

## **BSc Chemistry (Apprenticeship) Programme Specification**

Academic Year:	<b>2020/21</b>
Degree Awarding Body:	<b>University of Bradford</b>
Final and interim award(s):	<b>BSc (Honours) Chemistry</b> [Framework for Higher Education Qualifications (FHEQ) level 6] <b>BSc Chemistry</b> [Framework for Higher Education Qualifications (FHEQ) level 6] <b>DipHE Chemistry</b> [Framework for Higher Education Qualifications (FHEQ) level 5] <b>CertHE Chemistry</b> [Framework for Higher Education Qualifications (FHEQ) level 4]
Programme accredited by:	<b>Subject to the Royal Society of Chemistry</b>
Programme duration:	<b>4 years (Part Time)</b>
QAA Subject benchmark statement(s):	<b>Chemistry (2015)</b>
Date last confirmed and/or minor modification approved by Faculty Board	<b>September 2020</b>

**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, students 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.

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 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 uniquely placed to deploy the skills that have developed across the programmes 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:

- PLO 1 Describe the physical world using the language of chemistry.
- PLO 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.
- PLO 3 Describe the underlying scientific principles, principal theories, concepts and terminology of laboratory-based experimentation, including laboratory techniques relevant to the specialist discipline.
- PLO 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.

- PLO 5 Work collaboratively to analyse a given problem, and to prepare a presentation.
- PLO 6 Recognise the importance of integrity, respect, compliance and confidentiality in the workplace.
- PLO 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.
- PLO 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:

- PLO 9 Interpret the structure and reactivity of organic and inorganic molecules and compounds by considering appropriate bonding models.
- PLO 10 Discuss the way in which organic and inorganic compounds react at a molecular level with emphasis on mechanistic tools of interpretation.
- PLO 11 Explain physical processes, both in terms of classical thermodynamics and in terms of the quantisation of energy.
- PLO 12 Interpret the results of practical experiments, commenting specifically on the significance and quality of the associated data produced.
- PLO 13 Evaluate their skill sets against subject-specific requirements and identify areas for professional and personal development.
- PLO 14 Establish a collaborative approach to tackling problems and in the implementation of change management processes.
- PLO 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.
- PLO 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:

- PLO 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.
- PLO 18 Examine the internal and external regulatory environment and the needs of internal and external customers pertinent to the area of specialisation.
- PLO 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.
- PLO 20 Use mechanistic concepts to rationalise and discuss the outcome of complex reactions.
- PLO 21 Communicate effectively to a scientific and non-scientific audience using oral presentation, scientific debate and technical writing skills.

# Curriculum

## 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

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		Elective*	20		

\* Students choose **one** option or an elective module. The elective must be a 20-credit distance learning module.

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

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		Elective*	20		

\* Students choose **one** option or an elective module. The elective must be a 20-credit distance learning module.

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

FHEQ Level	Module Title	Type	Credits	Study Period	Module Code
6	Introduction to Polymer and Colloid Science (at distance)	Option ◊	20	Semester 1	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 2	CFS6028-B
6	Work based Research Project	Core	30	ACYR	CFS6029-C

◊ Apprentices must choose **three** from four of these options.

Apprentices will be eligible to exit with the award of Ordinary Degree of Bachelor if they have successfully completed 120 credits at stage 1 and 2 and at least 60 credits at stage 3 and achieved 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 twice-yearly formal face-to-face meetings, and through more regular contact.

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**

The following bespoke assessment regulations take precedence over the equivalent sections/sub-sections of the standard University Undergraduate Assessment Regulations:

- **All modules must be passed at 40%.**
- **Compensation and referral are not permitted.**
- **Progression between years:**
  - Students may progress from Year 1 to Year 2 of the programme if they achieve at least 40.0% in individual Year 1 modules amounting to 90 Credits.
  - Students may progress from Year 2 to Year 3 of the programme if they achieve at least 40.0% in individual Year 2 modules amounting to 90 Credits.
  - Students may progress from Year 3 to Year 4 of the programme if they achieve at least 40.0% in individual Year 3 modules amounting to 90 Credits.
- **Supplementary assessment:**
  - Students who at the initial attempt have not achieved the requirements either for progression to the next Year of the programme, or for an award, are entitled to undertake Supplementary Assessment on one occasion, as of right. One further attempt (3 in total, including initial attempt) will be permitted if a student achieves 60 credits at 40.0%. No fourth attempts are offered.
  - Students who do not achieve at least 40 credits at 40.0% at the initial attempt will forfeit the automatic right to Supplementary Assessment without attendance in the Supplementary Assessment period. A Board of Examiners may require such...

...students to repeat the Year with attendance or to undertake individual modules with attendance during the forthcoming academic year.

- The Board of Examiners will apply the following algorithm to determine whether a student should be permitted Supplementary Assessment without attendance in the Supplementary Assessment period:
  - More than 40 credits below 40.0% - required to repeat the Year with attendance.
  - 40 credits or fewer below 40.0% - permitted Supplementary Assessment in the Supplementary Assessment period with a view to proceeding on the Honours programme.
- Students repeating the year will be required to undertake Supplementary Assessment with attendance during the next academic session in all modules in which they have failed to obtain 40%. They will be formally recorded as repeating the year and will be charged a full year fee. They will also be advised to engage with teaching activities in modules which they have already passed but they will not be registered on the module and are not required to undertake assessment.
- Students on whose behalf evidence is presented attesting that for good cause the standard of their performance in the initial attempt was impaired may be permitted to undertake Supplementary Assessment. In such cases, the more successful performance, whether on the first or subsequent occasion, shall stand.
- At the discretion of the Board of Examiners, a student undertaking Supplementary Assessment who has already fulfilled satisfactorily any requirement for part of a module in which the student has not attained at least 40.0% may, on the occasion of the Supplementary Assessment, be excused from further assessment in that part of the module.
- **Performance in supplementary assessment:**
  - Students who, following Supplementary Assessment, meet the relevant requirements may progress to the next Year of the programme. Students who have undertaken Supplementary Assessment with a view to attaining an award, and who now meet the requirements for that award, shall be eligible for the award in question.
  - The facility to undertake Supplementary Assessment without attendance, as a third attempt following one unsuccessful attempt at Supplementary Assessment, is not permitted. However, students who have repeated the year or individual modules with attendance as second attempt will be permitted a third attempt without attendance in the Supplementary Assessment Period following their repeat year if they meet the regulation for a third attempt.
  - Students who, following Supplementary Assessment, do not meet the requirements for progression, or do not meet the requirements for an award, will be permitted a third attempt, with attendance, if they have obtained 60 credits at 40.0%.
  - Students who, following Supplementary Assessment, do not meet the requirements for a third attempt, will be required to withdraw from the programme.
  - Students who, following a third attempt at assessment, meet the relevant requirements may progress to the next Year of the programme. Students who have undertaken Supplementary Assessment with a view to attaining an award, and who now meet the requirements for that award, shall be eligible for the award in question.
  - Students who, following a third attempt, do not meet the requirements for progression to the next Year of the programme will be required to withdraw from the programme.

The programme conforms to all other applicable standard University Undergraduate regulations accessible at <https://www.bradford.ac.uk/regulations>.

## 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