LTCC Proposed Course

Title: Harmonic analysis and number theory

Basic Details:

- Core Audience (1st yr or 2nd/3rd yr: pure, app. or stats): PhD students in any year with interests in analysis or number theory
- Course Format (**Extended**: 5 x 2hr lectures) 5 x 2hr lectures

Course Description:

- **Keywords**: Keywords: Exponential sums, Gauss circle problem, Weyl's criterion, equidistribution, lattice points

- **Syllabus**:

  I. Exponential sums and lattice point problems
  a) The Gauss circle problem
  b) Van der Corput's method

  II. Sequences modulo 1 and Weyl's equidistribution criterion
  a) Equidistribution of sequences modulo 1
  b) The Erdos-Turan inequality and discrepancy
  d) Applications
  i*) Polynomials p(n) modulo 1

  III. Further select topics and applications
  a*) The large sieve and least quadratic non-residue
  b*) Equidistribution of roots of polynomials modulo n

  * This is an indication only of potential topics.
  ** More subjects might be added at the end

- **Recommended reading:** Montgomery ''Ten Lectures on the Interface Between Analytic Number Theory and Harmonic Analysis''

- **Additional Optional reading:** Iwaniec and Kowalski ``Analytic Number Theory'', Chapters 4, 7, 8, 21

Format:

- No of discussion/problem sheets: 1 without solutions
- Handwritten notes will be provided
- Necessary support facilities: we need multiple large boards (at least 5 meters in length)

Lecturer Details:

- Lecturer: Stephen Lester and Igor Wigman
- Lecturer home institution: KCL
- Lecturer e-mail: steve.lester@kcl.ac.uk, igor.wigman@kcl.ac.uk