**Title:** Potential Theory

**Basic Details:**
- Core Audience: Pure
- Course Format: Basic (10h)

**Course Description:**
- Potential theory has its roots in Newtonian Physics and has grown into a diverse part of analysis with rich applications. It is broadly concerned with the study of harmonic functions, that is, the solutions of Laplace’s equation. This is a course designed to give a flavour of potential theory and some of its applications in approximation theory and complex dynamics, focussing on the simple but illustrative two-dimensional case.
- Keywords: harmonic functions, subharmonic functions, potentials, polar sets, Dirichlet problem, Green’s function, capacity, transfinite diameter
- Syllabus:
  1. Harmonic functions: basic properties, maximum principle, mean-value property, positive harmonic functions, Harnack’s Theorem
  2. Subharmonic functions: maximum principle, local integrability
  3. Potentials, polar sets, equilibrium measures
  4. Dirichlet problem, harmonic measure, Green’s function
  5. Capacity, transfinite diameter, Bernstein-Walsh Theorem
- Recommended reading:
- Additional/Optional reading:
- Prerequisites: basic real and complex analysis; rudiments of measure theory are desirable, but not essential and can be provided during the course if necessary

**Format:**
- No of discussion/problem sheets: 4
- Electronic lecture notes will be available on the course web-site
- Necessary support facilities: blackboard, OHP, data projector
- Necessary software requirements for computing facilities: none
- Proposed timing: late spring 2011
- Lecture/computer session/tutorial/discussion split: formally 10/0/0/0, but time will be set aside in each 2-hour slot to allow for discussions in class if necessary

**Lecturer Details:**
- Lecturer: Oscar Bandtlow
- Lecturer home institution: QMUL
- Lecturer e-mail: o.bandtlow@qmul.ac.uk
- Lecturer telephone number: 020 7882 5438