

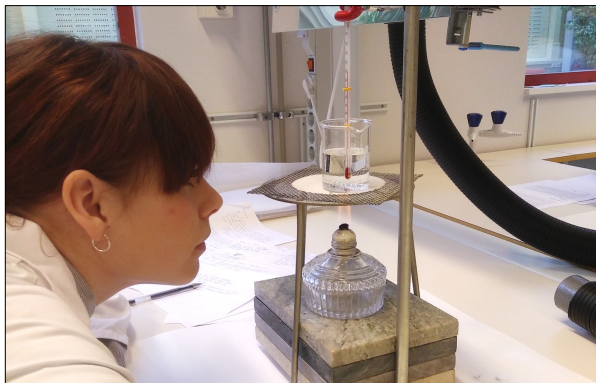
Organic Chemistry for ‘Chemistry-shy’ Emerging Conservators

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Intended Audience: Bachelors-level conservation students

- The *Organic Chemistry for Chemistry-shy Emerging Conservators* course module was developed and delivered over a three-year period to replace an existing organic chemistry module that was heavy on theory and light on laboratory sessions, and was consistently assessed by the students as boring and of limited use. The original course was taught by a non-conservator in a format suitable for industrial chemists but with little relevance to practical conservators. It focussed upon theory rather than practice and was delivered in the traditional didactic lecture-text-exam format. The module redesign aimed to improve the students' learning experience with special emphasis on conservation. The guiding mantra was: "chemistry does not have to be boring or painful."



Determining the melting points of different waxes

- The BSc conservation programme's student cohort consisted, for the most part, of approximately 15 students entering directly from high school with a bare minimum of chemistry. The module was redesigned to be bottom up in two ways. Firstly, it was structured specifically for the teaching framework of the programme, rather than a chemistry course squeezed incongruously between conservation teaching. Secondly, its starting point was atomic physics – a subject traditionally deemed "too difficult" for non-scientists.
- There were a number of limitations and logistical barriers that had to be accounted for. The course was required for all conservation BSc students. It was a 7.5 ECTS full time course that had to be delivered within the constraints of a block of 22 days (4½ weeks). The student science laboratory could not accommodate the whole class in one session. It was offered once each academic year, in the second semester of the first year of studies.

It was preceded by a general chemistry module (7.5 ECTS) in the first semester and was followed by an inorganic chemistry module (7.5 ECTS) later in the programme.

- Basically, the approach was to camouflage basic concepts of organic chemistry within practical, laboratory-based conservation investigation exercises. The course was full time with morning lectures and afternoon laboratory sessions. At least two morning or afternoon slots were free each week to prevent overload. In the first half of the module classic organic chemistry was covered beginning with electronic structure, working up to polymer chemistry and solvent interactions. Lectures were supported by a module compendium.
- This was followed by the organic chemistry of specific materials (e.g., leather, textiles, natural and synthetic polymers) then adhesives and solvents. Throughout the course, all laboratory sessions were conservation related (e.g., Oddy test for principles of organic chemistry, stain/solubility/burn tests for fibre identification). Laboratory sessions were supported by instruction sheets, theoretical underpinning, and report formats to guide reporting results.



Micro-Oddy tests within sealed glass pipettes for rapid testing of packing, storage and display materials

- In summary, the course module was completely restructured from theory-led to student-oriented learning, supported by one-on-one guidance. The practical techniques and interactive skills learned familiarised students with common research methods and made them comfortable within a laboratory environment and, perhaps more importantly, provided each student with a toolbox of conservation-related investigative chemical skills.