

MODULE DESCRIPTOR

Module Title

Environmental Analysis

Reference	ASM031	Version	2
Created	August 2021	SCQF Level	SCQF 11
Approved	February 2018	SCQF Points	30
Amended	August 2021	ECTS Points	15

Aims of Module

To enable students to critically appraise the sources and behaviour of environmental pollutants/contaminants. To evaluate how these pollutants/contaminants interact with biological systems to elicit toxicological effects. To reflect upon experience developed to determine the most effective sampling selection, sampling methodologies and instrumental and bio-analytical techniques to successfully monitor the environment. To select a range of appropriate analytical techniques to solve a given environmental problem and present the findings professionally, as part of a working group.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Critically appraise how physio-chemical parameters of environmental pollutants/contaminants affect their partitioning, biological uptake and biological effects.
- 2 Critically evaluate a range of techniques used for sample site location, sample selection and collection and then critically appraise suitable instrumentation and bio-analytical methodologies for a given contamination issue.
- 3 Critically review and plan work on proposed analytical work involving an environmental problem. Carry out the work as a member of a group, interacting confidently and effectively, demonstrating appropriate negotiating and leadership skills and present the findings of the group to a professional standard.

Indicative Module Content

Pollution in the environment: Review of natural and unnatural substances, xenobiotics, pollutants, degradation, persistence, accumulation, principal sources and behaviour of pollutants in air, water and land. Environmental regulations: The application of instrumental techniques for environmental monitoring. Environmental sampling methods and biological indicators of pollution. Measurement of key environmental parameters: Dissolved Oxygen, Chemical Oxygen Demand, Total Organic Carbon, Turbidity, etc. Automated methods: Technicon Auto Analyser, Flow Injection Analysis, laboratory robotics - techniques, advantages and limitations. Group project work on a given environmental analytical challenge. Solution of an analytical problem appropriate to Environmental Analysis requiring a combination of Laboratory techniques.

Module Delivery

Full-time; the module is delivered by formal lectures with some external speakers and 5 days of laboratory work as part of a designated group solving a given environmental problem. Part-time; mandatory attendance for 5 days in the lab as part of a designated group solving a given environmental problem.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	70	50
Non-Contact Hours	230	250
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	300	300
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Practical Exam	Weighting:	50%	Outcomes Assessed:	3
Description:	Demonstrate competent laboratory planning and analysis of a common environmental contaminant and individual performance in a PowerPoint presentation.				

Component 2

Type:	Coursework	Weighting:	50%	Outcomes Assessed:	1, 2
Description:	Critical review and assessment of methods of sample selection, sampling methodologies, sample storage and instrumental analytical/bioanalytical techniques for a given set of environmental contaminants.				

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

The first grade represents Component 1 (PE1) equally weighted with the second, Component 2 (CW2). A minimum of Module Grade D is required to pass the module, with compensation of grade E in Component 1 or Component 2 permitted. Non-submission of either component will result in an NS grade.

Module Grade	Minimum Requirements to achieve Module Grade:
A	AA, AB, BA
B	AC, AD, BB, BC, CA, CB, DA
C	AE, BD, BE, CC, CD, DB, DC, EA, EB
D	CE, DD, DE, EC, ED
E	AF, BF, CF, DF, EE, EF, FA, FB, FC, FD, FE
F	FF
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1. Skoog, D.A., West, D.M., Holler, F.J. and Crouch, S.R. Fundamentals of Analytical Chemistry. Current Edition. Cengage Learning.
2. Dean, J.R. Environmental Trace Analysis: Techniques and Applications. Current Edition. John Wiley and Sons.
3. Miroslav, R., Bashkin, V.N. Practical Environmental Analysis. Current Edition. RSC Publishing.
4. Zhang, C. Fundamentals of Environmental Sampling and Analysis. Current Edition. Wiley-Blackwell.