

BSc (Hons) Chemistry Apprenticeship Programme Specification

Academic Year:	2022/23
Degree Awarding Body:	University of Bradford
Final and interim award(s):	BSc (Honours) Chemistry [Framework for Higher Education Qualifications (FHEQ) level 6] BSc Chemistry [Framework for Higher Education Qualifications (FHEQ) level 6] DipHE Chemistry [Framework for Higher Education Qualifications (FHEQ) level 5] CertHE Chemistry [Framework for Higher Education Qualifications (FHEQ) level 4]
Programme accredited by:	The award meets the UK Government's apprenticeship standard published by the Education and Skills Funding Agency
Apprenticeship Standard:	Laboratory Scientist (Degree) L6 - https://www.instituteforapprenticeships.org/apprenticeship-standards/laboratory-scientist-degree-v1-0
LARS Code for the Standard:	221
Programme duration:	4 years (Part Time)
End Point Assessment:	Non-integrated degree
QAA Subject benchmark statement(s):	Chemistry (2015)
Date last confirmed and/or minor modification approved by Faculty Board	November 2022

Please note: This programme specification has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but changes may occur given the interval between publishing and commencement of teaching. Any change which impacts the terms and conditions of an applicant's offer will be communicated to them. Upon commencement of the programme, apprentices will receive further detail about their course and any minor changes will be discussed and/or communicated at this point.

Introduction

The University of Bradford's key mission statement is 'Making Knowledge Work'. The BSc Chemistry (Apprenticeship) programme is directly aligned with this message of meshing the academic with real-world outputs. This degree will give apprentices a solid background in the chemical sciences but will also focus on the application of chemistry in specific areas of this 'central science'.

Whilst they are studying, apprentices on this programme will be applying their knowledge in their companies and developing practical and theoretical skills through their work.

Apprentices are expected to spend 20% of their contracted hours completing off-the-job training, which must be carefully logged. This training will include contact hours with the core teaching programme, attendance at the Practical Chemistry Summer School, undertaking assessments, self-directed study and additional practical training to support the apprentice's application for the Level 6 Laboratory Scientist Apprenticeship.

Within three months of completing the core BSc Chemistry degree, apprentices will undergo an End Point Assessment (EPA), which is an impartial assessment of whether the apprentice has developed the relevant skills, knowledge and behaviours outlined in the apprenticeship standard. To reach Gateway for the EPA, the apprentice is required to have Level 2 certificates in English and Maths, a BSc (Hons) degree, have completed the Competence Evaluation Log and have completed a Workplace Synoptic Research Project which has been approved by a technical expert. The EPA will be overseen by an independent EPA provider, sourced by the University of Bradford.

Our degrees have been structured to give apprentices choice and flexibility. During the first two stages, apprentices will develop a sound understanding of theoretical and practical aspects of chemistry, with core content delivered across the traditional areas of organic, inorganic and physical chemistry. Further to this, apprentices will have the chance to pick optional or elective modules that have been developed in collaboration with industry. These elective modules will provide a direct link between the apprentice's core learning and the application of chemistry in their industrial area.

As a Bradford Chemistry graduate, apprentices will be well prepared to deploy the skills they have developed across the programme to 'Make Knowledge Work'.

Programme Aims

The programme is intended to:

- develop an enthusiasm for chemistry and an appreciation of its application in different contexts
- provide opportunities for apprentices to develop a systematic knowledge and understanding of the core principles of chemistry
- develop an understanding of the role of chemists in the chemical and related industries
- enable apprentices to develop a core range of chemistry-related practical skills
- develop apprentices' ability to think critically and creatively
- develop collaborative and group working skills
- develop awareness of sustainability in the context of the chemical sciences
- extend apprentices' comprehension of key chemical concepts and provide an in-depth understanding of applied areas of chemistry
- provide a supportive educational environment, which meets the needs of apprentices from a variety of backgrounds
- enable apprentices to become autonomous learners and prepare apprentices for the lifelong learning skills required to be adaptable over the course of their career

- enable apprentices to develop the ability to carry out experiments independently and assess the significance of their outcome
- develop the ability to adapt and apply methodology to the solution of unfamiliar problems
- and instil a critical awareness of advances at the forefront of the chemical sciences.

Programme Learning Outcomes

To be eligible for the award of Certificate of Higher Education at FHEQ level 4, apprentices will be able to:

1. Describe the physical world using the language of chemistry.
2. Describe chemical reactions in terms of the change in structure of organic and inorganic compounds and materials, and in the change of measurable physical attributes of these.
3. Describe the underlying scientific principles, principal theories, concepts and terminology of laboratory-based experimentation, including laboratory techniques relevant to the specialist discipline.
4. Describe the application of quality standards, safe working practices and compliance with risk management systems relevant to the workplace in their own work and in the work of others.
5. Work collaboratively to analyse a given problem, and to prepare a presentation.
6. Recognise the importance of integrity, respect, compliance and confidentiality in the workplace.
7. Explain the business environment in which the apprentice's company operates including their personal role within the organisation, ethical practice and codes of conduct.
8. Manage time effectively, being able to plan and complete work to schedule.

Additionally, to be eligible for the award of Diploma of Higher Education at FHEQ level 5, apprentices will be able to:

9. Interpret the structure and reactivity of organic and inorganic molecules and compounds by considering appropriate bonding models.
10. Discuss the way in which organic and inorganic compounds react at a molecular level with emphasis on mechanistic tools of interpretation.
11. Explain physical processes, both in terms of classical thermodynamics and in terms of the quantisation of energy.
12. Interpret the results of practical experiments, commenting specifically on the significance and quality of the associated data produced.
13. Evaluate their skill sets against subject-specific requirements and identify areas for professional and personal development.

14. Establish a collaborative approach to tackling problems and in the implementation of change management processes.
15. Identify and use the scientific approaches appropriate to the specialist discipline required to solve problems, support new investigations and follow-up experiments in the laboratory.
16. Compare different process mapping and analysis tools for performance improvement within the scientific and technical environment.

Additionally, to be eligible for the award of Honours Degree of Bachelor at FHEQ level 6, apprentices will be able to:

17. Accurately apply the range of theories contained within the sub-disciplines of organic, inorganic and physical chemistry to interdisciplinary areas of the chemical sciences.
18. Examine the internal and external regulatory environment and the needs of internal and external customers pertinent to the area of specialisation.
19. Develop a cohesive strategy for the implementation of a technical project, with a focus on the utilisation of data sources, team working, and project planning and experimental design.
20. Use mechanistic concepts to rationalise and discuss the outcome of complex reactions.
21. Communicate effectively to a scientific and non-scientific audience using oral presentation, scientific debate and technical writing skills.

Curriculum

Year 1 Modules

Apprentices should expect to complete 90 core credits in Year 1:

FHEQ Level	Module Title	Type	Credits	Semester	Module Code
4	Organic Chemistry 1 (at distance)	Core	20	1 + 2	CFS4028-B
4	Inorganic Chemistry 1 (at distance)	Core	20	1 + 2	CFS4029-B
4	Study Skills for Apprentices	Core	20	1 + 2	CFS4030-B
4	Practical Chemistry for Apprentices 1	Core	30	1 + 2	CFS4031-C

At the end of Year 1, apprentices will be eligible to exit with the award of Certificate of Continuing Education if they have successfully completed at least 20 credits.

Year 2 Modules

Apprentices complete 70 core credits and choose **one** option or an elective module. Any elective selected in Year 2 must be a 20-credit distance learning module.

FHEQ Level	Module Title	Type	Credits	Semester	Module Code
4	Physical Chemistry 1 (at distance)	Core	20	1 + 2	CFS4032-B
5	Organic Chemistry 2 (at distance)	Core	20	1 + 2	CFS5021-B
5	Practical Chemistry for Apprentices 2	Core	30	1 + 2	CFS5022-C
5	Cosmetic Science (at distance)	Option*	20	1 + 2	CFS5027-B
5	Mass Transfer Operations (at distance)	Option*	20	1 + 2	CPE5010-B
5	Biomolecules and Cells (at distance)	Option*	20	1 + 2	CFS5025-B
5	Any 20-Credit University Level 5 Distance Learning Elective	Elective*	20	1 or 2	Any-B

At the end of Year 2, apprentices will be eligible to exit with the award of Certificate of Higher Education if they have successfully completed at least 120 credits and achieved the award learning outcomes.

Year 3 Modules

Apprentices complete 70 core credits and choose **one** option or an elective module. Any elective selected in Year 3 must be a 20-credit distance learning module.

FHEQ Level	Module Title	Type	Credits	Semester	Module Code
5	Physical Chemistry 2 (at distance)	Core	20	1 + 2	CFS5023-B
5	Inorganic Chemistry 2 (at distance)	Core	20	1 + 2	CFS5024-B
6	Practical Chemistry for Apprentices 3	Core	30	1 + 2	CFS6024-C
5	Cosmetic Science (at distance)	Option*	20	1 + 2	CFS5027-B
5	Mass Transfer Operations (at distance)	Option*	20	1 + 2	CPE5010-B
5	Biomolecules and Cells (at distance)	Option*	20	1 + 2	CFS5025-B
5	Any 20-Credit University Level 5 Distance Learning Elective	Elective*	20	1 or 2	Any-B

At the end of Year 3, apprentices will be eligible to exit with the award of Diploma of Higher Education if they have successfully completed at least 240 credits and achieved the award learning outcomes.

Year 4 Modules

Apprentices must complete the Work based Research Project and choose **three** from four of these options:

FHEQ Level	Module Title	Type	Credits	Study Period	Module Code
6	Introduction to Polymer Science (at distance)	Option *	20	Semester 2	CFS6026-B
6	Bio-organic and Bio-inorganic Chemistry (at distance)	Option *	20	Semester 1	CFS6027-B
6	Organic Chemistry 3 (at distance)	Option *	20	Semester 2	CFS6025-B
6	Molecular Analysis (at distance)	Option *	20	Semester 1	CFS6028-B
6	Work based Research Project	Core	30	1 + 2	CFS6029-C

Apprentices will be eligible to exit with the award of Ordinary Degree of Bachelor if they have successfully completed/achieved all of:

- 110 credits at FHEQ Level 4
- 130 credits at FHEQ Level 5
- at least 60 credits at FHEQ Level 6
- at least Programme Learning Outcomes 1 to 17.

Apprentices will be eligible for the award of Honours Degree of Bachelor if they have successfully completed at least 360 credits and achieved the award learning outcomes.

Placement and/or Study Abroad

This programme does not provide the option for apprentices to undertake an additional work placement or period of study abroad.

Learning and Teaching Strategy

Apprentices on this programme will be engaged on an apprenticeship in a chemical (or related) company. Each apprentice will be assigned a supervisory team to consist of one member of academic staff, and one member of staff from the apprentice's company. This supervisory team will work with the apprentice to support their study, and to help develop and document the practical skills that the apprentice will gain within their company. In the final year, the supervisory team will support the research project. The supervisory team will closely monitor each apprentice's progress, through tripartite meetings, occurring at least once every 12 weeks or a minimum of 5 meetings per academic year.

Each year of study will commence with a residential summer school. These summer schools will be used to deliver key practical skills in support of the practical chemistry modules, and in year 4, for the final research project. Additionally, the year 1 summer school will introduce apprentices to the study skills required to engage with the 'at distance' parts of the programme. The summer schools will also allow apprentices to meet

their cohort and tutors, and this will help reinforce the learning community which apprentices will engage with when studying the 'at distance' material.

The 'at distance' parts of the programme will generally be delivered using a 'flipped teaching' approach. This means that taught material will need to be studied before the class takes place. This material will be presented in a range of media including podcasts, vodcasts and directed reading. The majority of classes will be hosted and facilitated online using collaborative software where apprentices and their course tutor will meet for regular timetabled sessions. These sessions will require apprentices to use the knowledge they have gained through completion of the pre-work and apply it to real world problems. Furthermore, the problems will require apprentices to take a collaborative approach to solving them, enabling them to develop their employability skills in a peer-learning environment. This part of the teaching strategy will address Programme Learning Outcomes 1-3,5-7, 9-11, 17 and 19.

Core practical skills will be developed in the residential summer school. Lectures in laboratory management and technique will be taught alongside intensive practical classes. Practical skills will be further developed in the apprentice's workplace. The supervisory team will regularly assess these skills and will facilitate the apprentice in evidencing them against defined capabilities using an on-line portfolio. This part of the course will address Programme Learning Outcomes 4, 8, and 12-16.

The individual project in year 4 will require the apprentice to engage in-depth with an aspect of research within their workplace. This project will be supported by the apprentice's supervisory team and will address Programme Learning Outcomes 18 and 19.

Assessment Strategy

Apprentices will demonstrate their achievement via written closed-book examinations using constructed (essays, short answers) and selected response (MCQ) questions and a variety of coursework assignments, including laboratory reports, oral presentations and dissertations.

The development of learning outcomes 3, 4, 6, 10, 20 and 21 will be through involvement in laboratory, small-group workshops, case-based work and projects (individual and small group). They will be assessed by critical appraisal, case analysis and critique, case presentations, laboratory reports and dissertations

Assessment Regulations

This programme conforms to the standard University Assessment Regulations which are available at:

<https://www.bradford.ac.uk/regulations/>

However, there are three exceptions to these regulations as listed below:

- 1) Compensation is not permitted. Students must pass all modules with a mark of 40% or above.
- 2) Referral is not permitted. Students must pass all modules in each year before proceeding to the next year of the programme.

- 3) For students who, following supplementary assessment, do not meet the requirements for progression or award:
 - a) Fail in 50 credits or more – required to repeat the year with attendance.
 - b) Fail in 40 credits or less – required to repeat individual modules with attendance in the forthcoming academic year, meanwhile not permitted to proceed.

Admission Requirements

We take into consideration a number of factors when assessing your application. It's not just about your grades; we take the time to understand your personal circumstances and make decisions based on your potential to thrive at university and beyond.

Consideration of applications will be based on a combination of formal academic qualifications and other relevant experience. Applications are welcome from apprentices with non-standard qualifications or mature apprentices (those over 21 years of age on entry) with significant relevant experience.

A typical offer to someone seeking entry through the UCAS scheme would be 111 points. The UCAS tariff applicable is published here:

<https://www.bradford.ac.uk/courses/apprenticeships/chemistry-apprenticeship/>. Please note this link provides admission information relevant to the current recruitment cycle and therefore may be different to when this document was originally published.

On completion of a UCAS form apprentices will be invited to the School for an Open Day when they will have the opportunity to meet staff, view the facilities and discuss “the Bradford experience” with current apprentices.

Recognition of Prior Learning

If applicants have prior certificated learning or professional experience which may be equivalent to parts of this programme, the University has procedures to evaluate and recognise this learning in order to provide applicants with exemptions from specified modules or parts of the programme.

Minor Modification Schedule

Version Number	Description of change	Date modified and approved
2	Additional optional module choices	March 2020
3	Specification reformatted and made accessible	October 2020
4	Annual update for 2021 Academic year	August 2021
5	Minor changes for 2021 Academic year	September 2021
6	Annual changes for 2022 Academic year	March 2022
7	Enhanced accessibility and republished	March 2023