1. **Title of the module**

LABS4120 Basic Analytical Chemistry

1. **Division or partner institution which will be responsible for management of the module**

Digital and Lifelong Learning

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 4

1. **The number of credits and the ECTS value which the module represents**

15 Credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Flexible delivery model

Autumn and/or Spring and/or Summer

1. **Prerequisite and co-requisite modules**

N/A

1. **The programmes of study to which the module contributes**

FdSc and BSc (Hons) in Applied Chemical Sciences

1. **The intended subject-specific learning outcomes.  
   On completing the module successfully, students will be able to:**

8.1 Demonstrate an understanding of key concepts in Analytical Chemistry.

8.2 Solve quantitative problems relating to these concepts.

8.3 Suggest appropriate methods to solve analytical tasks.

8.4 Describe the principles behind analytical separations.

1. **The intended generic learning outcomes.  
   On completing the module successfully, students will be able to:**

9.1 Demonstrate the development of practical/technical skills

9.2 Analyse, evaluate, and correctly interpret data

9.3 Communicate and present data effectively

9.4 Obtain and use information from a variety of sources as part of self-directed learning.

9.5 Manage the time and use organisation skills within the context of self-directed learning.

1. **A synopsis of the curriculum**

* Chemical Calculations: SI units, mass, moles, volume, density, concentration (%w/v, %v/v, M, N), dilution factor, yield, calibration.
* Statistics: basic statistical methods for analysis, accuracy, and precision, significant figures, experimental errors, sampling, and sample preparation
* Stoichiometry and the relation to classical analytical techniques such as titrimetry and gravimetry.
* Titrations: acid-base, redox, complexometric, iodometric and potentiometric, indicators, gravimetric and electrochemical analysis.
* Qualitative analysis: chemical tests for inorganic and organic compounds, flame tests, melting points, and elemental analysis
* Qualitative and quantitative methods (classical vs instrumental methods).
* Basics of analytical separations: Selected techniques: solvent extraction principles; selectivity based on pH control and complexation; methods of extraction; chromatography: principles and applications of partition and adsorption as applied to the separation of samples using paper and thin-layer chromatography.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

Skoog, D.A. *et al.* (2014) *Fundamentals of analytical chemistry*. Belmont, CA: Brooks/Cole, Cengage Learning.

Khopkar, S.M. (2012) *Basic concepts of analytical chemistry*. 3rd edn. Tunbridge Wells: New Age Science.

Ham, B.M. and MaHam, A. (2015) *Analytical chemistry: A chemist and laboratory technician's*   *toolkit*. Hoboken: John Wiley & Sons.

Li, N., Hefferren, J.J. and Li, K.'a. (2013) *Quantitative chemical analysis*. Hackensack, NJ: World Scientific.

Harris, D.C. and Lucy, C.A. (2018) *Quantitative chemical analysis*. New York: WH Freeman.

Hibbert, D.B. and Gooding, J.J. (2006) *Data analysis for chemistry: An introductory guide for*   *students and laboratory scientists*. Oxford: Oxford University Press.

1. **Learning and teaching methods**

Blended Distance learning:

Contact Hours: 120

Private Study Hours: 30

Total Study Hours: 150

1. **Assessment methods**
   1. Main assessment methods

Essay assignment/s (70%) - 1600 words.

Moodle Quiz. (30%)

The pass mark for this module is 40%. The aim of the assessment is that there should be an equal balance between ‘application’ (i.e. reflection related to practical/work experience) and ‘theory’ (i.e. examination), but that neither should enable the student to obtain a pass grade independently and in its entirety.

13.2 Reassessment methods

Like for Like

1. ***Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |
| **Teaching** | **x** | **x** | **x** | **x** |  | **x** | **x** | **x** | **x** |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Work-based experience | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| Assignment/s | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| MCQ | **x** | **x** | **x** | **x** |  | **x** | **x** | **x** | **x** |

1. **Inclusive module design**

The division recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where the module will be delivered**

Blended distance learning – delivered from Medway and Canterbury campus

1. **Internationalisation**

International vocation is an important part of Applied Chemical Science. The intended learning outcomes 8.1, and 8.4, for this module cover key universal principles and concepts of basic analytical chemistry and therefore are core components of Applied Chemical Science worldwide. The syllabus also covers solving analytical tasks and quantitative problems, which are fundamental in chemistry-based research. Furthermore, Basic Analytical Chemistry is a core component of the Pharmaceutic R & D industry and this module reflects international aspects.

**DIVISIONAL USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
|  |  |  |  |  |
|  |  |  |  |  |