Announcement for Fall 2016

681 Topics in Algebra
Modular Forms

Classical modular forms are functions on the complex upper-half plane that transform in a certain way under the action of a discrete subgroup \( \Gamma \) of \( \text{SL}(2, \mathbb{Z}) \). Such functions are relevant in various areas as number theory, geometry, moonshine and mathematical physics. For example, functions on Riemann surfaces are modular and the famous monstrous moonshine is about the modular functions on genus zero Riemann surfaces.

Most of the lecture will be an introduction to the theory of modular forms covering modular forms for \( \text{SL}(2, \mathbb{Z}) \) and its congruence subgroups; Hecke operators; the Weil representation and holomorphic Jacobi forms. Depending on interest, as last part, I can cover modern parts of the theory as e.g. mock modular forms.

This course is suitable for any mathematics graduate student and should not only be interesting for those in algebra. Some knowledge in complex analysis and group theory is surely helpful. Please let me know (my office is 573 and my email is creutzig@ualberta.ca) if you have any questions or concerns.

I plan to write lecture notes which will follow one of the many excellent textbooks. For example: Koblitz, Introduction to Elliptic Curves and Modular Forms.