

## MODULE DESCRIPTOR

### Module Title

Environmental Analysis

|           |               |             |         |
|-----------|---------------|-------------|---------|
| Reference | PLM305        | Version     | 1       |
| Created   | February 2023 | SCQF Level  | SCQF 11 |
| Approved  | March 2023    | 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 key factors related to the pollutants/contaminants in the environment.
- 2 Critically evaluate the appropriateness of the different techniques available for sampling, preparation and analysis for an analytical problem related to the pollutants/contaminants in the environment.
- 3 Critically review the results and conclusions from an analytical group project related to pollutants/contaminants in the environment.

### 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        | 70        |
| Non-Contact Hours  | 230       | 230       |
| Placement/Work-Based Learning Experience [Notional] Hours                    | N/A       | N/A       |
| TOTAL  | 300       | 300       |
| <i>Actual Placement hours for professional, statutory or regulatory body</i> |           |           |

### ASSESSMENT PLAN

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

#### Component 1

|              |   |            |      |                    |         |
|--------------|---|------------|------|--------------------|---------|
| Type:        | Practical Exam  | Weighting: | 100% | Outcomes Assessed: | 1, 2, 3 |
| Description: | Demonstrate competent laboratory planning and analysis of a common environmental contaminant and individual performance in a PowerPoint presentation. |            |      |                    |         |

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

The grade represents Component 1 (PE1). A minimum of Module Grade D is required to pass the module. Non-submission will result in an NS grade.

| Module Grade | Minimum Requirements to achieve Module Grade:                                  |
|--------------|--|
| <b>A</b>     | A  |
| <b>B</b>     | B  |
| <b>C</b>     | C  |
| <b>D</b>     | D  |
| <b>E</b>     | E  |
| <b>F</b>     | F  |
| <b>NS</b>    | Non-submission of work by published deadline or non-attendance for examination |

**Module Requirements**

|                          |   |
|--------------------------|---|
| Prerequisites for Module | None, in addition to the course entry requirements. |
| Corequisites for module  | None.   |
| Precluded Modules        | None.   |

**INDICATIVE BIBLIOGRAPHY**

- 1 Skoog, D.A., West, D.M., Holler, F.J. and Crouch, S.R. 2017. Fundamentals of Analytical Chemistry. Seventh Edition. Cengage Learning.
- 2 Dean, J.R. 2013. Environmental Trace Analysis: Techniques and Applications. John Wiley and Sons.
- 3 Miroslav, R., Bashkin, V.N. 2006. Practical Environmental Analysis. RSC Publishing.
- 4 Zhang, C. 2017. Fundamentals of Environmental Sampling and Analysis. Wiley-Blackwell.