

LTCC Basic Course

Title: Symmetric Functions

Basic Details:

- Core Audience: pure mathematics, 1st yr (although suitable for 2nd/3rd yr)
- Course Format (**Extended**: 5 x 2hr lectures)

Course Description:

- Keywords: symmetric polynomials, algebraic combinatorics, bases, Schur functions, Young tableaux.
- Syllabus: Symmetric functions (symmetric polynomials in infinitely many variables) are a central pillar of algebraic combinatorics, not just because of their beautiful combinatorics but also because of their importance in other areas of pure mathematics. We will begin by introducing the standard bases, with Schur functions and their Littlewood–Richardson coefficients as a focus. Highlights will include the RSK correspondence, the Murnaghan–Nakayama rule, and chromatic symmetric functions.
- Recommended reading: Richard P. Stanley, Enumerative Combinatorics, Volume 2, Chapter 7 (any edition)
- Additional Optional reading:
William Fulton, Young Tableaux
Ian G Macdonald, Symmetric Functions and Hall Polynomials, Chapter 1
Bruce E. Sagan, The Symmetric Group
- Prerequisites: Undergraduate abstract algebra and linear algebra

Format:

- 4 weekly problem/discussion sheets
- Electronic notes and specific references in the Stanley reading will be provided

Lecturer Details:

- Lecturer: Peter McNamara
- Lecturer home institution: QMUL and Bucknell University
- Lecturer email: peter.mcnamara@bucknell.edu