CHE-10048
PRACTICAL AND PROFESSIONAL CHEMISTRY SKILLS I

(15 Credits)
BSc Chemistry
BSc Medicinal Chemistry

Module Specification
2012-2013
1. Brief Description & Teaching Staff

This module introduces a number of essential preparative and analytical chemistry skills. The laboratory sessions are designed to equip students with key laboratory and reporting skills and are supported by pre-laboratory and computer classes. The module develops both subject-specific and more general employability skills, and provides a basis for future laboratory courses. The range of learning activities is designed to initiate progress towards the development of Keele’s graduate attributes with emphasis on high standards of written and verbal communication, information literacy and numeracy.

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2. Aims

➢ To develop essential preparative and analytical laboratory skills
➢ To equip students with the ability to communicate experimental procedures, findings, data and conclusions through appropriate scientific media.
➢ To equip students with experience in data analysis and problem solving.
➢ To initiate progress towards the development of Keele’s Graduate Attributes with a particular emphasis on high standards of record keeping, communication (oral and written), information literacy and presentation.

3. Intended Learning Outcomes

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<tr>
<th>Outcome</th>
<th>Mode of Assessment</th>
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| Identify and assemble standard chemical apparatus | ➢ Laboratory Diary  
➢ Practical Exam |
| Demonstrate competence in the use of standard chemical apparatus | ➢ Practical Exam |
| Demonstrate the competence in the use of chemical spectroscopy instrumentation including appropriate sample preparation and selection of instrumental parameters | ➢ Practical Exam |
| Interpret 'H, NMR, 13C NMR, IR and UV-vis spectra and use to evaluate the outcome of chemical experiments. | ➢ Laboratory Diary  
➢ Laboratory Reports |
| Perform COSHH risk assessments for chemical procedures with reference to chemical safety databases, including the documentation for all hazards and chemical disposal procedures. | ➢ Laboratory Diary  
➢ Practical Exam |
| Communicate the results and interpretation of a practical investigation through experimental reports. | ➢ Laboratory Reports |
| Record accurately and appropriately the purpose, methodology, safety practices, information sources, results and data analysis relating to experimental investigations in a systematically maintained laboratory diary. | ➢ Laboratory Diary |
| Extract and interpret relevant information from scientific literature. | ➢ Laboratory Diary  
➢ Laboratory Report |
| Analyse experimental data, using spreadsheets, to create appropriate straight line graphs and extract scientific parameters. | ➢ Laboratory Diary  
➢ Laboratory Report |
4. Description of Course Content and Student Effort

Indicative Content

**Laboratory Skills:** Writing and interpreting COSHH forms use of standard laboratory glassware, accurate weighing and transfer of materials, use of volumetric glassware, preparation of standard solutions, serial dilutions, undertaking titrations, recrystallisation, Buchner filtration, liquid-liquid extraction, heating at reflux, thin layer/column chromatography, melting point determination, Use of spectrometers (IR, NMR, UV-vis) and interpretation of spectra.

**Reporting Skills:** maintaining a contemporaneous laboratory diary with record of purpose, methodology, safety practices, information sources, results and data analysis, preparation of laboratory reports in appropriate scientific language and format.

**Data Analysis:** manipulation of data and extraction of scientific parameters using spreadsheets.

Allocation of Hours (150) of Student Effort

- Practical Classes: 58 hr
- Practical Exam: 2 hr
- Pre-laboratory Session: 18 hr
- Independent Study: 72 hr

5. Assessment Breakdown

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<tr>
<th>Component of Assessment</th>
<th>Weighting (%)</th>
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<tr>
<td>Reflective Laboratory Diary: Pre-laboratory exercises (20%) and in-lab record (30%) of COSHH risk assessment, aims, objectives, procedure, results, data analysis and conclusion of each experiment.</td>
<td>50</td>
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<tr>
<td>Laboratory Reports: Five short laboratory report sections (each worth 5%): introduction; results and discussion; data analysis; conclusion; experimental. Each report section will focus on a different practical.</td>
<td>25</td>
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<tr>
<td>Practical Exam: Station based practical exam assessing the practical skills developed over the course of the module.</td>
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NB. Each assessment component has a 40% threshold.

6. Deadlines and Submission Guidelines

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<tr>
<th>Component of Assessment</th>
<th>Deadlines and Submission</th>
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<tr>
<td>Pre-laboratory Exercises</td>
<td>Beginning of the FIRST laboratory session for the appropriate practical.</td>
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<tr>
<td>Laboratory Diary</td>
<td>Your laboratory notebook must be submitted to the Laboratory Office in Lennard-Jones building by <strong>12 noon Friday of Week 12.</strong></td>
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| Laboratory Reports | **Results and Discussion** (Practical 2) is to be submitted *via* the KLE by **12 noon Monday of Week 6.**  
**Experimental** (Practical 3) is to be submitted *via* the KLE by **12 noon Monday of Week 8.**  
**Data Analysis** (Practical 4) is to be submitted *via* the KLE by **12 noon Friday of Week 9.**  
**Introduction** (Practical 5) is to be submitted *via* the KLE by **12 noon Friday of Week 10.**  
**Conclusion** (Practical 7) is to be submitted *via* the KLE by **12 noon Monday of Week 12.** |
7. Core Reading: as directed by your lecturers, but the following textbooks are recommended: