Course Specifications
Valid in the academic year 2018-2019

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time (h)</th>
<th>Contact hrs (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>170</td>
<td>60.0</td>
</tr>
</tbody>
</table>

Course offerings and teaching methods in academic year 2018-2019

A (semester 1) Dutch
- Lecture: 30.0 h
- Seminar: practical PC room classes: 6.0 h
- Seminar: coached exercises: 24.0 h

Lecturers in academic year 2018-2019

Baetens, Jan LA26 lecturer-in-charge

Offered in the following programmes in 2018-2019

<table>
<thead>
<tr>
<th>Offered</th>
<th>Credits</th>
<th>Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Horticulture)</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Plant and Animal Production)</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Tropical Plant Production)</td>
<td>6</td>
<td>A</td>
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<tr>
<td>Linking Course Master of Science in Biochemical Engineering Technology</td>
<td>6</td>
<td>A</td>
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<tr>
<td>Linking Course Master of Science in Bioscience Engineering Technology: Food Industry</td>
<td>6</td>
<td>A</td>
</tr>
</tbody>
</table>

Teaching languages
Dutch

Keywords
Sets, vectors, functions, continuity and limits, differentiation, integration, (power) series, Taylor series, single variable calculus, multivariable calculus, multiple integrals, 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 production 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 from a practical point of view, though a 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 Python and Mathematica, respectively. Theorems will be stated, but proofs will be omitted.

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, polar coordinates, multiple integrals

Initial competences
Final competences of secondary school or equivalent.

(Approved)
Advis: required subjects in the curricula ‘Mathematics’ of the officially recognized educational networks in Flanders for programmes with at least 4 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 vectors, functions of one and several variables, (power) series, polar coordinates, multiple integrals and parametric curves
2. Being able to use vectors, functions of one and several variables, (power) series, polar coordinates, multiple integrals and parametric curves
3. Master basic mathematical concepts such as limits, derivatives, and so on
4. Being able to follow a reasoning correctly and act accordingly
5. Being able to work 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

References
Hartman, G., Siemers, T., Heinold, B., Chalishajar, D., Bowen, J., APEX Calculus; R. Adams and C. Essex, Calculus, a complete course

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 and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period
Written examination with open questions

Examination methods in case of permanent evaluation
Written examination with open questions

Possibilities of retake in case of permanent evaluation
examination during the second examination period is not possible

Extra information on the examination methods
The exam consists of exercises and questions of a more theoretical nature.

(Approved)
Calculation of the examination mark

The final mark is calculated as a weighted average of the marks obtained through the period aligned and non-period aligned evaluations, with weighting coefficients of \( \frac{3}{4} \) and \( \frac{1}{4} \), respectively. Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.