

## The LTCC

The LTCC fosters the training of doctoral research students in the Mathematical Sciences. Its courses cover the areas of Statistics, Applied Mathematics and Pure Mathematics, with the goals of providing students with an overview of these areas, and of acquiring a working knowledge of classical results and recent developments in their own broad research fields but outside the specialised domains of their individual research projects. There is a wide range of expertise among the staff of the institutions currently in the LTCC consortium: UCL, Queen Mary, Imperial College (Statistics), King's College, LSE, City, Kent, Brunel and Royal Holloway (Statistics).

The LTCC programme, which is supported UK Engineering and Physical Science Research Council, emphasises direct teaching and personal contact rather than distance learning. The programme includes modular lecture courses and short intensive courses.

LTCC lectures take place at De Morgan House, which is located on the south side of Russell Square, within walking distance of Euston Station, and Russell Square, Holborn and Euston Square tube stations. A detailed map is available on the LTCC website.

**LTCC  
De Morgan House  
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## Advanced courses 2011-2012

**for PhD students in the  
mathematical sciences**

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**LTCC**

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**London Taught Course Centre**

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## Advanced Courses 2011–12

**October 3 – October 31**

### **Model Theory**

*Dr I. Tomašić, QMUL*

An introduction to model theory with a view to the recent spectacular applications of logic in number theory and Diophantine geometry.

**November 7 – December 5**

### **Statistical Mechanics**

*Professor C. Beck, QMUL*

An introduction to the formalism of statistical mechanics as applied complex systems. Topics include generalized versions of statistical mechanics and the connection with the theory of dynamical systems.

### **Environmental Flows**

*Dr M. Davey, UCL*

Simplified mathematical models of some large-scale atmospheric and oceanic flow features will be presented, using geophysical fluid dynamics.

### **Constant Mean Curvature**

*Dr G. Tinaglia, KCL*

The course will examine the theory of constant mean curvature surfaces, focusing on three classical theorems: Hopf's Theorem, Alexandrov's Theorem and Barbosa-Do Carmo's Theorem.

All lectures take place at De Morgan House

### **Topological Arakelov Theory**

*Professor F.E.A. Johnson*

We consider the topological description of varieties which fibre over a complex curve with fibre a quasi projective variety and compare this with the group theoretic analysis of the corresponding extension of fundamental groups

### **Industrial Mathematics**

*Drs R. Leese and D. Allright, KTN*

This will be an interesting and up to date course on the subject, for which a full description should be on the website shortly. **Please note that this course will take place on 24 November and 1 December at 11.00–17.00.**

**January 16 – February 13**

### **Advanced Computational Methods in Statistics**

*Dr A. Gandy, Imperial*

This course surveys some advanced computational methods in statistics, including parallel computing, variance reduction techniques, (stochastic) optimization, MCMC, perfect sampling, bootstrapping and particle filtering.

### **Complex Analysis**

*Professor R. Halburd, UCL*

The course will cover the value distribution of meromorphic functions (Nevanlinna theory), special functions in the complex domain, the monodromy group and an introduction to Riemann-Hilbert problems.

### **Inverse Problems**

*Professor S. Arridge, UCL*

This course will introduce the mathematical theory of inverse problems. We will draw upon approaches to multi-dimensional inverse problems, particularly the Boundary Control method, and apply them to one-dimensional inverse problems.

**February 20 – March 19**

### **Distribution and Fourier Transforms**

*Professor Y. Safarov, KCL*

The course will introduce students to the modern technique of microlocal analysis. It will cover such topics as Fourier transform, Schwartz distribution, pseudodifferential operators, and will discuss some applications to partial differential equations.

### **Introduction to Semiparametric Modelling**

*Dr C. Lam, LSE*

The course introduces the solid theories and practical usage of several important semiparametric modelling techniques, with examples given throughout the course. Statistical inference and the fitting of different type of models in practice, including generalized additive mixed or varying coefficient model, will be considered.

### **Solid Mechanics, Including Elastic Wave Propagation**

*Professor J. Kaplunov, Brunel*

The course deals with the basics of Solid Mechanics with the focus on asymptotic modelling of dynamic phenomena in elastic media.

### **Statistical Pattern Recognition**

*Dr G. Montana, Imperial*

The lectures will focus on feature extraction, dimensionality reduction, data clustering and pattern classification and state-of-art approaches such as support vector machines and ensemble learning methods. Real-world applications will illustrate how the techniques are applied to real data sets.

**Please note that this course will take place on the 12, 19 and 26 March and 2 April at 15.30–17.30.**

Further information, full text syllabi, registration form, and timetables are available online: <http://www.ltcc.ac.uk> or contact us for further enquiries.