

# Unit Outline (Higher Education)

**Institute / School:** Institute of Innovation, Science & Sustainability

**Unit Title:** Analytical Techniques

**Unit ID:** SCCHM2001

**Credit Points:** 15.00

**Prerequisite(s):** (SCCHM1001)

**Co-requisite(s):** Nil

**Exclusion(s):** Nil

**ASCED:** 010599

**Description of the Unit:**

In this unit the principles of chemical analysis using a number of different analytical and instrumental techniques commonly encountered in chemical, biochemical, food and environmental applications will be examined. The emphasis will be on the practical application of these techniques. Students will gain hands-on experience in a range of spectroscopic and chromatographic techniques, as well as classical methods of analysis.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

**Work Experience:**

No work experience

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

**Course Level:**

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	■	■	■	■	■	■
Intermediate	■	■	✓	■	■	■
Advanced	■	■	■	■	■	■

### Learning Outcomes:

#### Knowledge:

- K1.** Explain the key principles involved in chemical analysis.
- K2.** Explain the principles, instrumentation and application of a variety of classical, spectroscopic and chromatographic techniques.
- K3.** Demonstrate an awareness of the use of standard methods of analysis in selected industries.

#### Skills:

- S1.** Successfully evaluate methods available for the determination of various analytes in a range of substances.
- S2.** Successfully utilize analytical chemical instrumentation including: preparation of high accuracy standards, setting the operating parameters of different instruments, performing calibration and analysis and proper presentation and communication of analytical results.
- S3.** Demonstrate problem solving skills and the ability to work both independently and in small groups in a laboratory setting and in online tasks.
- S4.** Identify and control risk in the laboratory and undertake analysis and reporting in an ethical manner.

#### Application of knowledge and skills:

- A1.** Recognize the value of the analytical equipment used, as well as their limitations, in the solution of selected problems.
- A2.** Suggest appropriate techniques and conditions to quantify various analytes using a range of techniques including, but not limited to, spectroscopic and chromatographic techniques.

#### Unit Content:

The emphasis of this unit will be on laboratory skills and using a range of techniques to solve analytical problems in the context of chemical, biochemical, food and environmental analyses. Students will be expected to be able to describe and compare the principles of analysis and different methods of analysis, and their benefits and limitations.

- Principles of Analysis - Principles of chemical analysis including classical methods of analysis: errors; sampling; calibration and standard solutions; interferences; accuracy and reliability; reporting results, limits of detection, and using standard methods.
- Spectroscopy - Ultraviolet/visible absorption spectroscopy; fluorescence spectroscopy; atomic absorption and atomic emission spectroscopy; infra-red spectroscopy
- Chromatography - Principles of chromatography; high performance liquid chromatography (HPLC); ion exchange chromatography; gas chromatography (GC); capillary electrophoresis

#### FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge)

provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are to be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: <ul style="list-style-type: none"> <li>Using effective verbal and non-verbal communication</li> <li>Listening for meaning and influencing via active listening</li> <li>Showing empathy for others</li> <li>Negotiating and demonstrating conflict resolution skills</li> <li>Working respectfully in cross-cultural and diverse teams.</li> </ul>	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Creating a collegial environment</li> <li>Showing self-awareness and the ability to self-reflect</li> <li>Inspiring and convincing others</li> <li>Making informed decisions</li> <li>Displaying initiative</li> </ul>	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Reflecting critically</li> <li>Evaluating ideas, concepts and information</li> <li>Considering alternative perspectives to refine ideas</li> <li>Challenging conventional thinking to clarify concepts</li> <li>Forming creative solutions in problem solving.</li> </ul>	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Finding, evaluating, managing, curating, organising and sharing digital information</li> <li>Collating, managing, accessing and using digital data securely</li> <li>Receiving and responding to messages in a range of digital media</li> <li>Contributing actively to digital teams and working groups</li> <li>Participating in and benefiting from digital learning opportunities.</li> </ul>	Not applicable	Not applicable

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: <ul style="list-style-type: none"> <li>• Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts</li> <li>• Committing to social responsibility as a professional and a citizen</li> <li>• Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses</li> <li>• Embracing lifelong, life-wide and life-deep learning to be open to diverse others</li> <li>• Implementing required actions to foster sustainability in their professional and personal life.</li> </ul>	Not applicable	Not applicable

### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, S3, A1, A2	Application of knowledge to real world analytical problems and to the analysis of scientific literature	Scientific communication task	10 - 20%
K1, K2, K3, S1, S2, S3, S4, A1, A2	Application of analytical techniques, interpretation, reporting and presentation of results	Laboratory performance and associated reports and/or presentations	40 - 60%
K1, K2, S1, S2, S3, S4, A1, A2	Practical use of analytical instrumentation, interpretation, reporting and presentation of results	Practical Examination	10 - 30%
K1, K2, K3, A1, A2	Demonstrate and apply knowledge from unit content in response to questions.	Test(s)	10 - 20%

### Adopted Reference Style:

APA ()

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)