Title: Modular Forms

Basic Details:
- Core Audience: pure mathematics (any year)
- Course Format: extended (10 hours at 2 hours per week)

Course Description:
- Syllabus: Modular forms are holomorphic functions on the complex upper half-plane satisfying certain transformation properties with respect to subgroups of $\text{SL}_2(\mathbb{Z})$. They play an important role in many areas of mathematics, especially number theory. The course will provide an introduction to the theory, with the main topics being:
  1. The basics (congruence subgroups and modular forms, examples including Eisenstein series)
  2. Elliptic curves (as abelian groups, complex tori and algebraic curves)
  3. Modular curves (as Riemann surfaces and as moduli spaces for elliptic curves)
  4. Hecke operators (double coset operators on modular forms, diagonalization and eigenforms)
  5. L-functions (functional equation, L-functions of eigenforms and elliptic curves)
- Prerequisites: Basic abstract algebra (groups, rings, modules), complex analysis and topology.

Format:
- No of problem sheets: 4
- Lecture/discussion split (hours of each): 8/2

Lecturer Details:
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