Programme Specification

1	**Awarding Institution/Body**	Leeds City College
2	**Delivery Location(s)**	University Centre
3	**Programme Externally Accredited by (e.g. PSRB)**	
4	**Award Title(s)**	Biomedical and Pharmaceutical Sciences Biomedical and Pharmaceutical Sciences (with Foundation Year) Certificate of Higher Education - Biomedical and Pharmaceutical Sciences
5	**FHEQ Level**	Level 3 (optional foundation year 0); level 4 and level 5
6	**Bologna Cycle**	Short cycle (within or linked to the first cycle)
7	**HECoS Code and Description**	(100392) applied science
8	**Mode of Attendance**	Full-time and Part-time
9	**Relevant QAA Subject Benchmarking Group(s)**	Biomedical Sciences (November 2015) Chemistry (December 2014) Materials (August 2017)
10	**Relevant Additional External Reference Points**	Foundation Degree qualification benchmark (May 2010) Level 5 Technician Scientist Apprenticeship Standard Level 6 Laboratory Scientist Apprenticeship Standard Good Laboratory Practice (Directive 2004/10/EC and Directive 2004/9/EC); COSHH, CLP and REACH safety and labelling guidelines for storage of chemicals.
11	**Date of Approval/Revision**	*June 2019*

12 **Criteria for Admission to the Programme**

Level 3 (Foundation Year 0) Entry Criteria
(text in red to be used where applicable)

	Typical offer	**Minimum Offer**
A Levels:	2xU grades at A-level	4 GCSES at grade A-C (4 or above under new grading system)
BTEC L3 Diploma or Extended Diploma:	PP grade in a Diploma or a Subsidiary Diploma	4 GCSES at grade A-C (4 or above under new grading system)
Access to HE Diploma:	Overall pass with 60 credits,	4 GCSES at grade A-C (4 or above under new grading system)
GCSE:	3 GCSEs at C and above (or the numerical equivalent) to include at least one science GCSE	
GCSE English:		An English language qualification would be **desirable** (e.g. GCSE English Language Grade C or above - grade 4 for those sitting their GCSE from 2017 onwards; Key Skills Level 2; Functional Skills Level 2; Certificate in Adult Literacy)
GCSE Maths:	Maths Grade C or above (grade 4 for those sitting their GCSE from 2017 onwards). Key Skills Level 2, Functional Skills Level 2 and the Certificate in Adult Numeracy are accepted in place of GCSEs.	Students who do not possess Maths Grade C or above (grade 4 for those sitting their GCSE from 2017 onwards) will be expected to enrol on an appropriate GCSE programme alongside and complete by the end of the Foundation Year.
International qualifications:	International qualifications will be assessed against these criteria	
Mature applicants:	Leeds City College welcomes applications from mature* applicants who may not have met the academic criteria, but who can demonstrate a wealth of experience in their chosen field. Candidates in this category and otherwise are likely to be interviewed to assess their suitability for the course and may be asked to provide a portfolio of evidence to support their application. *21 years and over at the start of the course*	

NEW CRITERIA

Foundation Degree Entry Criteria (text in red to be used where applicable)		
	Typical offer	**Minimum Offer**
A Levels:	D and C with the C in a relevant Science subject	D and E with D in a relevant science subject
BTEC L3 Diploma or Extended Diploma:	BTEC L3: MM, MMP grade in relevant subjects	MP, MPP grade or a Subsidiary Diploma with a D grade in relevant subjects
Access to HE Diploma:	Overall pass with 60 credits, with 30 credits to be at a Merit grade in a relevant subject	Overall pass with 60 credits in a relevant subject
GCSE English:	English Language Grade C or above (grade 4 for those sitting their GCSE from 2017 onwards). Key Skills Level 2, Functional Skills Level 2 and the Certificate in Adult Literacy are accepted in place of GCSEs.	
GCSE Maths:	Maths Grade C or above (grade 4 for those sitting their GCSE from 2017 onwards). Key Skills Level 2, Functional Skills Level 2 and the Certificate in Adult Numeracy are accepted in place of GCSEs.	
IELTS:	IELTS 6.0 with no less than 5.5 in any component.	
International qualifications:	International qualifications will be assessed against these criteria	
Mature applicants:	Leeds City College welcomes applications from mature* applicants who may not have met the academic criteria, but who can demonstrate a wealth of experience in their chosen field. Candidates in this category and otherwise are likely to be interviewed to assess their suitability for the course and may be asked to provide a portfolio of evidence to support their application. *2*1 years and over at the start of the course*	
RPL claims:	The course structure actively supports claims for Recognition of Prior Certified Learning (RPCL) or Recognition of Prior Experiential Learning (RPEL)	
Additional entry criteria (to be added where applicable)		
	Criteria	
GCSEs:	GCSE Science at Grade C or above (Grade 4 for those sitting their GCSE from 2017 onwards)	
Part Time courses:	Students for part time study are required to hold a full level 3 qualification or the equivalent experience in a relevant subject and will need to be working in the sector.	

13 Educational Aims of the Programme

The programme aims to:

- Develop a multidisciplinary understanding of the science of human life, health and disease at the molecular, cellular, system, organismal and environmental level.

	● Provide detailed knowledge of microbial processes and applications, including the opportunities for humans to exploit and benefit from these. ● Foster an understanding and appreciation of the chemistry and biochemistry of drug molecules: their design, synthesis and behaviour in the body ● Develop analytical and practical skills involving the use of a wide range of laboratory equipment and techniques as well as methods of scientific data collection, storage and processing. ● Produce graduates who are technically competent in common laboratory procedures, able to work independently as well as in teams with professionalism, and who are able to learn from experiences through reflective practice.

14	Learning Outcomes The programme will enable students to develop the knowledge and skills listed below. On successful completion of the programme, the student will be able to:	
	Knowledge and Understanding *(insert additional rows as necessary)*	
	K1	Demonstrate a comprehensive and detailed knowledge of activities and applications within the Biomedical, Bioscience, Chemical or Pharmaceutical industries
	K2	Demonstrate a clear, broad and detailed knowledge of standard scientific procedures and describe aspects of good practice including ethical considerations within relevant industry bases
	K3	Explain how hypotheses (devised or provided) may be tested using standard procedures
	K4	Demonstrate a broad, up to date interdisciplinary knowledge of theories and concepts relevant to the current body of scientific understanding within the Biomedical, Bioscience, Chemical or Pharmaceutical industries
	Cognitive/Intellectual Skills *(insert additional rows as necessary)*	
	C1	Research, plan, undertake and evaluate a self-managed project in which evidence is synthesized and appraised relevant to Biomedical, Bioscience, Chemical or Pharmaceutical industries
	C2	Demonstrate both breadth and depth in the application of knowledge to the solution of problems
	C3	Confidently and creatively identify, analyse and solve complex problems in a scientific context using appropriate knowledge and methods
	C4	Draw concise and accurate scientific conclusions through the analysis of data including evaluation of the quality and reliability of the data
	Practical/Professional Skills	
	P1	Respond to changing situations within the industrial environment of a relevant sector, showing knowledge of good practice and current regulations
	P2	Work safely within a laboratory environment and show knowledge of hazards, risks and ethical issues with appropriate responses for relevant industries
	Key Transferable Skills *(insert additional rows as necessary)*	
	T1	Plan, manage and evaluate the acquisition of new knowledge and skills as part of a strategy for employment and future professional development
	T2	Communicate clearly, fluently and effectively in a range of styles using technical and specialist language in a professional manner. Engage in academic debate and discussion effectively
	T3	Demonstrate the ability to use standard and specialist examples of computer software which are relevant to the industry sector

	T4	Operate as part of a team and evaluate own performance
15		Key Learning & Teaching Strategy and Methods A range of teaching and learning methods are employed as appropriate to the level and topic to develop the required knowledge base and skills base. The variety of methods will provide an interesting and enjoyable experience of studying these modules. Students will be encouraged to keep reflective learning journals, both an assessment tool, and as a way of monitoring and managing their own progress towards individual academic and career goals. As the course progresses, students will be increasingly required to conduct independent research - both as paper exercises, and by conducting their own laboratory experiments - which by the end of the course they will be expected to be able to design for themselves. The use of guest speakers in some modules will provide an industrial perspective on some topics, and will raise awareness of the range of activities undertaken in local scientific organisations - inspiring students and placing the theory that is being learned firmly in a real-world context. The programme will be mainly delivered in specially designed joint teaching-laboratory spaces in order to incorporate a mix of practical and theoretical based delivery. Some sessions will involve a blend of short, traditional expositions and lecture-style presentations interspersed with practical activities designed to reinforce or extend the material that has been presented. Other sessions will involve longer, investigative practical activities. Students will be directed to particular chapters of textbooks to read prior to teaching sessions, and there will also be videos, interactive quizzes, lecture notes and simulations of laboratory activities available for study before and after taught sessions. In this way students will have the opportunity to learn and discover for themselves new information using a wide variety of methods. They will also be regularly performing laboratory activities commonly employed in industry with the aim of increasing their competence and confidence in working safely and effectively in a laboratory environment. The college, and particularly the HE Science team, have a strong background in using technology to enhance learning. A rich and accessible single point of access for all material has been developed using the VLE - which has some services, such as Turnitin, embedded and also links seamlessly to other platforms such as Google Classrooms and Sites. As well as providing access to written materials, videos, interactive quizzes and simulations, the VLE will provide a central place in which all work will be submitted (through integration with Turnitin). Students will be directed to use the VLE also as a means of communication through the embedded forums, wikis, blogs and instant messaging facilities. Students will be taught to use common IT tools such as word processing and spreadsheet programmes in order to produce documents to meet standards of scientific writing. They will also regularly make use of more specialist pieces of software such as Molview and other chemical drawing packages, a tool for virtual dissection and 3D Atlas of human anatomy as well as databases and tool for predicting chemical properties. Use of all of these will be incorporated into theory and practical teaching and students will be expected to use them in producing assessed work. IT systems will be introduced during induction and students' skills will be developed continuously throughout the course.

	Students are required to perform meaningful work experience in a relevant science-based role. For students who are unable to find such work experience we will be able to offer short placements with the laboratory technicians in our labs or in the labs at other college campuses. As part of the WRL module students gain a range of laboratory competencies using standard equipment and developing essential skills. These competencies are observed and signed off by the tutor. A part time route is an option over three years studying 6 hours per week on one day. in addition to completing work-based learning in the workplace of a relevant industry. This is aimed at those individuals who have full-time employment in the sector. Each module delivered in college will be delivered over one semester, WRL and Science Investigation will be completed at the place of work. Students will be supported through the VLE in addition to tutorial activities. Each 15 week semester will contain delivery for two modules of 20 credits each. In this way the qualification can be used to offer either a level 5 Technician Scientist apprenticeship or a level 6 Laboratory Scientist apprenticeship delivered in a day release model over a period of 3 years. Apprentices would complete 3 modules per year in college, plus work-based modules with their employer. For part-time students, learning materials and online activities will be available through our VLE, and a robust support system will be in place. Full-time students will also be able to access these resources.
16	Key Assessment Strategy and Methods Taught sessions will incorporate regular short formative assessment activities with feedback (and feedforward) provided to guide students' progress and development. Pair and small group activities will be regularly used in all modules, allowing students to improve their communication and teamwork skills. Short presentations by students will form part of the body of formative and summative assessment activities, increasing students' confidence in speaking and presenting. Formative assessment will begin very early in the course, with short basic tests increasing in demand over the weeks. This is in order to provide a smooth transition from previous education and to identify any students who may need extra support. Online diagnostic testing in maths skills will be used at the very beginning of the course to provide information about specific support in this area that may be required. Formative assessment will be in the form of regular quizzes and tests, some of which will be discussed in subsequent sessions, others will be delivered via the VLE and will provide instant feedback. Preparation for practical activities will be available in the form of virtual experiments in which online feedback is instantly available. Real and simulated practical activities will also provide data and the processing of this provides another opportunity for formative assessment with feedback on both the quality of the data collected, and how this may be improved, and the way in which it is displayed and manipulated to form conclusions. The programme will be assessed summatively through a range of methods, including traditional examinations, laboratory activities with reports written to follow a standard GLP format, problem-based group projects (assessed on the outcome of the project and on the performance of the group), oral and poster presentations, case-studies, portfolios of evidence collected over a period of several weeks, research projects with written reports (including a mini-dissertation style report) and essays. This range of activities provides the opportunity for all students to demonstrate the knowledge and skills that they have acquired throughout the course of their studies. The mix of practical and written assessment, including formal examinations, will provide evidence to employers of the level of laboratory skills and other abilities (such as teamwork, communication skills, ethical integrity, etc.) that a student has developed, whilst also enabling those students who wish to go on to further study to demonstrate the theoretical knowledge and academic skills that they have learned.

	Examinations are included as part of the varied set of assessment methods as they are still widely used across the sector. Our students will be expected by employers to have experience of demonstrating their ability to apply knowledge under exam conditions. Also, students who wish to continue their studies at other institutions may be disadvantaged by not having been assessed through examinations. In year 1 (level 4) both formative and summative assessment will be used to gauge students' levels of ability in academic skills such as information retrieval, academic writing, evaluation of sources and correct referencing style. The development of these skills will be supported by the Library+ service with librarians providing short whole-group sessions and a drop-in service. Feedback on these skills will be developmental, intending to lead to increased independence by year 2 (level 5) when students will be expected to use these skills to produce written work with reduced assistance. For apprentices, there will be continuous assessment of competencies that begin almost immediately. There will also be an end point assessment involving a portfolio of work (comprising a problem-solving project report, presentation, and competence discussion). There will be additional tutorial time with an assessor at the end of each academic year to support preparation for the end-point assessment.

17	**Programme Modules**						
	Level 3 (year 0)						
	Code	**Title**	**Credits**	**Core/ Option**	**Non-Compensatable**	**Compensatable**	**Variance**
		Fundamentals of Biology	20	**Core**		✓	
		Further Biology	20	**Core**		✓	
		Fundamentals of Chemistry	20	**Core**		✓	
		Further Chemistry	20	**Core**		✓	
		Foundation Mathematics	20	**Core**		✓	
		Academic Skills	20	**Core**		✓	
	Level 4						
	Code	**Title**	**Credits**	**Core/ Option**	**Non-Compensatable**	**Compensatable**	**Variance**
		Personal & Professional Development	20	**Core**		✓	
		Integrated Biomolecular Science	20	**Core**		✓	
		Physiology and Pathology (option)	20	**Option**		✓	
		Physical, Inorganic and Organic Chemistry (option)	20	**Option**		✓	
		Integrated Practical Skills	20	**Core**		✓	
		Mathematics	20	**Core**		✓	
		Biochemical Processes (option)	20	**Option**		✓	
		Organic Chemistry (option)	20	**Option**		✓	
	Level 5						
	Code	**Title**	**Credits**	**Core/ Option**	**Non-Compensatable**	**Compensatable**	**Variance**
		Pharmacology and Therapeutics	20	**Core**		✓	
		Microbiology and Biotechnology	20	**Core**		✓	
		Work Related Learning	20	**Core**		✓	
		Scientific Investigation	20	**Core**		✓	
		Immunology (option)	20	**Option**		✓	
		Genetics (option)	20	**Option**		✓	
		Medicinal Chemistry (option)	20	**Option**		✓	
		Biomaterials and Solid State Chemistry (option)	20	**Option**		✓	

LCC Biomedical Science Programme Spec
Version 2
July 2022

18	**Programme Structure** **Full time** The programme is underpinned by the desire to equip students with foundation knowledge, skills and the ability to apply them through work based experiences. In addition the programme is informed by a range of industry sectors. Consistent contextualisation and application of module theory to industry practice embeds the learning, skills, principles and concepts to employment opportunities in the sector. Level 3 (year 0): The modules in semester 1 introduce the most basic topics in Biology and Chemistry, ensuring the essential concepts that underpin more advanced topics are thoroughly. The semester 2 modules build on this, progressing through some more demanding level 3 material in order to adequately prepare students for the level 4 module sin the following year. In both Biology and both Chemistry modules, the topics will be delivered in a context that is relevant to the Biomedical Sciences programme. There are two long and thin modules. The Mathematics module will cover key skills to support the topics in the Biology and Chemistry modules. It will provide practice of mathematical techniques throughout the year and so will be able to support learning in both semester 1 and semester 2 modules. Similarly, the Academic Skills module will provide essential support throughout the year, covering skills that are necessary for producing a range of forms of coursework and in preparation for sitting examinations. Running long and thin allows tailored support to be offered, broadly synchronised with the assessment in the Biology and Chemistry modules as they are delivered. For example, since exams are only used at the end of semester 2 the topics that specifically deal with preparation for these can be left until later in the planned delivery. Level 4: The first semester aims to provide students with strong foundations in scientific knowledge (with options relevant to either biomedical- or chemical-focussed industries) and an awareness of mathematical techniques applied in scientific study. Also in semester 1, students are encouraged to reflect on their learning and identify common academic skills that they need to develop in order to succeed on the course, as well as specific skills that they wish to gain to aid them in progressing towards a chosen career. There is a focus around the need for practical application of these skills into the specific occupational sector. This continues to be addressed in semester 2 with a module based on laboratory skills. In semester 2 students will also take one option module: studying either Organic Chemistry (the branch of chemistry that is most important to pharmaceutical and other life sciences), or the biochemical principles important in the biotechnology sector. There are no restrictions on the choice of modules, but students who wish to progress into pharmaceutical-based industries or further study would benefit from Organic Chemistry. Likewise Biochemical Processes would be useful for students interested in a career or further study in the Biotech sector. The continual contextualisation and application of scientific theory to sector-specific practice ensures students are fully engaged on a practical level which supports high levels of retention. The contained qualification, Certificate in higher education requires the achievement of 120 credits at Level 4 Level 5:

At this level, students are challenged to become more independent, taking greater control of their own learning and further applying theoretical aspects to their chosen sector.
In semester 1 they will be able to study topics of relevance to many bioscience or pharmaceutical industrial sectors as well as further develop their knowledge of the potential career choices available to them and how to maximise their potential for progressing into such careers. Students will be encouraged to arrange work experience that is most beneficial to their chosen career, but those students who are not able to find suitable work outside college will be offered internal opportunities and projects.

In semester 2 students are offered a choice of modules to suit their progression choices. Those interested in pharmaceutical-related industries may study Medicinal Chemistry so long as they have studied one of the two chemistry-based modules at level 4. Alternatively students may choose to study Immunology and learn about disease states and how the human immune system works.

There is also the option to study a module based on biomaterials - in which students will be able to learn about the use of modern materials for implants and prostheses and the strategies for choosing suitable materials for these applications. The alternative to this is to study Genetics and learn about inheritance and how genetic information affects biological processes.

The options allow students to tailor their studies to fit their particular interests or progression ambitions.

The research, design and analysis module ("Scientific Investigation") runs throughout the second year. As students can choose their own topic, it allows them to gain valuable background knowledge and laboratory skills of relevance to whatever area of science they are most interested in. This module will challenge students to organise and manage their own time effectively, leading to highly self-motivated and independent learners.

Part time
The part time structure is designed to allow for low numbers of students who may wish to follow this route. It would typically be offered on an infill basis with part time students joining classes with full time students in order to keep viable groups.

It is anticipated that this structure will be used mainly for apprentices who would attend college on one day per week. In the event of an employer requiring a different delivery model, we would apply for a major modification to the programme to accommodate this.

In this way, the complete set of level 4 modules would take 2 years to complete. The modules offered in year 1 deliver the essential study, laboratory and mathematical skills, with the second year containing one core module and the two optional subject-specific modules.

The level 5 modules would be completed in a single year as two modules (*Work Based Learning and Scientific Investigation*, totalling 40 credits) would be delivered remotely. It is anticipated that this would take the form of project work conducted at the student's place of work with close monitoring and support from college tutors. In the event that laboratory facilities were not available for such project work, paper-based research projects could be undertaken in the student's own time - again with close monitoring and support from college tutors.

In the event of taking on a student part-time who cannot complete *Work Based Learning and Scientific Investigation* remotely, that student would be able to infill to the classes on the full time programme in order to complete the work for those two modules in year 3.

Full time structure diagram

Level 3 (Year 0)	
Semester 1	**Semester 2**
Fundamentals of Chemistry (20 credits)	**Further Chemistry (20 credits)**
Fundamentals of Biology (20 credits)	**Further Biology (20 credits)**
Academic Skills (20 credits)	
Foundation Mathematics (20 credits)	

Level 4 (Year 1)	
Semester 1	**Semester 2**
Personal & Professional Development (20 credits)	**Integrated Practical Skills (20 credits)**
Integrated Biomolecular Science (20 credits)	**Biochemical Processes *(option)* OR Organic Chemistry *(option)* (20 credits)**
Mathematics (20 credits)	
Physiology and Pathology *(option)* OR Physical, Inorganic and Organic Chemistry *(option)* (20 credits)	

Level 5 (Year 2)	
Semester 1	**Semester 2**
Pharmacology and Therapeutics (20 credits)	**Immunology *(option)* OR Medicinal Chemistry *(option)* (both 20 credits)**
Microbiology and Biotechnology (20 credits)	**Genetics *(option)* OR Biomaterials and Solid State Chemistry *(option)* (both 20 credits)**
Work Related Learning (20 credits)	
Scientific Investigation (20 credits)	

Part time structure diagram

Structure (Year 0a - level 3 part 1)

Semester 1	Semester 2
Fundamentals of Chemistry (20 credits)	Further Chemistry (20 credits)
Foundation Mathematics (20 credits)	

Structure (Year 0b - level 3 part 2)

Semester 1	Semester 2
Fundamentals of Biology (20 credits)	Further Biology (20 credits)
Academic Skills (20 credits)	

Structure (Year 1)

Semester 1	Semester 2
Personal and Professional Development (20 credits)	Integrated Practical Skills (20 credits)

Mathematics (20 credits)

Structure (Year 2)

Semester 1	Semester 2
Integrated Biomolecular Science (20 credits)	
Physiology and Pathology ***(option)*** OR Physical, Inorganic and Organic Chemistry ***(option)*** (both 20 credits)	Biochemical Processes ***(option)*** OR Organic Chemistry ***(option)*** (both 20 credits)

Structure (Year 3)

Semester 1	Semester 2
Microbiology and Biotechnology (20 credits)	Immunology ***(option)*** OR Medicinal Chemistry ***(option)*** (both 20 credits)
Pharmacology and Therapeutics (20 credits)	Genetics ***(option)*** OR Biomaterials and Solid State Chemistry ***(option)*** (both 20 credits)
Work Related Learning (20 credits) (delivered as WBL or infill to F/T class)	Scientific Investigation (20 credits) (delivered as WBL or infill to F/T class)

19 **Apprenticeships**

The programme can be used to support achievement of the Level 5 Technician Scientist, delivered in a day release model over a period of 3 years where students will complete 3 modules per year of study to achieve the Level 4 and Level 5 of the degree but allowing for the completion of work based modules with their employer. End point assessment will be made on completion of a portfolio of work derived from additional tutorial time with an assessor at the end of each academic year. The platform OneFile will be used to collate this.

Support for students begins at recruitment where students complete initial tests. Induction contains an introduction to the structure and regulations of the course in addition to a skills scan and advice on academic skills and library support (with research and referencing). Students receive individual support through tutorial and are assigned a pastoral tutor. All students have access to welfare and may access specialist support through the learning support mentor. The VLE supports students with further resources and extension and is available 24/7 anywhere with internet access.

	Students are taught in specialist laboratories using a mixture of lecture, practical and workshop activities with access to specialist tutorial and additional resources including the course textbook and VLE sites. Tutors on the programme are highly qualified and experienced subject specialists with industry experience. End point assessment (EPA) requires the students to have successfully completed the FD and is performed by an external assessor appointed by the end point assessment organization (currently SIAS). EPA requires the solving of a workplace problem evidenced by a project report, presentation and discussion (graded). In addition, there is a vocational competence discussion, which is also graded.
20	**Support for Students and Their Learning** A detailed induction programme has been designed to introduce students to the key features of the course and methods of working such as use of the VLE and safe working practice in the laboratories. Activities give students hands-on experience of using college IT systems, laboratory equipment and facilities whilst also being engaging and providing opportunity for students to interact socially and become comfortable with the environment. Important support services such as the library and learning support officer are introduced at this point. All of the teaching and support staff are approachable, easily contactable and dedicated to assisting students in their studies. Each student is allocated a tutor for regular tutorials and personal development planning. The personal tutor will also provide pastoral care, plus the department has an attendance and well-being officer who will provide ancillary support where needed. Additional learning support is provided by a dedicated University Centre learning support officer. These arrangements are implemented in the first term and continued throughout all years of study. Part-time students will have access to support materials through the VLE and will be able to contact staff for support remotely using the VLE and other communication tools such as email and Google Hangouts. Apprentices will receive additional support in the workplace through mentors and assessors. Academic support beyond the delivery of modules is provided by staff, aided by study skills support tutors. This will be tailored to the needs of each student - challenging the highest achieving to go even further whilst providing support for those struggling in any areas. Staff holidays are managed, wherever possible, to ensure at least one person is available during vacations. The library and librarians provide a range of services to help students in finding information and producing high quality work that complies with set academic standards. Sessions can be delivered on simple academic online searching, understanding and avoiding plagiarism and correct referencing style. Apprentices, who would be attending college on one day per week, will have access to an increasing range of textbooks available remotely as e-books. A small number of vital texts that cannot be accessed remotely will be provided as hard copies for apprentices to use outside college. Support for preparation for the end-point assessment is built into the apprenticeship timetable. Guidance will be provided for those wishing to progress to the degree apprenticeship.

21	**Distinctive Features** The programme places an emphasis on the balance between core scientific theory and skills, setting both into industry-relevant contexts. It aims to producing students that have the tools to succeed within employment with appropriate transferable skills, as specified by our industrial contacts. There is an outstanding range of opportunities to develop practical scientific experience valued by sectors such as chemical industries (e.g. fine or bulk chemical production, analytical or environmental chemistry), bioscience and biotechnology industries (e.g. production and regulation of microbial processes including production of pharmaceuticals and bio-products). Almost all of our teaching is done in laboratories, with very little delivery in classrooms. We believe that the use of practical activity-led teaching in most of the modules sets this course apart from the majority (in which most teaching will be in lecture theatres and classrooms, supplemented by laboratory-based teaching in separate sessions). Throughout the course students will have many opportunities to develop a wide range of practical skills that are valued in a number of different industries. The employability skills of our graduates will be enhanced by developing their confidence in working in a laboratory environment and through their extensive practice of common industry-standard procedures. We have consulted carefully with a range of employers to ensure that both the theoretical content and the practical experience that is delivered fits their requirements, ensuring that our graduates have the best chance of being well-equipped to compete for jobs in the science sector. The range of modules offer an excellent opportunity to work across disciplines, providing an innovative and contemporary way of developing scientific skills. This is particularly well-evidenced in the Integrated Practical Skills core module, through which students gain experience of techniques specific to both bioscience and chemical laboratories. The balance of bioscience and chemistry also sets this programme apart from many others, providing opportunities for students to progress into industries requiring significant chemical knowledge. This would not be possible for graduates of equivalent courses from local competitors where there is not the opportunity to study as much chemistry.

Stage Outcomes (Undergraduate Awards only)

Key: **K** = Knowledge and Understanding **C** = Cognitive and Intellectual **P** = Practical Professional **T** = Key Transferable [*see Section 16 programme specification*]

No.	Programme Outcome	Stage/Level 4(stage 1)	Stage/Level 3(stage 0)
K1	Demonstrate a comprehensive and detailed knowledge of activities and applications within the Biomedical, Bioscience, Chemical or Pharmaceutical industries	Describe activities within relevant industries using scientific knowledge	Recognise activities as 'scientific'
K2	Demonstrate a clear, broad and detailed knowledge of standard scientific procedures and describe aspects of good practice including ethical considerations within relevant industry bases	Describe and identify good practice in relevant industry procedures, including ethical aspects	Demonstrate knowledge of some standard scientific procedures
K3	Explain how hypotheses (devised or provided) may be tested using standard procedures	List individual actions required to perform a practical activity in order to test a hypothesis	Describe simple laboratory activities that contribute to the testing of a hypothesis
K4	Demonstrate a broad, up to date interdisciplinary knowledge of theories and concepts relevant to the current body of scientific understanding within the Biomedical, Bioscience, Chemical or Pharmaceutical industries	Describe, explain and use key elements of the foundation knowledge of theories and concepts	Recall some of the theories and concepts from key areas of Bioscience and Chemistry
C1	Research, plan, undertake and evaluate a self-managed project in which evidence is synthesized and appraised relevant to Biomedical, Bioscience, Chemical or Pharmaceutical industries	Identify a topic and appropriate research methods to gather information and justify conclusions	Select an appropriate technique or piece of equipment for given laboratory exercises.

C2	Demonstrate both breadth and depth in the application of knowledge to the solution of problems	Gather, record and describe with guidance detailed information from a range of sources	Find information from appropriate sources that is relevant to defined problems
C3	Confidently and creatively identify, analyse and solve complex problems in a scientific context using appropriate knowledge and methods	Identify problem, apply given method accurately and carefully to solve problem creatively	Solve simple problems using provided information
C4	Draw concise and accurate scientific conclusions through the analysis of data including evaluation of the quality and reliability of the data	Gather, record and process data, including some graphical or mathematical analysis, in order to reach valid conclusions.	Draw conclusions from simple sets of data using any suitable techniques.
No.	**Programme Outcome**	**Stage/Level 4(stage 1)**	**Stage/Level 3(stage 0)**
P1	Respond to changing situations within the industrial environment of a relevant sector, showing knowledge of good practice and current regulations	Act with limited autonomy within defined guidelines, demonstrating ability to follow standard procedures and regulations.	Demonstrate awareness of standard practices and regulations in a scientific industry
P2	Work safely within a laboratory environment and show knowledge of hazards, risks and ethical issues with appropriate responses for relevant industries	Safely use a specified range of standard techniques and demonstrate awareness of common hazards, issues and their resolution	State the necessary precautions to be taken to minimise the risk associated with a specified hazard
T1	Plan, manage and evaluate the acquisition of new knowledge and skills as part of a strategy for employment and future professional development	Identify own learning strengths and articulate personal skills, abilities, interests and motivations and relate these to career opportunities.	Explain own strategy for maximising success in academic and career progression
T2	Communicate clearly, fluently and effectively in a range of styles using technical and specialist language in a professional manner. Engage in academic debate and discussion effectively	Communicate appropriately using scientific language verbally and in writing.	Distinguish between language that is appropriate for scientific writing and other styles of English
T3	Demonstrate the ability to use standard and specialist examples of computer software which are relevant to the industry sector	Use IT tools for specific scientific purposes	Use basic IT tools
T4	Operate as part of a team and evaluate own performance as such	Discuss own role in team activities	Engage in team activities

Map of Outcomes to Modules

Rules of combination
At level 3 (year 0), all modules must be studied (if applicable)

At level 4, all core modules must be studied: Personal and Professional Development, Mathematics, Integrated Biomolecular Science, Integrated Practical Skills.
Students may choose to study in semester 1, in addition to core modules: either *Physiology & Pathology* or *Physical, Inorganic & Organic Chemistry* - there are no prerequisites or corequisites for these options
Students may choose to study in semester 2, in addition to core modules: either *Biochemical Processes* or *Organic Chemistry* - there are no prerequisites or corequisites for these options

At level 5, all core modules must be studied: Work Related Learning; Scientific Investigation; Pharmacology and Therapeutics; Microbiology and Biotechnology
There are no optional modules in semester 1.
Students must study in semester 2, in addition to core modules: either *Immunology* or *Medicinal Chemistry* (one of these must be chosen), plus either *Genetics* or *Biomaterials & Solid State Chemistry* (one of these must be chosen).
Immunology requires that students have studied the level 4 module *Physiology & Pathology* (or can evidence having met the learning outcomes through APL).
Medicinal Chemistry requires that students have studied at least one of the level 4 modules *Physical, Inorganic and Organic Chemistry* or *Organic Chemistry* (or can evidence having met the learning outcomes through APL).

Level 3 (year 0)

	Outcome Key													
Module Titles	K1	K2	K3	K4	C1	C2	C3	C4	P1	P2	T1	T2	T3	T4
Fundamentals of Biology	**A**	**A**		**A**		**A**		**A**	**A**					**A**
Further Biology			**A**	**A**	**A**					**A**	**A**	**A**		
Fundamentals of Chemistry		**A**		**A**		**A**	**A**			**A**		**A**		

Further Chemistry			**A**	**A**	**A**		**A**	**A**					**A**	
Foundation Mathematics		**A**			**A**		**A**	**A**					**A**	
Academic Skills	**A**					**A**			**A**		**A**		**A**	**A**

Stage 1 (level 4)

	Outcome Key													
Module Titles	K1	K2	K3	K4	C1	C2	C3	C4	P1	P2	T1	T2	T3	T4
Personal & Professional Development				**A**			**A**		**A**		**A**		**A**	**A**
Mathematics	**A**	**A**			**A**			**A**				**A**	**A**	
Integrated Biomolecular Science				**A**		**A**	**A**		**A**					**A**
Integrated Practical Skills		**A**	**A**		**A**			**A**		**A**		**A**		
Biochemical Processes (option)			**A**	**A**	**A**	**A**				**A**				
Organic Chemistry (option)	**A**		**A**				**A**	**A**		**A**			**A**	
Physiology and Pathology (option)	**A**	**A**	**A**			**A**		**A**			**A**	**A**		
Physical, Inorganic and Organic Chemistry (option)	**A**			**A**	**A**	**A**			**A**	**A**	**A**			

Stage 2 (level 5)

	Outcome Key													
Module Titles	K1	K2	K3	K4	C1	C2	C3	C4	P1	P2	T1	T2	T3	T4
Work Related Learning	**A**						**A**				**A**	**A**	**A**	**A**
Scientific Investigation		**A**	**A**	**A**	**A**	**A**					**A**			**A**
Pharmacology and Therapeutics		**A**		**A**			**A**		**A**	**A**				
Immunology (option)				**A**				**A**				**A**	**A**	
Biomaterials and Solid State Chemistry (option)	**A**			**A**		**A**		**A**				**A**	**A**	
Genetics (option)			**A**			**A**	**A**	**A**		**A**		**A**		
Medicinal Chemistry (option)	**A**			**A**		**A**	**A**	**A**					**A**	
Microbiology and Biotechnology	**A**	**A**	**A**		**A**			**A**	**A**	**A**				

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Map of Teaching and Learning Methods

Level 3 (year 0)

	Methods								
Module Titles	Lectures	Student led/ interactive/ shared learning seminars	Case Studies	Skills workshops	Practicals (laboratory sessions)	Group activities	Guest speakers	Independent / E Learning/ On-line forums	Demonstrations
Fundamentals of Biology	✓			✓	✓			✓	✓
Further Biology	✓			✓	✓	✓		✓	✓
Fundamentals of Chemistry	✓			✓	✓			✓	✓
Further Chemistry	✓			✓	✓			✓	✓
Foundation Mathematics	✓							✓	
Academic Skills	✓	✓	✓	✓		✓		✓	

Level 4

	Methods								
Module Titles	Lectures	Student led/ interactive/ shared learning seminars	Case Studies	Skills workshops	Practicals	Group activities	Guest speakers	Independent / E Learning/ On-line forums	Demonstrations
Personal & Professional Development	✓	✓	✓	✓		✓	✓	✓	
Integrated Biomolecular Science	✓			✓	✓	✓		✓	✓
Physiology and Pathology (option)	✓		✓	✓	✓	✓		✓	✓
Physical, Inorganic and Organic Chemistry (option)	✓		✓	✓	✓	✓		✓	✓
Integrated Practical Skills				✓	✓	✓		✓	✓
Mathematics	✓	✓		✓		✓		✓	

Biochemical Processes (option)	✓			✓	✓	✓		✓	✓
Organic Chemistry (option)	✓			✓	✓	✓		✓	✓

Level 5

	Methods								
Module Titles	Lectures	Student led/ interactive/ shared learning seminars	Case Studies	Skills workshops	Practicals	Group activities	Guest speakers	Independent / E Learning/ On-line forums	Demonstration
Pharmacology and Therapeutics	✓		✓		✓	✓		✓	✓
Microbiology and Biotechnology	✓		✓		✓	✓		✓	✓
Work Related Learning	✓	✓	✓	✓		✓	✓	✓	
Scientific Investigation				✓	✓		✓		✓
Immunology (option)	✓				✓	✓		✓	✓
Medicinal Chemistry (option)	✓		✓		✓	✓		✓	✓
Genetics (option)	✓		✓		✓	✓		✓	✓
Biomaterials and Solid State Chemistry (option)	✓		✓		✓	✓		✓	✓

Map of Assessment Methods

Level 3 (year 0)

	Methods							
Module Titles	Laboratory Report	Reflective Online Journal (blog)	Exam	Open Book Time-limited Assessment	Laboratory Practical	Presentation	Problem -based coursework	Data Analysis Report
Fundamentals of Biology				40% (90 minutes) wk 15	60% (2 hour lab time plus 750 word report) wk 9			
Further Biology			40% (90 minutes) wk 30		60% (2 hour lab time plus 750 word report) wk 25			
Fundamentals of Chemistry	60% (1000 words) wk 7			40% (90 minutes) wk 15				
Further Chemistry							50% (1000 words) wk 30	50% (1000 words) wk 23
Foundation Mathematics							50% (1000 words) wk 17	50% (1000 words) wk 29
Academic Skills		50% (1000 words) wk 19				50% (15 minutes) wk 27		

Level 4

	Methods										
Module Titles	Laboratory Report	Assessed log book (record of skills)	Production of artefact	Reflective Online Journal (blog)	Exam	Online Time-limited Assessment	Written Time-limited Assessment	E-Portfolio	Oral Presentation	Academic Poster Presentation	Coursework Project
Personal & Professional Development				50% (1500 words) wk 11				50% (1500 words) wk 14			
Integrated Biomolecular Science	50% (1500 words) wk 14									50% (15 minutes) wk 7	
Physiology and Pathology	50% (1500 words) wk 8					50% (90 minutes) wk 15					
Physical, Inorganic and Organic Chemistry	50% (1500 words) wk 8					50% (90 minutes) wk 15					
Integrated Practical Skills		50% (1500 words) wk 29							50% (15 minutes) wk 21		
Mathematics							50% (90 minutes) wk 19				50% (1500 words) wk 27
Biochemical Processes	50% (1500 words) wk 23				50% (90 mins) wk 30						
Organic Chemistry			50% (1 chemical		50% (90 mins) wk 30						

			compound) wk 23								

Level 5

	Methods								
Module Titles	Laboratory report	Exam	Open book exam	Essay	Case study	Presentation	Coursework Project Report	Investigation design	Investigation report
Pharmacology and Therapeutics		60% (2 hours) wk 15		40% (1600 words) wk 9					
Microbiology and Biotechnology	40% (1600 words) wk 7		60% (2 hours) wk 15						
Work Related Learning						50% (15 minutes) wk 6	50% (2000 words) wk 14		
Scientific Investigation								40% (1600 words) wk 5	60% (2400 words) wk 29
Immunology (option)		60% (2 hours) wk 30		40% (1600 words) wk 23					
Medicinal Chemistry (option)		60% (2 hours) wk 30					40% (1600 words) wk 25		
Genetics (option)		60% (2 hours) wk 30			40% (1600 words) wk 25				

Biomaterials and Solid State Chemistry (option)		60% (2 hours) wk 30			40% (1600 words) wk 23				