

Engagement with a brewery for chemistry students in a unit

In SCC3201 Analytical Chemistry, students engage with a local brewery

SCC3201 Analytical Chemistry provides students with detailed theory and practice of key analytical methods in separation science (chromatography and capillary electrophoresis). Emphasis is placed on the development of relevant laboratory skills that are authentic to current work practices and workplaces. Learning and assessment activities are linked to particular authentic industries so that students clearly see the relevance of their learning.

Learning outcomes

On completion of SCC3201 Analytical Chemistry, students are expected to be able to:

- demonstrate a variety of laboratory skills;
- describe analytical techniques and their applications;
- demonstrate effective written and verbal communication skills;
- demonstrate problem solving and critical appraisal skills;
- work in teams; and
- demonstrate relevant numeracy and mathematics skills.

Learning Activity

In the **second half of the semester**, students practise and apply the skills they have learned in the first half of semester using a problem-oriented approach to learning the topic of chromatography in the context of a real industry by completing a number of activities. This year, students explore the issues relating to the analysis of amino acids by GC, HPLC and CE. Students are faced with the problem of how to analyse the amino acids in beer – chromatography is the most common approach but within the field of chromatography there are many options and difficulties. Students have to understand the difficulties in analysing amino acids, select a technique (HPLC or GC or CE), and then decide on the method.

The traditional prescribed lecture followed by a prescribed laboratory experiment is replaced with a five hour session that is largely devoted to laboratory work where the students also get to discuss their ideas with their peers, external partner and lecturer. **Degrees Brewery, located on ECU campus provides samples of beers for students to analyse levels of amino acids. The brewer is a guest at one of the lectures and this is followed up by a visit to the brewery. Students research the topic of amino acids specifically in beers.**

After an initial workshop, students read articles provided to them on the topic of amino acids analysis. They then research the topic further to enhance their understanding of the related theory and plan and design laboratory experiments. Their experimental plans are vetted by the lecturer. In the laboratory, students not only get to practise skills but they also develop new skills in sample preparation (pre-column derivatisation of AA for HPLC and GC) and use equipment that is new to them such as mass spectrometry. In designing and executing the experiments, students face unexpected challenges providing opportunities for problem solving. In order to complete the written assignments, students read and critically evaluate information from a variety of sources (including their peers) using independent learning skills and effective communication skills. Also students develop team and interpersonal skills that promote a collegial environment as they work collaboratively with their peers, the laboratory staff and the unit coordinator.

Engagement with industry provides a real-life context for two experiments. The truffle industry provides samples for carbohydrate analyses in the first half of semester then students analyse amino acids in beers provided by a local company in the second half of semester.

Assessment in SCC3201 Analytical Chemistry is authentic to chemistry laboratories and any other relevant industry partner. Assessment includes a full scientific laboratory report that will be completed in teams.

The amino acid activity is assessed by way of a portfolio. Each student will submit a portfolio that provides evidence of their learning. The portfolio will include: a 2 page summary of the issue to be investigated in the lab; a risk assessment; a scientific laboratory report; three items demonstrating evidence of self directed learning; two shared learning items and a reflection on this mode of learning.