



# MAT 536: Fall 2010

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## Welcome to MAT 536

MAT 536, "Algebra III" is a graduate level topics course; we will be studying Homogeneous Dynamics and their applications to Number Theory.

For more information, please select *General information* link in the menu to the left.

## Announcements

Announcements are listed in reverse chronological order: most recent announcement at the top.

**08/28/10**

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## General Information

**Place and time:** TuTh 12:50pm- 2:10pm, Physics P124

**Professor:** [Alex Kontorovich](#)

**Course description:** We will study dynamics of group actions on homogeneous spaces with applications to number theory, the end goal being (time permitting) Margulis's proof of the Oppenheim Conjecture. Along the way, we will encounter the following topics (developing each from scratch, and studying them just enough to gather the tools necessary for Oppenheim, while indicating a more general theory):

- Hyperbolic Geometry, Locally Symmetric Spaces, Tangent Bundles, Geodesic and Horocycle Flows
- Basic Ergodic Theory
- Unitary Representations of Semisimple Lie Groups, Howe-Moore Decay of Matrix Coefficients
- Equidistribution, Applications to Lattice Point Counting

**Textbook:** Bekka & Mayer, "Ergodic Theory and Topological Dynamics of Group Actions on Homogeneous Spaces", LMS Lecture Note Series 269, Cambridge, 2000.

**Grades policy:** The final grade will be based on the homeworks, class participation, and take home final exam.

**Office Hours:** TuTh 11:00am- 12:00pm, 3-120 Math Tower

### Information for students with disabilities

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or <http://studentaffairs.stonybrook.edu/dss/>. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:  
<http://www.sunysb.edu/ehs/fire/disabilities.shtml>



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## Syllabus

Date	Section	Comments
08/31	Intro	
9/02	II.1	
9/07	II.2	
9/09	No class	University Closed
9/14	II.2	
9/16	II.2	
9/21	I.1	
9/23	I.1 / I.2	
9/28	I.3	
9/30	II.3	
10/05	III.1	
10/07	III.3	
10/12	III.3	
10/14	I.2/I.3	
10/19	I.3/IV.1	
10/21	IV.2	

10/26	IV.2	
10/28	NO CLASS	
11/02	IV.2	
11/04	IV.3	
11/09	IV.3	
11/11	IV.4	
11/16	IV.4	
11/18	NO CLASS	
11/23	IV.4/Equidistribution	
11/25	No class	Thanksgiving
11/30	Equidistribution	See Venkatesh, " <a href="#">Sparse Equidistribution...</a> " <b>Annals Math 2010</b>
12/02	Equidistribution	See Strombergsson, " <a href="#">On Uniform Equidistribution...</a> " <b>Duke Math 2004</b>
12/07	VI.1/VI.2	
12/09	Ratner's Theorems	See David Witte Morris's book " <a href="#">Ratner's Theorems on Unipotent Flows</a> " 2005



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## Exams

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