



The Hebrew University of Jerusalem

Syllabus

Advanced topics in Geometry - 80671

Last update 28-10-2024

HU Credits: 4

Degree/Cycle: 2nd degree (Master)

Responsible Department: Mathematics

Academic year: 0

Semester: 1st Semester

Teaching Languages: English

Campus: E. Safra

Course/Module Coordinator: Dr. Yoel Groman

Coordinator Email: ygroman@gmail.com

Coordinator Office Hours:

Teaching Staff:

Dr. Yoel Groman

Course/Module description:

Almost toric methods in algebraic and symplectic geometry

Course/Module aims:

Aquire the tools of toric, almost toric and tropical geometry, and exposure to advanced topics at their meeting point

Learning outcomes - On successful completion of this module, students should be able to:

- 1. Investigate the topology of manifolds described by polynomial equations.*
- 2. Generate examples and phenomena in algebraic geometry*

Attendance requirements(%):

Teaching arrangement and method of instruction:

Course/Module Content:

- 1. A quick review of basics of algebraic geometry*
- 2. Lattices, fans and polytopes*
- 3. Toric algebraic geometry*
- 4. Toric symplectic geometry*
- 5. Integral affine geometry*
- 6. Almost toric fibrations*
- 7. Advanced topics (depending on time and preferences): Tropical geometry, exotic Lagrangians and Markov triples, Newton Okounkov bodies, toric degeneration, mirror symmetry for log Calabi-Yau surfaces, cusp singularities and Looijenga's conjecture*

Required Reading:

No required reading

Additional Reading Material:

Grading Scheme:

Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 100 %

Additional information:

Brief assignments will be handed out from time time. These will determine the grade.