Abstract:

Ergodic theory deals with a particular type of measure-preserving transformation on a probability space, and are mostly used in the study of dynamical systems. On the other hand, continued fractions are just a way to represent any real number as an infinite/finite sequence of integers such that this sequence when written as a 'fraction' gives this real number. In this talk, I shall set up the preliminaries of ergodic theory and state the ergodic theorem that we shall need, and then move on to define some notions in continued fractions, and then bridge these two seemingly unrelated subjects. The main application would be to find out the rate of convergence of these 'fractions' to the real number, and thereby coming across some interesting constants like the Khinchin's constant and the Lvy's constant. The talk will not require any prerequisites except for being familiar with the notion of a measure space, which again, is not too necessary. If time permits, I shall just mention some interesting patterns observed in the continued fraction expansion of e and its 1/n and 2/n th power, or give an idea how working with the continued fraction of √n is helpful in finding all the solutions of the Pell's equations, i.e. \( x^2 - ny^2 = 1 \) (or -1).