

School of Chemistry

Aims and Objectives: Session 2023-2024, Semester 1

Module CH3621/CH3622/CH3623: Organic Chemistry Laboratory

Duration: 100 hours (Laboratory time)

Staff: Dr R. A. Aitken, Dr N. S. Keddie, Dr R. J. Pearson, Dr I. A. Smellie* and Dr C. M. Young.

(*Co-ordinator)

Aims: To gain experience of planning and conducting procedures in preparative organic chemistry. To be able to successfully plan, carry out a preparation, isolation, purification and fully characterise the product(s) by physical and spectroscopic methods. Two comprehensive written reports, a short interview and a lab book will be completed for assessment.

Objectives:

1. Carry out a selection of the following experiments, for each one understand the theory behind the experiment and the reaction mechanisms involved (if necessary referring to standard textbooks). Carry out a full Risk Assessment for each experimental procedure, as required under the COSHH regulations. Know where to look up Hazard ratings for experimental materials and understand what these mean.
2. Perform the experiments carefully with due attention to accuracy, good procedure and health and safety. Obtain the required product and correctly calculate the % yield, accounting if necessary for any losses, which occur.
3. Purify the product by an appropriate method and determine its m.p. or b.p. Where possible compare the value obtained with the literature value obtained from appropriate literature sources. For **simple** structures, correctly name the product using IUPAC nomenclature
4. Characterise the product using appropriate physical and spectroscopic techniques as indicated for each experiment. Obtain IR data yourself and prepare a sample for NMR spectroscopic analysis and fully interpret the data from NMR techniques. Present the data in a systematic way, accounting in detail for each signal and commenting on how the data supports the expected structure of the product, the presence, amount and identity of any impurities, and the presence and ratio of isomers of the product in some cases.
5. Write a detailed report on each experiment which will include the relevant theory, a detailed experimental procedure in a format suitable for publication in the primary literature, fully interpreted spectroscopic data and answers to questions. The final task will be assessed by having a short interview to review experimental data and outcome of the task.
6. Gain experience of using any special techniques and apparatus involved in some of the experiments. Consult the staff to obtain expert advice on these where necessary.