysis), definitions, terminologies like, sequences, series, limits of it's; differentiate, integrate and limits of univariate and bivariate real functions. Referring on related real (economical, financial) file problems.
The modeling process we follow: to create the mathematical model of a real file problem, to solve it by the aid of some computer tool, to interpret the solution we got, and to implement it for the real file problem, transposing the results into practice.
The teaching process we implement: at the theoretical (presentation) lessons we not only introduce the definitions, terminologies, but we even illustrate, visualize the concepts. For the solution we use simple, free, available but dynamic, general, proper computer tools (Excel, Geogebra).
The practical lessons are in computer labs, where students can use either computer tools or handy calculation techniques to solve the problems of their own. We try to take advantage of the dynamics.

Brief content: sequences, limits of sequences; series, sum of series; real functions; elementary functions, properties of functions; limits at finite points and at infinity; definition of derivative, sump, analysis of real functions by the aid of differential computation; further applications of differential calculations (like: tangent of a curve and Bernoulli L'Hospital rule); indefinite and definite integral, fundamental theorem of calculus; applications of integral calculus; definition of bivariate functions, partial derivatives and extreme values of its'.

Compulsory and recommended literatures (2-5 pieces) with full bibliography

Compulsory literature:
Michael Range What is Calculus? From Simple Algebra to Deep Analysis, 2015, ISBN: 978-981-4644-48-8
Recommended literature:
http://www-math.mit.edu/~djk/calculus_beginners/ (07 June 2018)
https://www.khanacademy.org/math/differential-calculus (07 June 2018)
http://www.understandingcalculus.com/ (07 June 2018)

Elements of Student Requirement System (KKK) that the course contributes to:

a) **knowledge**
- The students can possess elementary mathematical analysis methods.
- They have an overview of the most important theoretical approaches.

b) **skills**
- Using the learned techniques, methodologies, students can explore contexts, analyze relationships, formulate conclusions.

c) **attitude**
- To show problem-sensitive attitude, to reach high quality work process, results.
- Constantly striving for self-education, knowledge, and updating knowledge.

d) **autonomy**
- Capable for independent work (methodology, selection of the proper technique, data,- collection, systematization, analysis, evaluation)

Course leader: Eleonóra Stettner PhD, associate professor