MATH 542 TOPICS IN ADVANCED TOPOLOGY–ARITHMETIC OF HYPERBOLIC MANIFOLDS

Instructor information:

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Course Information:

Class meets: 1:00PM - 1:50PM MWF in HBH 423

Office hours: Tuesday, Thursday: 11–12

Course objectives:

This class will study arithmetic aspects of hyperbolic manifolds. This will largely be confined to finite volume hyperbolic manifolds in dimensions 2 and 3, but if time allows a discussion of higher dimensions will be given.

Associated to any finite volume hyperbolic 2 or 3-manifold M is a pair (AM, kM) which consists of a quaternion algebra AM over a field kM which is an invariant of the commensurability class. In particular, in dimension 3, kM is a number field, and algebraic and arithmetic invariants of this field and algebra are powerful tools in the study hyperbolic 3-manifolds. The main aim of this course is to develop this. In the special setting of arithmetic hyperbolic 3-manifolds (and 2-manifolds) this pair underpins much of the geometric, topological and spectral properties of the manifold.

There is no set text book.

Occasional HW sheets will be given out for self-study and group discussion. These are not to be handed in.

There will be no exams.

Pre-requisites: *The graduate topology and algebra courses, some number theory would be helpful, but not absolutely necessary.*

Grades: *Students are required to attend lectures, your grade is completely determined by attendance. In order to get an A, you must miss* ≤ 5 *lectures. If you miss* $6-8$ *lectures, you get a B. If you miss* $9-12$ *lectures, you get a C. If you miss more than* 12 *lectures, you get an F.*

Disability Support:*Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All discussions will remain as confidential as possible. Students with disabilities will also need to contact the Disability Support Services Office in the Ley Student Center.*