

## School of Chemistry

### Aims and Objectives: Session 2023-2024, Semester 1

#### Module CH3514: Physical Inorganic Chemistry

**Course Title:** Inorganic Spectroscopy

**Duration:** 8 hours

**Lecturer:** Dr B. E. Bode

**Aims:** To highlight useful spectroscopic methods for structure elucidation in inorganic chemistry.

**Objectives:**

1. To survey different spectroscopic methods and their application for determining structure and composition of small inorganic molecules and coordination complexes.
2. To survey several aspects of the use of NMR spectroscopy for structure determination in molecular inorganic chemistry:
  - a. Monoisotopic spin  $\frac{1}{2}$  nuclei (e.g.  $^{19}\text{F}$ ,  $^{31}\text{P}$ )
  - b. Isotopologues involving spin  $\frac{1}{2}$  nuclei (e.g.  $^{29}\text{Si}$ ,  $^{129}\text{Xe}$ )
  - c. NMR of and coupling to quadrupolar nuclei (e.g.  $^{11}\text{B}$ )
  - d. The effects of dynamics, quadrupolar relaxation and paramagnetic relaxation.
3. To introduce EPR spectroscopy and survey several aspects of its use for determination of electronic and molecular structure in molecular inorganic chemistry:
  - a. Acquisition and representation of spectra
  - b. Hyperfine couplings and  $g$ -values
  - c. Anisotropic spectra in solids.