NATS 2019 FORENSIC AND ENVIRONMENTAL ANALYSIS

Credit Points 10

Legacy Code 300843

Coordinator Mark Williams (https://directory.westernsydney.edu.au/search/name/Mark Williams/)

Description This unit extends the student's knowledge and experience of analytical techniques by applying them to forensic investigations and analysis in the environmental and food sciences. It will provide an understanding of the chemical and physical principles underlying the use of instrumentation in chemical analysis. Topics include principles of spectroscopic techniques, separation methods; sample collection and storage; presumptive testing; modern chemical instrumentation for gas and liquid chromatography; atomic spectroscopy; mass spectroscopy; x-ray methods and spectroscopic methods.

School Science

Discipline Forensic Science

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 2 subject

Pre-requisite(s) CHEM 1003 OR CHEM 1008

Equivalent Subjects NATS 2018 - Forensic and Environmental Analysis

Incompatible Subjects CHEM 2001 - Analytical Chemistry and CHEM 2002 - Analytical Chemistry 2

Assumed Knowledge

An understanding and competence with basic chemical principles including SI units, chemical symbols, formulas and equations, stoichiometry, the mole concept, equilibria, acids and bases, pH and electrochemistry. Introductory statistics – mean, standard deviation, distributions, linear regression.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Demonstrate a familiarity with a range of instrumental analytical techniques that are relevant to forensic and environmental investigations.
2. Describe the underlying chemical principles of chromatography including the basic theory and practical applications.
3. Show an understanding of instrumental analysis, the factors which govern its application in real-world situations and the limitations and interferences of specific techniques.
4. Explain how presumptive tests are used in forensic and environmental analyses.
5. Discuss the concepts in designing experiments for analysing forensic, environmental and food samples including principles of sampling and sample preparation.
6. Conduct instrumental investigations to determine concentrations of specific analytes relevant to either a forensic or environmental analysis.
7. Perform result analysis of experimental data including error calculation by applying relevant statistics. analyse and graph data and draw appropriate conclusions from data.
8. Record and communicate the results of their investigations demonstrating awareness of the conventions of scientific writing and graphical presentations.

Subject Content

1. Introduction to instrumental analysis - comparison with wet chemical methods
2. Basic principles of chromatography - high performance liquid chromatography, gas chromatography
3. Experimental design, sampling, sampling techniques, sample preparation
4. Atomic spectroscopy - atomic absorption, atomic emission, ICP
5. Spectroscopic techniques - UV/visible, IR spectroscopy
6. Mass spectrometry
7. Statistical methods relevant to linear regression based analytical methods
8. Presumptive testing

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/Group Task
Practical	6 practicals (4 hours in duration), 3 workshops (2 hours in duration)	30	N	Individual
Essay	2,000 words	20	N	Individual
Participation	Weekly	10	N	Individual
Final Exam	2 hours	40	N	Individual

Teaching Periods

Autumn

Hawkesbury

Day

Subject Contact Mark Williams (https://directory.westernsydney.edu.au/search/name/Mark Williams/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=NATS2019_22-AUT_HW_D#subjects)