

Course Information Document: Undergraduate

For students starting in Academic Year 2017/2018

1. Course Summary

Names of programme(s) and award title(s)	BSc (Hons) Pharmaceutical Science, Technology and Business
Award type	Single Honours
Mode of study	Full time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 6
Duration	3 years
Location of study	Keele University – main campus
Accreditation (if applicable)	Not applicable
Regulator	Higher Education Funding Council for England (HEFCE)
Tuition Fees	UK/EU students: Fee for 2017/18 is £9,250* International students: Fee for 2017/18 is £16,000**
Additional Costs	Refer to section 16

How this information might change: Please read the important information at <http://www.keele.ac.uk/student-agreement/>. This explains how and why we may need to make changes to the information provided in this document and to help you understand how we will communicate with you if this happens.

2. What is a Single Honours programme?

The Single Honours programme described in this document allows you to focus more or less exclusively on Pharmaceutical Science, Technology and Business. In keeping with Keele's commitment to breadth in the curriculum, the programme also gives you the opportunity to take some modules outside Pharmaceutical Science, Technology and Business, in other disciplines and in modern foreign languages as part of a 360-credit Honours degree. Thus it enables you to gain, and be able to demonstrate, a distinctive range of graduate attributes.

** These fees are regulated by Government. We reserve the right to increase fees in subsequent years of study in response to changes in government policy and/or changes to the law. If permitted by such change in policy or law, we may increase your fees by an inflationary amount or such other measure as required by government policy or the law. Please refer to the accompanying Student Terms & Conditions. Further information on fees can be found at <http://www.keele.ac.uk/studentfunding/tuitionfees/>*

*** We reserve the right to increase fees in subsequent years of study by an inflationary amount. Please refer to the accompanying Student Terms & Conditions for full details. Further information on fees can be found at <http://www.keele.ac.uk/studentfunding/tuitionfees/>*

3. Overview of the Programme

The BSc in Pharmaceutical Science, Technology and Business (PSTaB) programme integrates a thorough exposition of the essential and applied pharmaceutical sciences with appropriate coverage of business and management skills that will prepare our graduates to be effective leaders in the global pharmaceutical industry. It is an innovative course that combines a study of the essential and applied pharmaceutical sciences with a thorough analysis of the global pharmaceutical industry. It aims to meet the needs of the industry by producing graduates who are pharmaceutically aware, who have the ability to think critically and creatively, who understand and can apply the essential concepts of sustainable development within the pharmaceutical industry, and who also have significant knowledge and understanding of business and management, thus facilitating the transition to employment and their immediate contribution.

The degree programme is uniquely structured against the "spine" of the New Chemical Entity coming from research and is carefully defined against corporate strategy to the development and registration of a product for use in man, launch and commercialisation, life cycle management and generic manufacture. The multidisciplinary course will deliver a new generation of potential global industry leaders, with a broad knowledge of applied and cutting-edge aspects of pharmaceutical science and technology. Our graduates will have the business insight essential in the new industrial model to be able to buy and sell science and to participate in, manage and lead global product development teams.

4. Aims of the Programme

The global pharmaceutical research scientist and industry pharmaceutical business professional are, today, going to be more involved in the evaluation of scientific data and the business case involved in new science acquisition. In order to stay abreast of current developments in the pharmaceutical industry students must have a high-level awareness of both the science and the business of the global pharmaceutical industry. In particular, they must be aware of the teams they will be a member of and lead, but also understand the holistic nature of the global business and how different teams work together synergistically within the relevant frameworks, including sustainable development and ethical operation.

The overall aims of the PSTaB BSc programme are therefore to:

- provide the students with the knowledge, skills, attitudes and values to underpin studies in pharmaceutical science and business, and develop their competence in applying these skills.
- develop student's critical thinking, evaluation and decision-making skills in order to enable them to join the fast-paced and evolving modern pharmaceutical industry.
- facilitate student's development of the competencies required for autonomous practice and leadership in a diverse range of scientific and business settings.
- promote research awareness and its application to developing new products and delivering these in challenging and emerging markets.
- provide students with the skills to adapt and respond positively to change. In doing this, students will develop key transferable skills to prepare them for graduate employment.

A more full description of the subject-specific knowledge and skills, and the employability skills that are embedded within the programme is given later in this document.

5. What you will learn

The learning and teaching methods described in section 4 enable students to achieve the learning outcomes of the programme in a variety of ways. For example:

- **Lectures and associated independent study** enable students to broaden and deepen their existing knowledge and understanding of core and applied concepts of science and business, and to transfer that knowledge from theory into practice.

- **Laboratory work and practical skills-based workshops** enable students to integrate theoretical and practical knowledge, to develop and enhance their learning of new skills under the supervision of expert staff and to ensure safe and competent practice.
- **Small-group workshops, seminars and tutorials**, including individual and group presentations, provide opportunities for students to clarify and exchange ideas, and to question and challenge professional concepts.
- **Independent study and online learning** encourage students to reflect upon their learning and to take responsibility for its development, and to collaborate with others to share, explore, and evaluate ideas in greater depth.
- **Undertaking a research project** further develops the student's independent learning and research capability; it also enables them to plan, implement and document a piece of research with relevance to the pharmaceutical sciences. This piece of work encourages competence with IT and data analysis skills.

6. How is the Programme taught?

Learning and teaching methods used on the programme vary according to the discipline and nature of the subject matter at that stage of the course. All teaching is undertaken on the University campus in the appropriate classroom and laboratory environments and group sizes vary according to the subject matter. A variety of approaches to teaching are used on the programme:

- **Traditional and interactive lectures** in which the lecturer provides students with a framework and context for further reading and independent study. Some lectures may feature invited external speakers who are active researchers and practitioners from the pharmaceutical science and industry arenas.
- **Laboratory work** in which students develop the acquisition of key manipulative, preparative and analytical laboratory skills under the supervision of academic staff.
- **Workshops** facilitated by academic staff allow students to work together and develop practical skills by applying subject-specific knowledge to critically evaluate a piece of literature or to solving in-context problems, for example.
- **Individual and group presentations** where students research and present a topic to the whole group with time allowed for interactive questions and discussion, peer review and feedback.
- **Tutorials**, led by academic tutors or by students, which encourage topics of interest and relevance to be discussed in depth within a small group.
- **Online learning** using the Keele Virtual Learning Environment (KLE): this is used at all Levels of the programme and provides a platform for students to access a wide range of learning resources, to share online discussions, to submit work for assessment and to receive individual feedback that is specific to a particular assignment or task.

Independent study will be required throughout the programme, perhaps guided by academic staff or self-directed in relation to the various demands of each module and its assessment. This type of learning may be facilitated by use of various resources including those provided on the KLE. Independent study also forms an important part of the development of the final year research project, which is supported by a designated member of the academic staff.

One-to-one tutorials with members of staff are available to support all students on an individual basis, at their request, to enable them to discuss any particular identified areas of difficulty, and special learning needs they may have, and to give help and feedback during preparation of assessed work.

7. Teaching Staff

The permanent academic staff members contributing to the PSTaB programme are drawn from the staff of the University's School of Pharmacy along with contributions by staff from other Schools and external stakeholders, when appropriate. The staffing within the School of Pharmacy includes professors and a complement of readers, senior lecturers, lecturers and academic-related and technical support staff, all of which contribute to a supportive environment for study. A number of staff have dual roles, in that they have contracts with the University but also hold contracts with other relevant stakeholders, including the NHS. Several of the current staff also have extensive experience of working within the pharmaceutical industry and are able to provide context and perspective to the business aspects of the PSTaB programme.

All current permanent academic staff are members of, or are working towards, membership of the Higher Education Academy. All current permanent academic staff hold academic qualifications to at least Masters level and the majority hold a PhD qualification in a discipline firmly rooted in pharmaceutical science. The staff group has extensive experience of teaching at undergraduate and postgraduate level and includes individuals with expertise in learning and teaching, and research. The work of all research-active staff has been published widely and shared via conference presentations, for example.

The University will attempt to minimise changes to our core teaching teams, however, delivery of the programme depends on having a sufficient number of staff with the relevant expertise to ensure that the programme is taught to the appropriate academic standard.

Staff turnover, for example where key members of staff leave, fall ill or go on research leave, may result in changes to the programme's content. The University will endeavour to ensure that any impact on students is limited if such changes occur.

8. What is the Structure of the Programme?

The academic year runs from September to June and is divided into two semesters. The number of weeks of teaching will vary from course to course, but you can generally expect to attend scheduled teaching sessions between the end of September and mid-December, and from mid-January to the end of April.

Our degree courses are organised into modules. Each module is usually a self-contained unit of study and each is usually assessed separately with the award of credits on the basis of 1 credit = 10 hours of student effort. An outline of the structure of the programme is provided in the tables below.

The PSTaB programme integrates development of students' knowledge and skills of the essential and applied pharmaceutical sciences contextualised by a thorough exposition of the requisite business and management skills. The three-year programme has been designed with a spiral curriculum in mind, with progressive reinforcement of concepts in a fully-contextualised manner. All modules in the PSTaB programme are compulsory though there may be elements of choice within some.

The first year of the programme adopts an integrated approach to developing students' knowledge of the physical and life sciences, and business alongside enriching their skills in numeracy, language and communication, which will be assessed formally. As the programme progresses students' knowledge and understanding of the sciences will be applied in the key areas of chemistry and pharmaceutical analysis, pharmacology and drug action, pharmaceuticals and formulation science, and research skills and ethics, whilst their business acumen will be developed through interactions with leading practitioners from the industrial arena and our own internal experts within the School of Pharmacy.

The final year will provide students with the ability to explore science and business topics of particular interest to them, alongside undertaking an extended research project at the cutting-edge of the pharmaceutical sciences. The final year programme will cover contemporary business and management aspects specific to the pharmaceutical industry, including accounts of regulatory affairs, global financial modelling, commercialization and the emergence of new markets, and aligning new working models with the global agenda for sustainable development. There are obvious opportunities within the programme for further integration of business and management topics through appropriate experiential interactions and placements with industrial partners.

Assessment at each Level of the programme is staged throughout the academic session, as far as possible, in order to spread the burden of assessments out across each year of study. For example, at Level 4 each of the examinations fall at the end of eight weeks of learning and teaching with other laboratory- and skills-based assessments being submitted throughout the academic session.

Year 1 (Level 4)

Core modules	Credits
Essential Topics in Pharmaceutical Science	30
Core Topics in Pharmaceutical Science I	30
Core Topics in Pharmaceutical Science II	30
The Business of Drug Discovery	15
Elective modules	
Language Module (Language Learning Unit)	15

The first year of the programme adopts an integrated approach to developing students' knowledge of the physical and life sciences, alongside coupled modules that are rich in business content and provide essential skills for students entering the global business environment. The Essential Topics and Core Topics modules are uncompromisingly science-rich and comprise large-group lecture presentations, laboratory classes and skills-based workshops, supported by bespoke small-group sessions that contextualise the module content. It is essential to note here that students will also study aspects of ethics that are relevant to both the science and business arenas, and will reflect upon their own attitudes and values. The Business of Drug Discovery will provide a detailed overview of the global pharmaceutical industry and will place the drug discovery process, which forms the spine for Level 4, firmly in the context of business, regulation and globalisation. The taught programme at all levels will be supported by a series of plenary sessions delivered by people working in various arenas in the pharmaceutical industry.

Language and communication skills form a key part of the curriculum at Level 4 and are essential for assessments at all Levels of the PSTaB programme. The programme is designed for overseas non-EU students, which may include both native and non-native English speakers. All students will be assessed for fluency in English on entry and will be directed towards an appropriate choice of module from the range offered by the Language Learning Unit. For example, students for whom English is a second language and who lack English language skills in particular areas will be required to undertake ENL-90006 English for Academic Purposes, or a variant thereof; the assessments in this module will be directed towards supporting the business aspects of the curriculum, in particular. Any students who are native English speakers or are deemed to have well-developed English language skills will be directed to choose an alternative module at from the Language Learning Unit at a Level appropriate to their language skills, so that they may develop fluency in another language; for example, students aiming for employment in developing markets may choose to study a 15-credit module in Spanish or Mandarin. The Language Learning Unit provides language training for students with all levels of proficiency and it is important to note that, whilst developing student's spoken and written communication skills, a significant proportion of each module is devoted to the study of national culture and customs. Students will be encouraged to continue independently to develop skills in a second language throughout their studies.

Year 2 (Level 5)

Core modules	Credits
Applications of Pharmaceutical Science I	45
Applications of Pharmaceutical Science II	45
Pharmaceutical Business Development	30

As the programme progresses students' knowledge and understanding of the sciences will be applied in the key areas of chemistry and pharmaceutical analysis, pharmacology and drug action, and pharmaceuticals and formulation science, whilst their business acumen will be developed in the core business and management module 'Pharmaceutical Business Development' through interactions with leading practitioners from the industrial arena.

The Applications of Pharmaceutical Science modules will cover the core aspects of pharmaceuticals and formulation science, enriched by a comprehensive fully-formed programme of laboratory classes, and additional practical exercises reinforce the key concepts in product design and formulation. The modules together will cover all essential aspects of pharmacology, again supported by well-formed laboratory classes and non-laboratory practical exercises. Additional material covering advances in medicinal chemistry, metabolism in health and disease, and microbiology is incorporated with appropriate context. Advanced aspects of chemical analysis, separation science and spectrometry are covered with the emphasis upon quality assurance and control, accompanied by appropriate preparative laboratory work and practical exercises in analytical techniques, assays and calculations. Research methods will be covered to provide critical skills in research and data analysis, not all derived experimentally, to provide a link with and support the extended research project and other assessments at Level 6. In particular, students will be exposed to a more developed discussion of ethics within both the science and business arenas: students will be required to consider ethics as part of good governance in research and this will form part of their preparation for their Level 6 research project.

Year 3 (Level 6)

Core modules	Credits
Pharmaceutical Science Research Project	30
Current Developments in Pharmaceutical Science	30
Advanced Topics in Pharmacology and Pharmaceutics	30
The Pharmaceutical Industry at the Cutting Edge	30

The final year provides students with the opportunity to specialize in pharmaceutical science topics of particular interest to them, including studies in sustainable pharmaceutical science, alongside undertaking an extended research project at the cutting-edge of the pharmaceutical sciences. Contemporary business leadership and management aspects specific to the pharmaceutical industry are covered, including contemporaneous accounts of regulatory affairs, global financial modelling and emergence of new markets.

The extended Pharmaceutical Science Research Project spans the entire session, with the initial phase consisting of a thorough literature survey to support the subsequent body of project work. Current Developments in Pharmaceutical Science allows students to choose two electives to study from a selection of topics at the forefront of science. Advanced Topics in Pharmacology and Pharmaceutics covers aspects of the programme which will bring students up to the cutting edge of science and technology, whilst The Pharmaceutical Industry at the Cutting Edge aims to do the same for the advanced business and management components. These advanced business and management topics no longer need to be balanced against aspects of science and technology so the content can be quite creative, rich in small group work and delivered within plenary sessions from visiting speakers. Key skills in team building, management and leadership of teams are embedded here, with students being expected to demonstrate the ability to practise in the industry environment.

For further information on the content of modules currently offered please visit:

www.keele.ac.uk/recordsandexams/az

9. Final and intermediate awards

Credits required for each level of academic award are as follows:

Honours Degree	360 credits	You will require at least 120 credits at levels 4, 5 and 6 You must accumulate at least 255 credits in Pharmaceutical Science, Technology and Business (out of 360 credits overall), with at least 60 credits in each of the three years of study, to graduate with a named single honours degree in Pharmaceutical Science, Technology and Business.
Diploma in Higher Education	240 credits	You will require at least 120 credits at level 4 or higher and at least 120 credits at level 5 or higher

Certificate in Higher Education	120 credits	You will require at least 120 credits at level 4 or higher

10. How is the Programme assessed?

The wide variety of assessment methods used on the Pharmaceutical Science, Technology and Business programme at Keele reflects the broad range of knowledge and skills that are developed as you progress through the degree programme. Teaching staff take care to apply the principles of assessment laid out in the University's assessment strategy and pay particular attention to specifying clear assessment criteria and providing timely, regular and constructive feedback that helps to clarify things you did not understand and helps you to improve your performance. The following list is representative of the variety of assessment methods used within PSTaB:

- **Written examinations** test students' knowledge and their ability to apply that knowledge to solving in-context problems. Examinations may consist of multiple-choice questions, questions that require short written answers including calculations, and longer essay-style questions.
- **Laboratory skills assignments and reports** test the students' ability to undertake experimental work and obtain data of a high standard for further analysis. They require students to demonstrate their skills in preparative and experimental science, data acquisition and analysis, and written communication skills for the preparation of pre-laboratory tasks, completion of in-laboratory pro-forma reports, and writing laboratory reports with appropriate referencing. Students will often work in groups during laboratory exercises so team-working and honed communication skills are essential.
- **Written work and practical skills assignments** test the quality and application of subject knowledge. In addition they allow students to demonstrate their ability to carry out basic literature searches, communicate their ideas effectively in writing and support their arguments with appropriate referencing. Written pieces vary in their length depending upon the discipline area and subject matter. In some cases there may be an element of student choice in relation to the topic and content of the written work.
- **Oral presentations** assess student's subject knowledge and understanding, and may also serve to assess team-working skills. Crucially, they also test student's oral and visual communication skills, and peer assessment and feedback is used to facilitate reflection and personal skills development.
- **Research Project** is a student-led piece of independent research within one of the many disciplines that comprise pharmaceutical science, combining an in-depth literature review with experimental work. Supervisors support the student throughout the research project, providing discipline-specific guidance. This assessment develops the student's capacity as an independent learner and their ability to engage with the process of research. It also develops skills in many key areas, especially data handling and communication

Marks are awarded for summative assessments designed to assess students' achievement of learning outcomes. Students are also assessed formatively to enable them to monitor their own progress and to assist staff in identifying and addressing any specific learning needs. Feedback, including guidance on how students can improve the quality of their work, is also provided on all summative assessments within three working weeks of submission, unless there are compelling circumstances that make this impossible, and more informally in the course of tutorial and seminar discussions.

Students can meet with their Personal Tutor to obtain and clarify feedback at any time.

11. Contact Time and Expected Workload

This contact time measure is intended to provide you with an indication of the type of activity you are likely to undertake during this programme. The data is compiled based on module choices and learning patterns of

students on similar programmes in previous years. Every effort is made to ensure this data is a realistic representation of what you are likely to experience, but changes to programmes, teaching methods and assessment methods mean this data is representative and not specific.

Undergraduate courses at Keele contain an element of module choice; therefore, individual students will experience a different mix of contact time and assessment types dependent upon their own individual choice of modules. The figures below are an example of activities that a student may expect on your chosen course by year/stage of study. Contact time includes scheduled activities such as: lecture, seminar, tutorial, project supervision, demonstration, practical classes and labs, supervised time in labs/workshop, fieldwork and external visits. The figures are based on 1,200 hours of student effort each year for full-time students.

Activity	Year 1 (Level 4)	Year 2 (Level 5)	Year 3 (Level 6)
Scheduled learning and teaching activities	34%	34%	34%
Guided independent Study	66%	66%	66%
Placements	0%	0%	0%

12. Accreditation

This programme does not have accreditation from an external body.

13. Regulations

The University Regulations form the framework for learning, teaching and assessment and other aspects of the student experience. Further information about the University Regulations can be found at: <http://www.keele.ac.uk/student-agreement/>

Attendance requirements

Absence from laboratory-based classes may result in the loss of marks if credit is given for work completed in the laboratory notebook or submitted as a pro-forma report during that particular session. Students may not be allowed to carry out experiments that have been missed without due cause. Repeated absence could result in failure in the assessment of laboratory work and failure to progress within the programme.

14. What are the typical admission requirements for the programme?

This programme as proposed is currently intended for overseas non-EU students only. Candidates must be able to satisfy the general requirements of Keele University and the School of Pharmacy.

Subject	A-level	Subjects not included	International Baccalaureate	BTEC	Access to Higher Education Diploma	GCSE requirements
Pharmaceutical Science, Technology and Business	BBB / ABC Biology and Chemistry at grade B or above. A pass in at least one Science Practical will be required.** ** Science practical only required from applicants taking reformed A level Biology, Chemistry or Physics in England.	General Studies and Critical Thinking	32 points to include Higher Level Chemistry and Biology at 6	DDD You must have taken sufficient Science units, please contact us for advice	Please contact us for advice	Maths @ B (or 6) or above, English at C (or 4) or above

Applicants who are not currently undertaking any formal study or who have been out of formal education for more than 3 years and are not qualified to A-level or BTEC standard may be offered entry to the University's Foundation Year Programme.

Applicants for whom English is not a first language must provide evidence of a recognised qualification in English language. The minimum score for entry to the Programme is Academic IELTS 7.0 overall with 6.5 in each subtest.

Please note: All non-native English speaking students are required to undertake a diagnostic English language assessment on arrival at Keele, to determine whether English language support may help them succeed with their studies. An English language module may be compulsory for some students during their first year at Keele.

Students are only accepted into the first year of the course – there are no opportunities for Accreditation of Prior Learning (APL).

15. Other learning opportunities

The integrated teaching model used to teach students on the PSTaB programme does not currently provide opportunity to undertake placements or periods of study at other institutions, within the United Kingdom or overseas. However, should such opportunities arise the School will endeavour to provide appropriate guidance and support

Students may wish to arrange a period of study or placement outside of the normal curriculum; in this case also, the School will endeavour to offer appropriate guidance and support. However, it would be the student's responsibility to make suitable arrangements with regards to the timing and funding of such activities.

16. Additional costs

As to be expected there will be additional costs for inter-library loans and potential overdue library fines, print and graduation.

We do not anticipate any further additional costs for this undergraduate programme.

17. Document Version History

Version history	Date	Notes
Date first created	October 2016	
Revision history		
Date approved		