

## School of Chemistry

### Aims and Objectives: Session 2022-2023

#### Module CH3612: Synthetic Methodology

**Duration:** 15 hours + 1 x 2 hour workshops

**Lecturers:** Dr C. P. Johnston and Professor N. J. Westwood\*

(\*Module Convenor)

**Aims:** To provide an extensive review of well-established methods in organic synthesis. A detailed understanding of sulfur, phosphorus, boron, silicon and transition metal chemistry will be developed. The further development of skills in understanding and describing reaction mechanisms forms a central part of this course.

**Objectives:** It is hoped that on completion of this course a student will have an appreciation of the following:

1. The chemistry of organosulfur, organophosphorus, organoboron and organosilicon compounds including their synthesis and use in a variety of chemical transformations.
2. General reactivity trends for these 4 classes of compounds as well as examples of their role in specific/named reactions.
3. The reactivity of the s-block and reactive transition metal organometallic reagents and how both protecting groups and directing groups are used to expand their utility in synthesis; An understanding of the chemoselectivity of deprotonations of heteroatom-functionalised aromatics with alkyl lithium reagents.
4. The reactions used to prepare organo-s-block compounds, organozincs, organocuprates and organo-boronic acids, and their reactivity with functional groups including Weinreb amides, acid chlorides, nitriles and other carbonyl derivatives.
5. Methods to predict the stereochemistry of attack of organometallics with chiral ketones including the Felkin-Anh model.
6. The reaction mechanisms and applications of the Kumada / Negishi / Suzuki / Stille, amination and Sonogashira coupling reactions.
7. The reactivity and synthetic applications of the Heck Reactions in synthesis.
8. The synthetic applications of Ru (or W) catalysed Ring Closing Metathesis.