



UNIVERSITÀ DEGLI STUDI DI TORINO

Dipartimento di Matematica “Giuseppe Peano”  
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## LECTURE SERIES ON TORIC VARIETIES AND MODULAR FORMS

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ABSTRACT: Toric varieties give a way to describe geometric properties using combinatorics. This feature has led to many concrete examples and constructions in algebraic geometry. Exploiting this, it is possible to connect them to one of the most important notions in mathematics: modular forms. From number theory to geometry, modular forms are present in many areas in mathematics, pointing to surprising and deep insights difficult to see otherwise. In the late 1990s, Borisov and Gunnells introduced the notion of toric modular forms. They are constructed from simple data on toric varieties. In this mini lecture series, our aim is to understand this concept and use it to explicitly write down equations of modular curves. For this, we will start by recalling the basic theory in toric geometry and modular forms. Then we will proceed to the concept of toric modular forms and the application at the end.

There will be four lectures:

**Lecture 1. Monday 27th November 14:30-16:30 - Room S**  
Introduction and modular forms.

**Lecture 2. Tuesday 28th November 14:30-16:30 - Room S**  
Basics of toric varieties.

**Lecture 3. Wednesday 29th November 14:30-16:30 - Room S**  
Toric modular forms I.

**Lecture 4. Thursday 30th November 9:30-11:30 - Room S**  
Toric modular forms II.

This course will be self-contained and assumes elementary knowledge in complex analysis and algebraic geometry.

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