

## Mathematics I(B) (F000110)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 4.0**

**Study time 120 h**

**Course offerings and teaching methods in academic year 2023-2024**

A (semester 2)

Dutch

Gent

lecture

seminar

**Lecturers in academic year 2023-2024**

Cornelis, Chris

WE02

lecturer-in-charge

**Offered in the following programmes in 2023-2024**

[Bachelor of Science in Business Economics](#)

4

A

[Bachelor of Science in Business Engineering](#)

4

A

[Bachelor of Science in Economics](#)

4

A

[Bachelor of Science in Economics, Business Economics and Business Engineering \(Joint Section\)](#)

4

A

[Linking Course Master of Science in Business Economics](#)

4

A

[Linking Course Master of Science in Economics](#)

4

A

[Preparatory Course Master of Science in Business Economics](#)

4

A

[Preparatory Course Master of Science in Economics](#)

4

A

**Teaching languages**

Dutch

**Keywords**

Mathematics, analysis, algebra

**Position of the course**

The aim of this course is to give the student a deeper understanding and knowledge of the mathematical concepts that are necessary to work with realistic economic models.

On the one hand, mathematical techniques are systematically developed; on the other hand much attention is paid to mathematical ideas and intuition, to a thorough understanding of the theory, and to methodical and logical thinking.

These skills are important for the successful application of mathematical knowledge to problems arising in economics or statistics.

**Contents**

The mathematical concepts being considered are partly a repetition of those subjects studied in the Secondary School, or they are a continuation of them.

The contents is a logical continuation of Mathematics I(A). The subjects are motivated by examples coming from economic models.

The following topics are treated:

- Behaviour of functions: extreme values, concavity, applications in economics (optimisation).
- Integral calculus and applications.
- Series: infinite series, power series.
- Linear algebra: linear models in economics, sets of linear equations, matrices,

input-output matrices, determinants.

### **Initial competences**

The student can understand and use mathematical language and can analyse mathematical information using schemes and structures.

The student can use knowledge, understanding and skills acquired in mathematics for exploring, formulating and explaining problems and practical applications from reality.

The student has a basic knowledge of numbers, elementary algebra, real functions and geometry as listed in the final objectives of Secondary Education.

The student has a thorough theoretical and practical knowledge of real analysis, in particular of: elementary functions in mathematics and economics, limits, derivatives and elasticity.

### **Final competences**

- 1 He/she can think methodically and logically, can analyse and synthesise problems.
- 2 The student has a thorough theoretical and practical knowledge of linear algebra and real analysis, in particular of: function analysis, optimisation problems, integrals, infinite series and their applications.
- 3 He/she can translate an economics problem into a mathematical problem, can approach this quantitatively and/or graphically and solve it.
- 4 The student can work with mathematical techniques, has understanding of mathematical concepts and proofs, can represent functional relations graphically, analyse and interpret them, and when appropriate use a calculator.
- 5 He/she can mathematically deduce properties of functions and linear models from economics.

### **Conditions for credit contract**

Access to this course unit via a credit contract is unrestricted: the student takes into consideration the conditions mentioned in 'Starting Competences'

### **Conditions for exam contract**

Access to this course unit via an exam contract is unrestricted

### **Teaching methods**

Seminar, Lecture

### **Extra information on the teaching methods**

Theory: lectures. Exercise classes: with individual coaching.

Use of Ufora for the distribution of study and documentation material.

### **Learning materials and price**

Lecture notes and solved exercises are available (together for Mathematics I(A) and I(B): 12 euro). Cost: 12 EUR

### **References**

- SIMON C.P. and BLUME L., Mathematics for economists, W.W. Norton, New York, 1994.
- HOY M. et al, Mathematics for Economics, Addison-Wesley, New York, 1996.
- HAEUSSLER E.F. and PAUL R.S., Introductory Mathematical Analysis, Prentice Hall, New Jersey, 1999.

### **Course content-related study coaching**

During the lectures, the necessary coaching is given for the understanding of the material, and the lecturer is always available for additional explanations. In the lectures, questions testing insight in the theory are used, giving rise to discussion forums. During exercise classes specific training is given by an assistant in order to develop mathematical skills and techniques. Students can contact assistants and the monitor for additional training. The following documents are made available through Ufora: slides of the lectures, questions testing the understanding, preparatory and extra exercises (differentiated according to schooling) with solutions, examples of exam questions.

### **Assessment moments**

end-of-term assessment

**Examination methods in case of periodic assessment during the first examination period**

Written assessment with open-ended questions

**Examination methods in case of periodic assessment during the second examination period**

Written assessment with open-ended questions

**Examination methods in case of permanent assessment**

**Possibilities of retake in case of permanent assessment**

not applicable

**Extra information on the examination methods**

Theory: written examination, during which the insight in mathematical concepts is assessed. During the theory exam, the reproduction of lecture material is not requested, but the understanding of derivations, graphs and arguments is assessed. Also the vertical understanding (interconnections and relations between various methods) is being tested.

Exercises: written examination, during which the use of mathematical techniques and the application of the new material to economics problems is tested.

**Calculation of the examination mark**