Module Descriptor

Nature of Matter and Instrumental Analysis

Module Code: ARC7045-B
Academic Year: 2018-19
Credit Rating: 20
School: School of Archaeological and Forensic Sciences
Subject Area: Archaeology
FHEQ Level: FHEQ Level 7 (Masters)

Pre-requisites:
Co-requisites:

Contact Hours

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>35</td>
</tr>
<tr>
<td>Practical classes and</td>
<td>11</td>
</tr>
<tr>
<td>Tutorials</td>
<td>4</td>
</tr>
<tr>
<td>Directed Study</td>
<td>150</td>
</tr>
</tbody>
</table>

Availability Periods

<table>
<thead>
<tr>
<th>Occurrence</th>
<th>Location/Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDA</td>
<td>University of Bradford / Academic Year (Sept - May)</td>
</tr>
</tbody>
</table>

Module Aims

Semester 1: To develop critical awareness of the relationship between physical and chemical properties and their links to underlying atomic interactions. To provide insight into the relationships between macroscopic measurements and microscopic properties encountered in the archaeological sciences, with particular emphasis on the physical sciences. These insights will also aid the student’s understanding of scientific techniques introduced in other modules.

Semester 2: This semester covers the fundamental physical and chemical principles of
instrumental analytical techniques, the operational requirements and interpretative methods
of the techniques of importance to archaeological and forensic science applications.

**Outline Syllabus**


**Module Learning Outcomes**

*On successful completion of this module, students will be able to...*

1. Master the understanding of the relationships between macroscopic measurements and microscopic properties.

2. They will have gained critical awareness of the relationship between physical and chemical properties and their link to underlying atomic interactions.

3. Review the principles, operational requirements and applications of a range of analytical techniques.

4. Evaluate and compare different instrumental methods in a research context.

5. Develop scientific thinking and improve confidence when dealing with scientific formulae and calculations.

6. Students will have gained knowledge of a variety of scientific concepts that they can apply to different areas of archaeological sciences.

7. Choose appropriate instrumental techniques and critically evaluate data within the disciplinary context.

8. Demonstrate acquired and refined analytical, numerical and problem solving skills. Display powers of logical reasoning and interpretation of scientific data used in publications.

9. Employ critical skills in analysis and synthesis.

**Learning, Teaching and Assessment Strategy**

Semester 1: Lectures and structured workshops. Office hours for additional support at students’ request. Past questions and model answers provided on the VLE (Canvas) for self-assessment. Assessment of semester 1 is by coursework and open book exam. Feedback of assessed work within 4 working weeks: opportunity to consult marked work and discuss
Semester 2: Lectures cover the principles of analytical approaches in general and in detail for selected instruments, and include quality control, sample preparation, data analysis and interpretation. The use of case studies based on recently published research. Preparation is given in the tutorials for the assessment, which is a written proposal for analysis. Written feedback is given on the assessment. Directed study will be used by students for reading literature detailed in the module documentation, and for researching and preparing for coursework.

### Mode of Assessment

<table>
<thead>
<tr>
<th>Type</th>
<th>Method</th>
<th>Description</th>
<th>Length</th>
<th>Weighting</th>
<th>Final Assess'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summative</td>
<td>Examination - open book or seen paper</td>
<td>A formal exam (open book) covering the taught syllabus in semester 1. Short questions followed by longer essay-type questions.</td>
<td>1.5 hours</td>
<td>50%</td>
<td>No</td>
</tr>
<tr>
<td>Summative</td>
<td>Coursework</td>
<td>Critical Analysis: A detailed proposal for analysis of your choice of objects or material, which employs - by design - several techniques and proceeds along a process of logical elimination to determine the chemical composition of the object(s).</td>
<td>-2000 words</td>
<td>50%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Legacy Code (if applicable)**

**Reading List**
To view Reading List, please go to rebus:list.