

## Module specification

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Module Code	SCI545
Module Title	Analytical Methods in Applied Science
Level	5
Credit value	20
Faculty	FAST
HECoS Code	100413
Cost Code	GAFS

### Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BSc (Hons) Forensic Science	Core
BSc (Hons) Forensic Science with Placement Year	Core
BSc (Hons) Biochemistry	Core

### Pre-requisites

None

### Breakdown of module hours

Learning and teaching hours	30 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
<b>Total active learning and teaching hours</b>	<b>30 hrs</b>
Placement / work based learning	0 hrs
Guided independent study	170 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

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Initial approval date	14/10/2020
With effect from date	September 2021
Date and details of revision	10/05/2022 Revalidation of BSc (Hons) Forensic Science programme (module update)
Version number	3

## Module aims

This module will introduce students to the main techniques used for the isolation and chemical analysis of trace materials, including general chemical separation and analysis, chromatographic methods, immunoassay, and electrophoresis *etc.*, with the case studies to demonstrate their applications in forensic and biochemical fields.

**Module Learning Outcomes** - at the end of this module, students will be able to:

1	Explain the principles of common chemical analyses and separation techniques.
2	Evaluate strengths and limitations of different chromatographic methods used in trace analysis.
3	Develop the ability to apply knowledge and skills in chemical analysis to solve problems in forensic and biochemical sciences.
4	Evaluate the importance of chemical analysis in forensic and biochemical sciences.

## Assessment

### Indicative Assessment Tasks:

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

### Assessment 1: Exam (2 hours)

This will contain multiple choice and short-answer questions focusing on the fundamental knowledge and principles in analytical methods.

### Assessment 2: Coursework

Approximately 10 problem-solving questions, focusing on calculations, data processing and the applications of analytical methods in forensic and biochemical sciences, will be issued near the end of semester.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-2	Examination	50
2	3-4	Coursework	50

## Derogations

None

## Learning and Teaching Strategies

The module will be delivered in line with the University's Active Learning Framework and will involve:

**Lectures:** To provide students with a comprehensive overview of the key concepts and principles.

**Discussions and Seminars:** To allow students to engage with the materials and explore different perspectives on the applications of analytical methods in the fields related to their

programme of study while also providing an opportunity for students to ask questions and clarify concepts.

**Problem solving workshops:** To test students' knowledge and understanding of the concepts covered and train their calculation skills in analytical chemistry.

**Online resources and videos:** To supplement classroom learning by providing students with additional information and visual aids to further their understanding of the materials.

**Self-directed study:** To empower students to take responsibility for their own learning and to explore topics of interest in more depth.

## Indicative Syllabus Outline

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- Introduction to analytical chemistry
- Examples of statistical sampling methods in chemical analysis
- Gravimetric analysis
- Volumetric analysis
- Extraction of trace materials
- Fundamental principles of chromatography
- Methods of chromatography, including the most popular techniques
- Chromatographic analysis in arson crime investigations
- Fundamental principles of electrophoresis
- Immunochemical methods
- Analytical methods specific to colorant materials such as dyes, inks and paints
- Chemical analysis of polymers, such as hair and fibres
- Case studies to demonstrate the applications of chemical separation and analytical techniques in forensic and biochemical fields

## Indicative Bibliography:

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Please note the essential reads and other indicative reading are subject to annual review and update.

### Essential Reads

Skoog, D.A., West, D.M., Holler, F.J. & Crouch, S.R. (2021), *Fundamentals of Analytical Chemistry*, 10<sup>th</sup> Edition, United States: Cengage Learning.

### Other indicative reading

Bell, S. (2022), *Forensic Chemistry*, 3<sup>rd</sup> Edition, Abingdon: CRC Press.

Lottspeich, F. & Engels, J.W. (2018), *Bioanalytics: Analytical Methods and Concepts in Biochemistry and Molecular Biology*, Germany: Wiley.

## Employability skills – the Glyndŵr Graduate

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Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of

their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas.

### Core Attributes

Engaged  
Creative

### Key Attitudes

Commitment

Curiosity  
Resilience  
Confidence  
Adaptability

**Practical Skillsets**

Digital Fluency  
Organisation  
Leadership & Team working  
Critical Thinking  
Emotional Intelligence  
Communication