GHENT UNIVERSITY

Course Specifications

From the academic year 2021-2022 up to and including the academic year

Capita Selecta in Incidence Geometry (C004399)

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

Credits 6.0 **Study time 180 h** **Contact hrs** 45.0h

Course offerings and teaching methods in academic year 2022-2023

null

Lecturers in academic year 2022-2023

Thas, Koen	WE01	lecturer-in-charge

Offered in the following programmes in 2022-2023	**crdts**	**offering**
null		

Teaching languages

English, Dutch

Keywords

Incidence geometry, synthetic geometry, geometries and groups

Position of the course

This course is an optional course within the master studies mathematics. The course "Projective geometry" from the bachelor studies mathematics, and the courses "Polar spaces" and Galois geometry from the master studies mathematics form the direct preparation to this course.
The aim of this course is to get the students acquainted with recent developments in Incidence geometry. Emphasis is also put on the acquisition of geometrical intuition and insight for the master student.

Contents

Continuously, progress is made within Incidence geometry. This course discusses specific topics from these research areas. The selected topics play an important role within Incidence geometry and are topics for which great progress has been made in recent years.
The topics will be selected among, but not restricted to, generalized polygons, polar spaces, Tits-buildings, partial geometries and other point-line geometries, geometric group modules, and finally field theory and algebraic geometry related to incidence geometries.

Initial competences

Having successfully attended the course "Projective geometry" from the bachelor studies mathematics, and "Galois geometry and/or "Polar spaces" from the master studies mathematics, or having acquired the requested starting competences in an other way

Final competences

1 Apply specialized knowledge within Incidence geometry in an innovative way.
2 Demonstrate deep insight in the most recent developments within Incidence geometry.
3 Critically consider and reflect on Incidence geometry.
4 Select and apply the adequate methods for an advanced mathematical problem within Incidence geometry.
5 Express openness for new scientific developments within Incidence geometry.
6 Independently understand, develop and critically evaluate logical reasonings.
7 Approach and generalize problems within Incidence geometry on the required level.

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

Online lecture, Lecture, Online seminar: coached exercises, Seminar: coached exercises

Extra information on the teaching methods

Theory and exercises are presented during the lectures, and the students also have to make exercises, under supervision of the assistant.
If 2 or less students are registered for the course, the course will be taught online.
Theory and exercises: because of COVID19, alternative didactic methods can be used when this is necessary.

Learning materials and price

Cost: 10.0 EUR.
A syllabus is available to the students for some parts of the course.

References

- F. Buekenhout (Editor), Handbook of Incidence Geometry, Elsevier, Amsterdam, 1995.
- J.W.P. Hirschfeld, Projective Geometries over Finite Fields, Oxford University Press, Oxford, 1998.
- J.W.P. Hirschfeld, Finite Projective Spaces of Three Dimensions, Oxford UniversityPress, Oxford, 1985.
- D.R. Hughes and F.C. Piper, Projective Planes, Springer-Verlag, Berlin, 1973.
- S.E. Payne and J.A. Thas, Finite Generalized Quadrangles, Pitman, Boston, 1984.
- J.A. Thas, K. Thas and H. Van Maldeghem, Translation Generalized Quadrangles, Singapore, 2006.
- K. Thas, A Course on Elation Quadrangles, EMS Publishing house, Zürich, 2012.
- K. Thas (ed.), Absolute Geometry and $\mathbf{F}_1$-Geometry, EMS Publishing house, Zürich, 2016.
- H. Van Maldeghem, Generalized Polygons, Birkhäuser, Basel, 1998.

Course content-related study coaching

It is always possible for the students to contact the lecturer and the assistant with questions regarding the theory and exercises, and with questions regarding other problems on the discussed topics.
We will also make use of the electronic learning environment Ufora to obtain an optimal communication with the students.

Assessment moments

end-of-term assessment

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

Oral examination, Open book examination

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

Oral examination, Open book examination

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Oral exam with written preparation. During the exam, general and more specific detailed questions are asked to evaluate the students' insight in the presented topics.
COVID19 measures can imply that the exam is a completely written exam.

Calculation of the examination mark

Theory and exercises both count for 50% of the total number of points.