

Course Outline (Higher Education)

School: School of Science, Psychology and Sport

Course Title: ANALYTICAL TECHNIQUES

Course ID: SCCHM2001

Credit Points: 15.00

Prerequisite(s): (SCCHM1001)

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 010599

Description of the Course:

In this course 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: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.
- 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.

Course Content:

The emphasis of this course 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.

Topics may include:

- 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

Values:

- V1.** In this course, students will continue to develop an enquiring and curious attitude to science. They will have the opportunity to collaborate with others and lead group efforts as they work through the laboratory program. Experiential learning is a key focus of this course. Students will reflect on safe and ethical behaviour in the laboratory and in the appropriate presentation and reporting of results. As they work through the content students will continue to acquire the ability for reflective, life-long learning.

Graduate Attributes

The Federation University Federation graduate attributes (GA) are entrenched in the [Higher Education Graduate](#)

[Attributes Policy](#) (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		Development and acquisition of GAs in the course	
		Learning Outcomes (KSA)	Assessment task (AT#)
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1, K2, K3, S1, S2, S3, S4, A1, A2	AT1, AT2, AT3, AT4
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	Not applicable	Not applicable
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	S4	AT1, AT2
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1, K2, S1, S2, S4, A1	AT1, AT2, AT3, AT4
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1-K3, S1-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-S4, A1-A2	Practical use of analytical instrumentation, interpretation, reporting and presentation of results	Practical Examination	10 - 30%
K1-K3, A1-A2	Demonstrated understanding of principles of analysis and analytical techniques and their benefits and limitations	Online test	10 - 20%
K1-K3, A1-A2	Application of knowledge to real world analytical problems and to the analysis of scientific literature	Digital scientific communication task	10 - 20%

Adopted Reference Style:

Australian Harvard

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

Fed Cite - [referencing tool](#)