

# LTCC Proposed Course

- Title: Distributions, Fourier Transforms and Microlocal Analysis
- Basic Details:
  - Core Audience: 1st year, pure
  - Course Format: extended (10 hours at 2 hours per week)
- Course Description:
  - Keywords:  
Fourier transform, tempered distributions, singularities, pseudodifferential operators
  - Syllabus:
    - the Schwartz spaces  $\mathcal{S}(\mathbb{R}^n)$  and  $\mathcal{S}'(\mathbb{R}^n)$ ;
    - definition of the Fourier transform and its basic properties;
    - the Schwartz kernel theorem;
    - oscillatory integrals and pseudodifferential operators in  $\mathbb{R}^n$ ;
    - composition formula for pseudodifferential operators;
    - elliptic operators and their parametrices (approximate inverses);
    - singularities and wave front sets of functions and distributions;
    - the elliptic regularity theorem.
  - Recommended reading:  
M. Shubin, *Pseudodifferential Operators and Spectral Theory*, Springer-Verlag, 1987.
  - Additional Optional reading:  
M. Taylor, *Pseudodifferential operators*, Princeton Univ. Press, Princeton, New Jersey, 1981.
  - Prerequisites:  
functions of several real variables, partial derivatives, Riemann integrals and their basic properties.
- Format:
  - No of discussion/problem sheets: 4
  - Electronic lecture notes: <http://www.mth.kcl.ac.uk/~Eysafarov/Lectures/bath.pdf>
  - Necessary support facilities: blackboard or whiteboard, overhead or data projector
  - Necessary software requirements for computing facilities: none
  - Proposed timing: autumn 2012
  - Lecture/computer session/tutorial/discussion split (hours of each): 8 / 0 / 2 / 0 /
- Lecturer Details:
  - Lecturer: Yuri Safarov
  - Lecturer home institution: King's College London
  - Lecturer e-mail: [yuri.safarov@kcl.ac.uk](mailto:yuri.safarov@kcl.ac.uk)
  - Lecturer telephone number: 020 78482215