GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Computer Project Mathematics (C003552)

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

Credits 4.0 **Study time 100 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 1)	Dutch	Gent	seminar

Lecturers in academic year 2024-2025

De Medts, Tom	WE01	lecturer-in-charge

Offered in the following programmes in 2024-2025	**crdts**	**offering**
Bachelor of Science in Mathematics	4	A

Teaching languages

Dutch

Keywords

Computer skills, computer algebra, communicative skills, mathematical reporting

Position of the course

ICT and computer algebra packages are part of a mathematical education. Information on mathematics is distributed by, for instance, ICT and computer algebra packages are being used as a tool for analysing and solving mathematical problems. In our society, communicative skills play an important role. The objectives of this course consist of making the students acquainted with ICT and with computer algebra packages, and in imparting to them the necessary written and oral communicative skills. In particular, the following objectives are aimed at:

1 Acquiring computer skills with on the one hand special attention to mathematical calculations, and on the other hand to mathematical word processing;
2 Learning to think about and to analyse, with a critical mind, problems of a mathematical nature;
3 Learning to write in a concise and orderly manner a report on a mathematical topic, to make slides for a presentation and to present it orally.

Contents

1 Introduction to a computer algebra package (Sage).
2 Introduction to mathematical word processing (LaTeX), including the beamer package for presentations.
3 Supervised exercises.
4 Team projects resulting in Sage worksheets which have to be handed in, and an individual project resulting in a LaTeX report and a beamer presentation.

Initial competences

As far as the mathematics is concerned, needed to solve the problems treated in the practicum mathematics, there are no particular prerequisites. The mathematical problems are either very elementary or come from the first semester of the first year Bachelor Mathematics.
Also with respect to the word processor LaTeX, there are no specific prerequisites. This is presented from scratch.

Final competences

1 The students are able to solve problems in a concise way using a computer algebra package.
2 The students have been taught to analyse a mathematical problem, to draw up a correct method to solve the problem using a computer algebra package, and to

implement this method in a correct way using this package.
3 The lectures are designed in such a way that the students also have been taught to acquaint themselves as quickly as possible with a computer algebra package, and how to write a report on their projects using a mathematical word processor.
4 These experiences will enable them to get acquainted as quickly as possible with other computer algebra packages and to apply computer algebra in the remainder of the education.

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

Seminar

Extra information on the teaching methods

Theoretical introduction, followed by individual and team work (exercises and projects) on PC. Use of the website of the course and of the electronic learning platform Ufora to make the students get acquainted with the use of ICT.

Study material

Type: Software

Name: LaTeX
Indicative price: Free or paid by faculty
Optional: no
Available on Athena : No
Online Available : Yes
Available in the Library : No
Available through Student Association : No
Usability and Lifetime within the Course Unit : intensive
Usability and Lifetime within the Study Programme : intensive
Usability and Lifetime after the Study Programme : intensive

Type: Software

Name: Sage
Indicative price: Free or paid by faculty
Optional: no
Available on Athena : No
Online Available : Yes
Available in the Library : No
Available through Student Association : No
Usability and Lifetime within the Course Unit : intensive
Usability and Lifetime within the Study Programme : regularly
Usability and Lifetime after the Study Programme : regularly

References

Donald Knuth, The TeX book. Addison Wesley.
R. Smedinga, LaTeX cursus (University of Groningen, The Netherlands).
P. Zimmermann et al., Calcul mathématique avec Sage, http://sagebook.gforge.inria.fr, 2010.
C. Finch, Sage Beginner's Guide, Packt Publishing, 2011.

Course content-related study coaching

The lectures take place in PC-rooms. It is always possible for the students to contact the lecturer and assistant(s) responsible for this course for extra supervision.
After the evaluation of the Sage projects, the students get brief individual feedback.

Assessment moments

end-of-term and continuous assessment

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

Oral assessment

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

Oral assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

Permanent evaluation: the finished Sage project and LaTeX text are evaluated to see to which extent the students are able to study mathematical problems and solve them using the computer and to write a report about the work they have done.
Periodical evaluation: the exam consists of an oral presentation of one of the projects or of another mathematical subject using slides made by the student. The evaluation considers the contents and the form of the presentation and the communicative skills of the students.
In case of a fail, the student can retake the exam in the second exam period with a new Sage project and/or new LaTeX text. The student can also decide to keep the score of the permanent evaluation and only redo the periodical evaluation.

Calculation of the examination mark

60% permanent evaluation (3 points LaTeX text, 9 points Sage project) + 40% periodical evaluation (3 points form, 5 points presentation and content). However, the student has to obtain at least 50% on each of these two parts separately (NPE, PE) in order to be able to pass this course. If this criterion is not met but the student would have obtained a score of 10/20 or higher, then the score is reduced to 9/20.