School of Chemistry

Aims and Objectives: Session 2022-2023

Module CH5711: Advanced Spectroscopic Methods

Duration: 20 hours

Lecturers: Professor C. J. Baddeley and Dr G. Haehner*

(*Module Convenor)

Aims: This course describes the importance of more advanced spectroscopic methods for the elucidation of structure and properties of increasingly complex molecules and materials. Particular attention will be paid to techniques which have opened up new dimensions in the frequency and time domains and, thus, in the understanding of chemical reactions and material properties.

Objectives:

1. To learn about particles (atoms, ions, electrons) and photons as spectroscopic tools.

2. To appreciate the opportunities presented by high intensity, polarised and monochromatic radiation over a wide range of photon energies for the characterisation of chemical and biological materials.

3. To understand what a synchrotron is and to appreciate its unique characteristics for spectroscopic applications.

4. To learn about the basics of nonlinear optical techniques as versatile tools to study gases, liquids, condensed matter, and interfaces.

5. To understand the measurement of processes occurring down to ultra-short time-scales.

6. To understand the importance and opportunities presented by the combination of spectroscopy with microscopy for the study of matter down to the nanoscale.