Course Specifications
Valid in the academic year 2018-2019

Mathematics 2: Differential and Integral Calculus (I001829)

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>180 h</td>
<td>72.0 h</td>
</tr>
</tbody>
</table>

Course offerings and teaching methods in academic year 2018-2019

A (semester 2) Dutch

- Lecture: 32.5 h
- Seminar: practical PC room classes: 6.25 h
- Seminar: coached exercises: 33.75 h

Lecturers in academic year 2018-2019

Baetens, Jan LA26 lecturer-in-charge
Waegeman, Willem LA26 co-lecturer

Offered in the following programmes in 2018-2019

<table>
<thead>
<tr>
<th>Programme</th>
<th>crds</th>
<th>offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Agricultural Sciences)</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Cell and Gene Biotechnology)</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Chemistry and Food Technology)</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Environmental Technology)</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Land and Forest Management)</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Joint Section Bachelor of Science in Bio-Engineering</td>
<td>6</td>
<td>A</td>
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</tbody>
</table>

Teaching languages

Dutch

Keywords

Sets, continuity, limits, functions, exponential, logarithmic, (inverse) trigonometric and hyperbolic functions, differentiation, integration, (power) series, Taylor series, single variable calculus, multivariable calculus, extremum problems, multiple integrals, polar, cylindrical and spherical coordinates, Mathematica, MATLAB

Position of the course

This course provides the students with the tools and techniques that are needed to approach and solve engineering problems and to understand, analyse and describe biological, natural and productions processes. Such a solid mathematical background is needed in engineering disciplines, and is surely pervaded by differential and integral calculus. The focus of this course will be on problem solving and a sound theoretical underpinning of the presented techniques, concepts and methods will be provided. Given the growing complexity of engineering problems and the omnipresence of computers, the students will also be introduced to numerical and symbolical calculations in MATLAB and Mathematica, respectively.

Contents

Sets, functions, continuity and limits, elementary functions (exponential, logarithmic, (inverse) trigonometric and hyperbolic), differentiation, graphical behavior of functions, integration, (power) series, Taylor series, parametric curves, functions of several variables, extremum problems, polar, cylindrical and spherical coordinates, double integrals, triple integrals, line and contour integrals

Initial competences
Final competences of secondary school or equivalent.

**Advises:** required subjects in the curricula ‘Mathematics’ of the officially recognized educational networks in Flanders for programmes with at least 6 hours of mathematics training per week in the last two years of the secondary school program are recommended.

Final competences

1. Have insight into the mathematical, geometric and physical meaning of functions of one and several variables, (power) series, polar, cylindrical and spherical coordinates, multiple integrals, line and contour integrals, parametric curves.
2. Being able to use functions of one and several variables, (power) series, polar, cylindrical and spherical coordinates, multiple integrals, line and contour integrals, parametric curve.
3. Master basic mathematical concepts such as limits, derivatives, integrals, and so on.
4. Being able to make a correct reasoning and to write it down in a structured way.
5. Being able to formulate correctly and with mathematical precision.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment.

Conditions for exam contract

This course unit cannot be taken via an exam contract.

Teaching methods

- Lecture, seminar: coached exercises, seminar: practical PC room classes

Extra information on the teaching methods

During the lectures important concepts and properties are introduced, which form the starting point for solving problems during the seminars.

Learning materials and price

- Lecture notes with worked examples and exercises or a customized book

References

- Hartman, G., Siemers, T., Heinold, B., Chalishajar, D., Bowen, J., APEX Calculus

Course content-related study coaching

The lecturer answers questions concerning the theory upon appointment and before and after the lectures, the teaching assistants are available for questions related to the exercises and practical sessions, interactive support via Minerva.

Evaluation methods

- End-of-term evaluation

Examination methods in case of periodic evaluation during the first examination period

- Written examination

Examination methods in case of periodic evaluation during the second examination period

- Written examination

Examination methods in case of permanent evaluation

- Written examination

Possibilities of retake in case of permanent evaluation

- Not applicable

Extra information on the examination methods

The exam consists of exercises and questions of a more theoretical nature.

Calculation of the examination mark

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.