

Module Guide

24-M-GT-AG2 Algebraic Geometry 2

Fakultät für Mathematik

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This module guide reflects the current state and is subject to change. Up-to-date information and the latest version of this document can be found online via the page

<https://ekvv.uni-bielefeld.de/sinfo/publ/modul/533557594>

The current and valid provisions in the module guide are binding and further specify the subject-related regulations (German "FsB") published in the Official Announcements of Bielefeld University.

24-M-GT-AG2 Algebraic Geometry 2

Faculty

Fakultät für Mathematik

Person responsible for module

Herr Prof. Dr. Eike Lau

Herr Prof. Dr. Michael Spieß

Herr Prof. Dr. Charles Vial

Regular cycle (beginning)

Every winter semester

Credit points

10 Credit points

Competencies

Non-official translation of the module descriptions. Only the German version is legally binding.

Students master advanced content and methods of Algebraic Geometry, in particular they can independently carry out very complex proofs in this area requiring a higher level of mathematical expertise. They are able to define central concepts of the theory (e.g. sheaf cohomology, derived functors, flat and smooth morphisms) and apply them in context. Students know leading examples of the theory and can use these examples to illustrate concepts and theorems.

Students will be introduced to current research questions in the area of Algebraic Geometry. They are able to recognise and assess further development opportunities and research goals.

Furthermore, students recognise further-reaching connections to mathematical issues that have already been worked out. They can transfer and apply the knowledge and methods they have learnt so far to deeper mathematical problem areas. Students also expand their mathematical intuition as a result of more intensive study.

In combination with other in-depth modules, they will be able to write their own research papers, e.g. a master's thesis in the field of Algebraic Geometry.

In the tutorials, students develop their ability to discuss mathematical topics and thus further prepare themselves for the requirements of the Master's module, in particular for the scientific discussion within the Master's seminar presentation and the defence of their Master's thesis.

Content of teaching

The following advanced content of teaching from the field of Algebraic Geometry is compulsory:

- Sheaf cohomology
- derived functors
- flat and smooth morphisms

This module prepares the content of a master's thesis.

Recommended previous knowledge

Solid basic knowledge of algebraic geometry, as taught in Algebraic Geometry 1 (module 24-M-GT-AG1) is expected; knowledge of algebraic topology and homological algebra is also helpful.

Necessary requirements

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Explanation regarding the elements of the module

Module structure: 1 SL, 1 bPr ¹

Courses

Title	Type	Regular cycle	Workload ⁵	LP ²
Lecture Algebraic Geometry 2	lecture	WiSe	60 h (60 + 0)	2 [Pr]
Tutorials Algebraic Geometry 2	exercise	WiSe	90 h (30 + 60)	3 [SL]

Study requirements

Allocated examiner	Workload	LP ²
<p>Teaching staff of the course Tutorials Algebraic Geometry 2 (exercise)</p> <p><i>Regular completion of the exercises, each with a recognisable solution approach, as well as participation in the exercise groups for the module's lecture. As a rule, participation in the exercise group includes presenting solutions to exercises twice after being asked to do so as well as regular contributions to the scientific discussion in the exercise group, for example in the form of comments and questions on the proposed solutions presented. The organiser may replace some of the exercises with face-to-face exercises.</i></p>	see above	see above

Examinations

Allocated examiner	Type	Weighting	Workload	LP ²
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Teaching staff of the course Lecture Algebraic Geometry 2 (lecture) <i>(electronic) written examination in presence of usually 120 minutes, oral examination in presence or remote of usually 40 minutes, A remote electronic written examination is not permitted.</i>	e-Klausur o. Klausur o. mündliche e-Prüfung o. mündliche Prüfung	1	150h	5
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Legend

- 1 The module structure displays the required number of study requirements and examinations.
 - 2 LP is the short form for credit points.
 - 3 The figures in this column are the specialist semesters in which it is recommended to start the module. Depending on the individual study schedule, entirely different courses of study are possible and advisable.
 - 4 Explanations on mandatory option: "Obligation" means: This module is mandatory for the course of the studies; "Optional obligation" means: This module belongs to a number of modules available for selection under certain circumstances. This is more precisely regulated by the "Subject-related regulations" (see navigation).
 - 5 Workload (contact time + self-study)
- SoSe** Summer semester
- WiSe** Winter semester
- SL** study requirement
- Pr** Examination
- bPr** Number of examinations with grades
- uPr** Number of examinations without grades