

## School of Chemistry

### Aims and Objectives: Session 2023-2024, Semester 2

#### Module CH1402: Inorganic and Physical Chemistry 1

**Course Title:** Inorganic Solids

**Duration:** 6 lectures

**Lecturer:** Dr J. L. Payne

**Aims:** To become familiar with some of the basic concepts of solid-state chemistry. To introduce the different types of chemical bonding in solids, structural and synthetic aspects of solids and the reasons for the formation of amorphous and crystalline solids. To become familiar with the basics of symmetry in the solid-state, including the concepts of close-packing, the crystal lattice and unit cell.

**Objectives:**

1. **Introduction** – Overview of the different types of bonding in solids – ionic, covalent and other interactions.
2. **Why Solids Form** – Amorphous versus crystalline solids. Energetics of formation: Born-Haber cycle. The Ionic Model.
3. **The Structure of Solids** – Close-packing of metallic crystals. Unit cell and crystal lattice. Relationship of atomic radius to unit cell: calculation of densities of crystals. Imperfections in crystals - defects.
4. **The Synthesis of Solids** – Differences between solid-state and solution state reactions.