

## LTCC Proposed Course

**Title: Cohomology of groups**

**Basic Details:**

- Core Audience: 2/3<sup>rd</sup> year Pure; (1<sup>st</sup> year depending on background)
- Course Format: extended

**Course Description:**

- Keywords: Cohomology of a group, Classifying spaces, Cohomological finiteness conditions

**Syllabus:** Group cohomology is an area of mathematics relying on a rich interaction between algebra and topology. In this course we will introduce some important concepts in group cohomology using both algebraic and topological methods. In particular, we shall cover:

- Definition of group cohomology via free resolutions (necessary background in homological algebra will be introduced).
- Topological interpretation, group presentations, the presentation-2-complex, Eilenberg-Mac Lane spaces
- Cohomological finiteness conditions: cohomological dimension, groups of type FP, groups of type F
- Morse theoretic methods to study finiteness conditions
- If time permits: R. Thompson's groups and their finiteness conditions.

**Recommended reading:** - K.S. Brown "Cohomology of groups" Springer Graduate Texts in Mathematics 87

**Additional reading:** R. Geoghegan, "Topological Methods in Group Theory" Springer Graduate Texts in Mathematics 243

**Prerequisites:** Basic Group Theory, some background in homological algebra or algebraic topology helpful

**Format:**

- 4 discussion/problem sheets
- Summary lecture notes will be provided
- Necessary support facilities: large board
- Proposed timing: Term one
- 10 hours of lectures (problem sheets will be discussed during the lectures)

**Lecturer Details:**

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