Version History

Version	Occasion of Change	Change Author	Last Modified
1.0	Version presented for approval	*Dr Mark Carlile*	*11 Jan 2017*
2.0	Post Periodic Review updates	*Dr Mark Carlile*	*14 July 2017*
3.0	Updated to include the minor modifications submitted in May 2018	*Dr Mark Carlile*	*25 May 2018*

SECTION A: CORE INFORMATION

1. Name of programme(s)

Medicinal Chemistry
-
Medicinal Chemistry (Sandwich)

2. Award title

BSc Honours

3. Programme linkage **Yes**

This is a group of related programmes which includes:
Biopharmaceutical Science
Biochemistry
Medicinal Chemistry
-
Biopharmaceutical Science (Sandwich)
Biochemistry (Sandwich)
Medicinal Chemistry (Sandwich)

All programmes share the year of curriculum (Levels 4) and 100 credits of content with the BSc Biopharmaceutical science programme at Level 5. At the end of Level 5 transfer from the standard degree programme onto the industrial placement scheme is possible and results in a sandwich degree in the chosen subject area:

Medicinal Chemistry → Medicinal Chemistry (Sandwich)

4. Is the programme a top-up only? **No**

5. Does the programme have a Foundation Year (Level 3) associated with it so that students enter for a four-year programme and progress directly from the Foundation Year to Stage 1 without having to re-apply? **Yes**

You can take a Foundation Year (Level 3) as an integral part of this programme of study. For details of the Foundation Year see the programme specification for ***(Joint Scheme of Extended Programmes – Biopharmaceutical Science pathway)***.

6. Level of award: Level 6

7. Awarding body: University of Sunderland

8. Which department is it in? School of Pharmacy and Pharmaceutical Sciences

9. Programme Studies Board? Pharmaceutical Science/Biomolecular Science

10. Programme Leader:

Dr Mark Carlile

11. How and where can I study the programme?

At Sunderland:	
Full-time on campus	X
Part-time on campus	X
As work-based learning full-time	
As work-based learning part-time	
As a full-time sandwich course	X for Applied and Sandwich
As a part-time sandwich course	
By distance learning	

At a partner college:	
Full-time in the UK	
Part-time in the UK	
Full-time overseas	
Part-time overseas	
By distance learning	
As a full-time sandwich course in the UK	
As a part-time sandwich course in the UK	
As a full-time sandwich course overseas	
As a part-time sandwich course overseas	
As work-based learning full-time in the UK	
As work-based learning part-time overseas	
Other (please specify)	

12. How long does the programme take?

Medicinal Chemistry

	Min number of years / months	Max number of years / months
Full-time	3 years	9 years
Part-time	6 years	9 years
Distance learning		
Work-based learning		

Medicinal Chemistry (Sandwich Programmes):

	Min number of years / months	Max number of years / months
Full-time	4 years	9 years
Part-time	7 years	9 years
Distance learning		
Work-based learning	1 year (inclusive)	1 year (inclusive)

For start-dates please see the current edition of the Prospectus or contact the relevant department at the University. For start-dates for programmes delivered in a partner college, please contact the college.

SECTION B – FURTHER CORE INFORMATION

Use Outline Programme Proposal Form for ADC (AQH-B2-2), for questions 13 to 25 (new programmes only)

26. Learning and teaching strategy

All aspects of the learning environment and course organisation support learning, which is at the heart of the University of Sunderland culture. In line with the University's Learning and Teaching Plan, the methods employed on this programme aim to produce graduates competent in a range of subject-specific knowledge and skills appropriate to biomolecular and chemical science, as well as transferrable skills that are universal for graduate employment.

The teaching and learning strategy is designed to progressively develop the ability to learn independently and facilitate academic success within a supportive and productive learning environment. The teaching and assessments on the programme have been constructively aligned with the intended outcomes of student achievement. The programme integrates traditional lecture- and laboratory-based learning with active, experiential and enquiry-based learning, promoting inclusivity of different learning styles. The learning and teaching strategy is focussed in two areas:

Subject-specific

Curriculum content is driven and informed by QAA subject benchmarks in Chemistry and Biomedical Science, providing an integrated curriculum and a developmental progression of learning, assessment and feedback. Teaching and learning methods are designed to support and challenge students, develop investigative and problem-solving skills and encourage creativity, and include a range of approaches to reflect different ways of learning, such as lectures, laboratory sessions, workshops/seminars, case-based learning, group work, one-to-one and/or group tutorials, as well as directed and independent study and use of the virtual learning environment (VLE).

Assessment practices are an integral part of learning and teaching and a variety of formative and summative assessment types are incorporated to reflect the full range of programme learning objectives, with assessments based on threshold Levels of learning. Formative feedback is often

rapid, for example through the use of peer review or interactive response tool software (which also facilitates monitoring of student learning). Summative assessments have staggered submissions dates to provide regular assessment and promote constructive use of feedback (which is provided within four working weeks). Both formative and summative assessment feedback contributes to academic development and is intended to support further learning as well as reflection and self-assessment (promoted through a PDP).

The programme is designed to promote advancement in terms of academic understanding from fundamental knowledge and skills towards their application within biomolecular science and related basic and translational research. A central aim is to provide a curriculum that is informed by current and emerging developments in research and professional practice, and which draws directly upon staff research expertise (both discipline-specific and pedagogic) as well as external expertise through visiting lecturers.

There has recently been significant investment in the provision of biological sciences, analytical, organic chemistry and pharmaceutical science capabilities in the Faculty of Health Sciences and Wellbeing. All of the resources are utilised in the teaching and learning plans for these programmes.

The incorporation of an optional placement year (48 weeks) with a host company in a relevant industrial sector allows the students to gain "real-life" work experience whilst still on their degree programme.

In addition, all students will have the opportunity to gain experience of the approach to, practice and appraisal of scientific research through an individual research project. Students will use the knowledge and skills learnt in the first two years to generate, analyse and evaluate scientific data and present this in the form of a conference poster and research paper.

Transferrable skills and enhanced employability

The prerequisite skills which characterise meaningful learning are also valued by employers. Whilst development of academic skills (e.g. analysis of data and literature, critical thinking, and scientific writing) is embedded within the teaching and learning activities, a key aim of the programme is to enable students to identify and develop transferrable skills (such as numeracy, analytical, problem-solving, teamwork, communication, self-management, application of IT infrastructure and resources) through personal development planning and the use of a skills e-portfolio to facilitate student reflection on their learning and development as a graduate. The programme also provides opportunity for employer engagement through transfer to sandwich degree programmes as well as via Careers days and employability-focussed seminars. The transferable skills mapping for these programmes is shown in Table 4.

This combined approach is designed to continually develop both the subject-specific and transferrable skills required of chemical and biomolecular science graduates, and students will be equipped for careers in chemical and biomolecular research or allied industries and services, as well as careers beyond those immediately related.

The programmes will utilise the Sunderland Professional Awards (SuPA)[1] framework to engage students with transferable skill development, realisation and structured capture into an employability portfolio.

[1] SuPA Awards: See : http://www.sunderland.ac.uk/futures/getnoticed/supa/

27. Retention strategy

High quality student support (both academic and pastoral) is integrated with the programme and aims to build a culture that enables a sense of belonging and partnership. Successful completion of the programme demands student engagement and appropriate support from those involved in teaching, learning and pastoral care. Inclusivity, equality and diversity are embedded in the Institution values and act to enrich curricular, learning and teaching. A range of practices are implemented to promote student retention, and include support during the student journey (induction, on-going personal tutoring, attendance monitoring, social events), academic support (inclusive teaching and learning approach, assistive technologies to aid learning, supportive learning environment), placement support (academic placement coordinator, administrative placement officer and work-based supervisor/mentor) as well as systems to support students with personal difficulties and disabilities. Furthermore, consistent and meaningful engagement with the student voice acts as a continual feedback mechanism to improve the student experience.

28. Any other information.

The programme team have a close partnership with industrial employers and regular meetings between employers and academic staff provides a platform for ongoing review and development.

SECTION C - TEACHING AND LEARNING

29. What is the programme about?

This programme suite focuses on fundamental underpinning of molecular and cellular science. More specifically, topics in the following disciplines are covered:

Level 4 (Stage 1):

- Fundamental chemistry
- Cell biology and biochemistry
- Fundamental analytical science
- Fundamental pharmacology
- Fundamental pharmaceutics

Level 5 (Stage 2):

- Organic chemistry and pharmaceutical science
- Molecular biology
- Medicinal chemistry
- Further analytical chemistry

Level 6 (Stage 3):

- Organic and biological chemistry
- Medicinal chemistry
- Pharmacology

- Protein biochemistry

There is a strong emphasis on graduate employability, integrating employment-related skills into modules and developing laboratory and research skills throughout the course. Thus, the programme aims to produce graduates who have significant scientific knowledge and an understanding of its application to the study of chemical and biomolecular sciences, whilst also acquiring the highly valued experimental, analytical and transferrable skills applicable to a wide range of employment opportunities.

30. What will I know or be able to do at each Stage of the programme?

Programme learning outcomes mapped to specific modules are shown in:

Level 4 (Stage 1) : Table 1
Level 5 (Stage 2) : **Table 4**
Level 6 (Stage 3) : Table 3

Learning Outcomes Stage 1 – Skills

By the end of this Stage of the programme, successful students should know, understand or be able to do the following:

S1	Communicate concepts and ideas using a variety of appropriate methods
S2	Demonstrate the skills required for the production of laboratory reports involved in scientific research
S3	Recognise safety and ethical issues within a scientific investigation
S4	Apply the principles of data collection, analysis and basic statistical methods to experimental investigation
S5	Demonstrate an understanding of the use of instrumentation applicable to the study of chemistry and biology
S6	Identify and reflect upon interpersonal, transferable, and study skills

Learning Outcomes Stage 1 – Knowledge

By the end of this Stage of the programme successful students should know, understand or be able to do the following:

K1	A broad and balanced appreciation of key chemical concepts of general chemistry and biochemistry
K2	Knowledge of the process and regulations involved in drug approval and manufacture including principles of good practice such as COSHH, GMP and GLP
K3	Understanding of the widespread and varied applications of analytical science and the principles of analytical techniques used with reference to biological, chemical and pharmaceutical science

K4	An understanding of the source of pharmaceuticals and the rationale for their development
K5	An understanding of the function, regulation and structure of prokaryotic and eukaryotic cell structure.

Learning Outcomes Stage 2 – Skills

By the end of this Stage of the programmes successful students should know, understand or be able to do the following:

S7	Apply modern analytical methods to the characterisation of chemical and biological molecules
S8	Use synthetic procedures to prepare, purify and analyse drug substances
S9	Apply the concepts of recombinant DNA technologies to prepare biological molecules
S10	Present experimental work in laboratory reports and oral presentations
S11	Evaluate and synthesise information, arguments and analyses using evidence from appropriate sources

By the end of this Stage of the placement scheme successful students should know, understand or be able to do the following:

S12	Identify the skills and knowledge obtained in the workplace relevant to enhanced employability and their application in practice

Learning Outcomes Stage 2 – Knowledge

By the end of this Stage of the programme successful students should know, understand or be able to do the following:

K6	Explain and use general organic and chemical synthetic pathways to theoretically produce small organic and pharmaceutical molecules
K7	Describe the overall process of drug discovery, and the role played by medicinal chemistry in this process
K8	Describe the drug development process from selection of lead chemical and biological compounds through to clinical testing and manufacture
K9	Explain the theory and practice of modern analytical methods
K10	Relate the structure and physical properties of drugs to their pharmacological activity

By the end of this Stage of the placement scheme, successful students should know, understand or be able to do the following:

K11	Theoretically underpin the principles of biomolecular, pharmaceutical and/or medicinal sciences in a workplace environment

Learning Outcomes Stage 3 – Skills

By the end of this Stage of the programme successful students should know, understand or be able to do the following:

S13	Apply research and data analysis methods to a research project
S14	Evaluate the significance and relevance of scientific information
S15	Evaluate the application of a range of analytical techniques for the characterisation of disease and therapeutic development
S16	Utilise synthetic and computational methods for the design of therapeutic molecules

Learning Outcomes Stage 3 – Knowledge

By the end of this Stage of the programme successful students should know, understand or be able to do the following:

K12	Theoretically underpin a research project in chemical or bimolecular science
K13	Explain how advanced analytical chemistry methods can be applied to small chemical and biological molecules
K14	Compose synthetic pathways to functional organic molecules
K15	Summarize and critically review modern chemical and bimolecular specialist methodologies
K16	Discuss examples of pharmaceutical drug discovery in detail, and relate patterns and lessons from discovery of these examples to other seen and unseen examples
K17	Demonstrate an understanding of concepts such as drug metabolism, bioavailability and pharmacokinetics and the role of medicinal chemistry in improving these parameters

Learning Outcomes – Ordinary degree

If you are awarded an Ordinary degree you will have achieved the majority of the learning outcomes for the programme studied. However, you will have gained fewer credits at Stage 3 than students

awarded an Honours degree, your knowledge will typically be less broad and you will typically be less proficient in higher-Level skills such as independent learning.

31. What will the programme(s) consist of?

Each undergraduate programme consists of a number of Stages from a minimum of 1 to a maximum of 4, each of which is equivalent to a year's full-time study. The summary below describes briefly what is contained in each Stage. Most programmes have a mixture of core (compulsory) modules and optional ones, often with increasing choice as you move through the programme and gain in experience. In some programmes the choice of optional modules gives you particular 'routes' through the programme. The programme structure including a detailed list of modules can be found in Figure 1.

The programme has been constructed to promote advancement in terms of academic understanding from fundamental knowledge and skills. This design allows their application within the pharmaceutical, biomolecular and medicinal chemistry disciplines and integration of subject areas. The research placement module will also be directed towards the exits route path for the students.

- **BSc Honours Degree programmes:** All three programmes are delivered on-campus in full-time mode over three years. A part-time mode can be considered.

- **BSc Honours Sandwich Degree programmes**: All three programmes are delivered both on-campus and via a placement, in full time mode over four years. Students undertake a placement in an industrial setting at the end of Level 5. This pathway can also be considered in part-time mode.

	Level 4		Level 5		Placement Yr		Level 6
Theme	**Chemistry**						
Module	**110**		**210**				**311**
Module Leader	**Mark Ashton**		**Nicolas Haroune**				**Mark Ashton**
Title	**Introduction to biological and pharmaceutical chemistry**	-->	**Organic Chemistry**	-->		-->	**Advanced chemistry and pharmaceutics**
Credits	20		20				20
Theme	**Biology**						
Module	**111**		**211**				**312**
Module Leader	**Shafiq Ahmed**		**Shafiq Ahmed**				**Amal Elkordy**
Title	**Introduction to cell biology and biochemistry**	-->	**Genetics and molecular biology**	-->		-->	**Advanced biotechnology and biochemistry**
Credits	20		20				20
Theme	**Analytical science**						
Module	**112**		**212**		**205**		**314**
Module Leader	**John Lough**		**John Lough**		**Mark Carlile**		**Mark Gray**
Title	**Introduction to analytical chemistry**	-->	**Further analytical sciences**	-->	**Pharmaceutical Sciences Industrial Placement**	-->	**Advanced medicinal chemistry**
Credits	20		20		120		20
Theme	**Pharmacology, pharmaceutics, Medicinal chemistry**						
Module	**113**		**BPS215**				**317**
Module Leader	**Cheng Chaw**		**Mark Ashton**				**Gabrial Boachie-Ansah**
Title	**Introduction to pharmaceutics, pharmacology and pharmaceutical regulation**	-->	**Introduction to medicinal chemistry**	-->		-->	**Advanced pharmacology**
Credits	20		20				**20**
Theme	**Practical/Research Skills**						
Module	**114**		**214**				**310**
Module Leader	**Mark Carlile**		**Mark Carlile**				**Ken McGarry**
Title	**Research and practical skills in biopharmaceutical science**	-->	**Further research and practical skills in biopharmaceutical science**	-->		-->	**Research project**
Credits	40		40				40
Credits	**120**		**120**		**120**		**120**

Figure 1: Programme structure and modular organisation : BSc Medicinal Chemistry,

Level 4 (Stage 1):

Level 4			
Module	**Code**	**Credits**	**Module Leader**
Introduction to pharmaceutical and biological chemistry	BPS110	20	Mark Ashton
Introduction to cell biology and biochemistry	BPS111	20	Shafiq Ahmed
Introduction to analytical chemistry	BPS112	20	John Lough
Introduction to pharmaceutics and pharmacology	BPS113	20	Cheng Chaw
Research and practical skills in biopharmaceutical science	BPS114	40	Mark Carlile

The aim of this year is to ensure all students have reached the same Level of scientific development in core scientific subject areas. These core concepts and principles will provide the underpinning science for Stages 2 and 3. Four core 20-credit modules (BPS110, BPS111, BPS112 and BPS113) in Stage 1 of the programme introduce students to general chemistry, cell biology, biochemistry, molecular biology, pharmaceutics, pharmacology and microbiology theory. In addition Stage 1 utilises a 40-credit skills module wherein all of the general research skills and practical sessions are delivered. This structure will allow us to better integrate the different theoretical module content whilst still allowing development of subject-specific practical skills, alongside transferrable skills. The skills module (BPS114) will provide students with the tools to acquire the fundamental skills required in chemistry and biomolecular sciences. This includes development of basic competency in laboratory skills and an understanding of laboratory health and safety, as well as science study skills.

All of the Stage 1 modules will run from September through to May therein allowing time to assimilate theoretical and practical content and allow the integration of subject areas to be carried out in a very structured and managed way.

Level 5 (Stage 2):

Level 5			
Module	**Code**	**Credits**	**Module Leader**
Organic Chemistry	BPS210	20	Nicolas Haroune
Biochemistry, Genetics and Biotechnology	BPS211	20	Shafiq Ahmed
Further Analytical Chemistry	BPS212	20	Lee Williams
Introduction to medicinal chemistry	BPS215	20	Mark Ashton
Further research and practical skills in biopharmaceutical science	BPS214	40	Mark Carlile

In Level 5 (Stage 2), building on the fundamental knowledge acquired in Stage 1, students develop knowledge and skills in organic chemistry (BPS210), cellular biochemistry (BPS211), recombinant DNA technologies (BPS211), cellular and medicinal and biological chemistry (BPS215). Students also further develop their skills in analytical science and start to explore more complex analytical methods for biological samples (BPS212). All of these theoretical modules are 20 credits.

Students will further develop their practical skills beyond the basic competencies though a further practical/skills module. As in Stage 1, an integrative approach to developing laboratory skills is used and will provide students with a holistic understanding of chemistry and biomolecular sciences. To extend the range of transferrable skills, analytical and problem-solving skills are introduced at this

Stage, which will enable students to appreciate some of the issues related to the laboratory investigation of disease.

Students can transfer to the Sandwich programme in their chosen exit route by securing a 48-week work placement. This scheme runs through the BPS205 module.

Level 6 (Stage 3)

The final year of the programme focuses on the theoretical and practical knowledge underpinning the specialisms within drug design and medicinal chemistry.

Level 6			
Module	**Code**	**Credits**	**Module Leader**
Research project	BPS310	40	Ken McGarry
Advanced chemistry and pharmaceutics	BPS311	20	Mark Ashton
Advanced biotechnology and biochemistry	BPS312	20	Amal Elkordy
Advanced medicinal chemsitry	BPS313	20	Mark Gray
Advanced pharmacology	BPS317	20	Gabriel Boachie-Ans

This Stage utilises a core research project module (BPS310, 40 credits) and two core 20-credit modules (BPS311 and BPS312). The final year research project gives students the opportunity to carry out novel research over an extended period and promotes independent learning in a specialist area of medicinal chemistry. The research projects allow students to pursue independent work in an area that they are interested in and which will contribute to their degree.

Further modules allow specialisation in current areas of medicinal chemistry. These specialisms are reflected in the suite of modules available (BPS313 and BPS317). Both of these modules will deliver the most current knowledge-base in biological chemistry, medicinal chemistry and drug design to the final year students.

Current knowledge and trends in both basic and applied research (such as omics technologies, bioinformatics, personalised medicine and therapeutic development) is embedded within the modules where appropriate, ensuring the next generation of scientists are equipped to deal with advances in their chosen area and can innovate based upon their degree training. Dedicated research laboratories, as well as collaboration between students, academics, researchers, regional industrial labs, provides the opportunity for students to be at the forefront of their discipline.

To further extend the range of transferrable skills, analytical and problem-solving skills are applied to more complex case studies/scenarios and research questions, with an emphasis on engaging in critical assessment and intellectual argument. Skills such as self-management and workload organisation will be put into practice in preparation for employment.

32. How will I be taught?

Scheduled teaching activities	Lectures, interactive laboratory and simulation practicals, computing sessions, seminars and workshops, including verbal presentations and posters, group work, case-based learning, directed learning, research project supervision, and tutorials
Independent study	Virtual learning environment Portfolio generation
Placement	Work-based learning (Biomedical Science (Sandwich) & Applied Biomedical Science)

The strategy behind the teaching and learning approach used on the programme is to utilise a broad range of methods that reflect the different types of learning students undertake in terms of both skill development and knowledge acquisition, as well as to provide a diverse learning experience which addresses different learning styles. The programme integrates traditional lecture- and laboratory-based learning with active, experiential and enquiry-based learning, and is designed to encourage a progressive acquisition of subject knowledge and skills by moving from study methods that have a greater degree of support gradually towards more independence and self-direction.

Seminal lectures

Key subject knowledge will be delivered in lectures throughout the programme. These sessions incorporate various methods to convey ideas and concepts (such as verbal and visual presentation of information, demonstrations, multimedia and external speakers) with integrated active learning approaches (such as in-session quizzes, brainstorming activities) which can be used to inform teaching practice as well as assess learning and monitor progression. The active learning approach will progress from the early Stage (Level 4), where activities test the acquisition of knowledge and understanding, to the final Stage (Level 6) where activities are designed to promote analytical and critical thinking (in line with summative assessments). Opportunities for a "flipped-classroom" format will be sought all levels of the programme so as to put students into a more self-directed learning environment.

Laboratory and practical classes

Laboratory and practical classes are an essential part of the learning experience, and are designed to promote development of a wide range of discipline-specific techniques and transferrable skills, as well as to demonstrate and reinforce material taught in lectures. A key feature is the extensive training in laboratory-based skills relevant to biological chemistry and medicinal chemistry. Skills are developed sequentially during the programme, from developing competence in basic practical skills and an awareness of safe working practices in Stage 1, discipline-specific techniques and analytical skills in Stage 2, towards the opportunity to develop skills of scientific inquiry and investigation at Stage 3, alongside development of transferrable skills such as self-dependence and management of resources which are of significant value beyond the programme.

Enquiry-based learning

A number of strategies for learning through enquiry-based approaches have been adopted, such as the use of case studies, small-scale investigations and engagement with research activity. These activities can be taken from real life or areas of professional practice, and the process of enquiry is facilitated by academic staff. This form of learning promotes a research-orientated approach to a problem and helps gain essential skills that are highly valued by employers.

E-learning

Independent study is facilitated through the virtual learning environment (VLE) which gives access to learning materials, self-assessment exercises, sample data and virtual experiments, and discussion group facilities, as well as submission of work electronically.

Work-based learning (Sandwich Degree programmes)

Work-based learning offers the opportunity to develop problem-solving and practical skills that can only be learned by practising, and promotes development of an analytical, reflective approach to professional practice.

A list of the modules in each Stage of the programme can be found in the Appendix.

A summary of the types of teaching, learning and assessment in each module of the programme can be found in the Matrix of Modes of Teaching (See Appendices)

33. How will I be assessed and given feedback?

Written examinations	Multiple choice questions Short/long answer questions Problem-solving Case study & data interpretation
Coursework	Laboratory report, Portfolio, Health & safety review, media summary, Essay (descriptive and reflective), Case study, Oral presentation, Poster, Research proposal Dissertation, Science communication exercise, Research report, Evaluative analysis, Professional portfolio
Practical assessments	Laboratory work

A summary of the types of teaching, learning and assessment in each module of the programme can be found in the **Matrix of Modes of Teaching (Appendices)**

The generic assessment criteria which we use can be found here. Some programmes use subject-specific assessment criteria which are based on the generic ones.

This programme uses the Generic University Assessment Criteria	**YES**	
This programme uses the Subject Specific Assessment Criteria		

The University assessment regulations can be found here.

The assessment strategy has been developed in line with University policy, but also aims to build on good practice developed in the department to date. Assessments are designed to become more demanding as the programme progresses in line with the development of skills in the interpretation and evaluation of scientific information.

Written examinations

Written examinations are included in most modules, with an emphasis on knowledge retention at Stage 1 (Level 4), short answer/essay and problem solving questions demonstrating understanding and application at Stage 2 (Level 5), and long essay questions focussed on interpretation and evaluation of scientific information at Stage 3 (Level 6).

Coursework

Laboratory reports are a key assessment type and are used throughout the programme to practice the ability to analyse and interpret data and place experimental results within a broader scientific context, and to underpin professional standards of presenting scientific reports. This is highlighted in the final year where the research project assessment is a report in the style of a research paper suitable for submission to Bioscience Horizons (an online journal which publishes undergraduate and taught masters bioscience research) or similar.

A range of additional coursework assessments are included at different Stages, which progress from short descriptive essay writing, oral presentation and media summary (designed to identify appropriate sources of information and promote communication of scientific concepts to a variety of audiences) in Stage 1, to the introduction of problem solving questions and case studies as well as a scientific research proposal and a literature-based dissertation (all of which have a greater emphasis on application and analysis) in Stage 2. In Stage 3, assessment methods are designed to encourage critical evaluation of information and data interpretation in the context more complex problems and areas of emerging technology/innovation in medicinal chemistry.

Practical and portfolio assessments

Basic laboratory competencies are assessed at Stage 1, forming a platform for the acquisition of discipline-specific practical skills during the programme. Assessments involving the production of a portfolio (such as to review practical skills, professional standards, or health and safety issues) provide a structured opportunity for self-assessment and reflection and facilitate personal development planning.

Marking guidelines are used for all assessments, which undergo internal and external review, and are used to ensure consistency of marking. Assessments are marked according to the University of Sunderland generic assessment criteria, and all modules undergo standard moderation procedures to ensure fair assessment. Formative feedback is given throughout the programme, either informally through interactive learning activities, or formally in selected modules. Summative assessment feedback is provided within four working weeks, promoting constructive feed-forward throughout the programme. Practice questions are provided for revision purposes, and sessions are scheduled to discuss exam technique using past questions as examples.

The VLE is used extensively to deliver assessments and provide feedback, with significant use of *Turnitin* and *Grademark.* All written work will submitted through the VLE and feedback will be given from within the VLE. Additionally, 1:1 sessions with academic staff will be offered alongside generalised feedback within timetabled whole-class sessions. This is a very useful strategy to promote information literacy as originality reports generated by *Turnitin* are available, therefore identifying inappropriate writing practices.

34. Teaching, learning and assessment matrix – see **Appendices**

35. How does research influence the programme?

The Faculty and School considers research to be central to its activities and ethos. Many of the staff in the department are research active, and engaged in research projects at the cutting edge of the discipline. The majority of permanent staff have a PhD qualification and most members of the team currently supervise PhD students in their areas of research. In the REF 2014, the pharmaceutical sciences team contributed 9 staff from 14 in the team, to the university submission to UoA 3 - Allied Health Professions, Dentistry, Nursing and Pharmacy

The programme is strengthened by both academic research of the teaching staff, and the programme is underpinned by a research active curriculum (where appropriate teaching is supported by examples grounded in the basic and translational research of academic staff or visiting lecturers). Students learn about the work lecturers do as researchers, and in doing so, develop their own research skills. This is developed most during the final year project at Level 6 where students undertake new research in collaboration with staff in their research field. Additionally, many of the Level 5 and 6 modules draw on staff research interests, providing students with learning and teaching experience that is guided by expertise and enthusiasm. Staff research interests are diverse, and include developing personalised treatments for cancer, HIV, protozoan pathogenesis, dosage form design and biotechnology. Staff are also engaged in reach-out activities, applying their expertise to projects in local and national industry partners.

Recent projects that have facilitated student research engagement include:

- The analysis and model building of a variety of biostatistical and protein interaction data sets using a range of computational techniques. This work now includes building maps of related diseases since proteins tend to have several functions in the cell. Work in this area of bioinformatics (drug repositioning through shared side-effects) has led to three publications with current BPS project students (**Dr Ken McGarry**).

- Generation of recombinant proteins and biological therapeutics in collaboration with Fujifilm Diosynth Biotechnologies and members of the BioProNet group. Characterisation of gene expression pathways controlling tissue patterning and regeneration (**Dr Mark Carlile**)

- The development of new antiviral agents with current projects looking to develop novel inhibitors for HIV-1 and Hepatitis B (**Dr Mark Ashton**)

- Use of analytical chemistry in a number of challenging applications; for example, the application of hyphenated analytical techniques in a number of applications to discern the underlying biology of cancer and relative difference in the metabolites between cancer and "normal" cells (**Dr Lee Williams**)

- Rational design and synthesis of drug candidates, diagnostic materials, and delivery vehicles in collaboration with BioMerieux (France). Development of computational tools for automating the routine decision process within standard drug discovery pipelines. **(Dr Mark Gray)**

- Identification of metabolomic changes in incurable brain tumours (e.g Glioblastomas) during tumour growth and therapy resistance for the development of novel therapeutics **(Dr Shafiq Ahmed)**

- Formulation of therapeutic proteins and gene products. Design and enhancement of dissolution in hydrophobic drugs using liquisolid tablets and liposomes **(Dr Amal Elkordy)**

- Chiral separation and advance analytical method development for therapeutic molecules **(Dr John Lough)**

SECTION D EMPLOYABILITY

36. How will the programme prepare me for employment?

The programme gives you the opportunity to develop skills which you can use in the future. Some skills are more specific than others to the subject area, or to a particular type of activity, but all skills can be applied in a range of employment situations, sometimes in quite unexpected ways.

The skills which this programme is designed to develop are listed below

Academic study skills: avoiding plagiarism, time management, reading, note taking, referencing, revision analysis, and scientific writing
Practical skills: laboratory competency, experimental skills and techniques

Transferrable skills: numeracy, analytical, problem-solving, teamwork, communication, self-management & organisation, application of IT, consideration of ethical and safety requirements, critical thinking, personal development planning and reflection (full list and their modular mapping is shown in the Appendices).

A high value is placed on employability and the requirements of the Employability Curriculum Framework are embedded into the programme across all Stages. In line with the University's Learning and Teaching Plan, the methods employed on this programme aim to produce graduates competent in a range of subject-specific knowledge and skills, as well as transferrable skills appropriate to biomolecular science. Graduates will be equipped with specialist knowledge about how major diseases can be diagnosed and treated, as well as the ability to research, evaluate and synthesise information from a variety of sources. The emphasis on practical skills throughout the programme means graduates have a range of experience with the theory and practise of discipline specific and research methodology, which is not only relevant to the practice of medicinal chemistry and related research, but promotes the opportunity to actively develop a range of transferrable skills such as organisation and teamwork.

The approach to the acquisition of transferrable skills is co-ordinated via scheduled activities throughout each module. Furthermore, personal development planning (PDP) is embedded within specific modules (BPS114, BPS214, BPS310 and utilisation of the SuPA framework), so that graduates develop to their full potential as reflective practitioners. PDP is also achieved through the personal tutoring system whereby new students are allocated a Personal Tutor who is able to provide advice and support throughout the programme.

Skill e-portfolio : The programme will develop the use of e-portfolios for students to continuously reflect on career-related activities and skills development. An e-portfolio can provide ready to use evidence of relevant work experience and transferrable skills gained during the programme, showcasing achievement and suitability when applying for graduate jobs. This will use the SuPA framework as a standard basis for capture and the VLE for implementation.

The programmes provides opportunity for employer engagement through transfer to a degree with industrial work experience:
BSc Medicinal Chemistry (Sandwich)

Graduates from all degree programmes will be prepared for suitable employment in biomolecular, pharmaceutical science industries or undertake further training (MSc/PhD) in an allied research field.

There are many career options that do not involve laboratory work, such as working health and safety or quality assurance roles, customer services, sales or IT. A number of graduates choose to continue in education, by studying for a Postgraduate Certificate in Education (PGCE), a Masters or PhD degree, or other programmes such as pharmacy or medicine.

The programme team have a close partnership with local and national industries allied to biomolecular science and therapeutic development. Through liaison and stakeholder meetings between employers, the programme team are able to provide a platform for ongoing review and development to the programmes. This enables employers to inform the University of any relevant changes within their field which may impact on the employability of graduates.

There are also opportunities for on-campus students outside the programme of study. These include the opportunity to attend regional seminar series or conferences for national discipline-specific learning societies, or internal research seminars (given by University research students or external speakers). It is also possible to apply (in collaboration with a prospective supervisor) for a vacation research scholarship funded by a number of national societies, providing the opportunity to engage with an individual research project between Stages 2 and 3 of the programme.

For information about other opportunities available to our students who study on campus, click here.

Additional opportunities to develop your experiences more widely will vary if you study at one of our partner colleges. For information about the extra-curricular activities available in any of our colleges please contact the college direct.

37. Particular features of the qualification

Medicinal chemistry (Sandwich)	Graduates of these programmes will have undertaken a placement in an industrial setting in the third year of study and students have to pass the placement module (BPS205).

38. Professional statutory or regulatory body (PSRB) accreditation. *Choose one of the following.*

PSRB accreditation is not relevant to this programme	X
PSRB accreditation is currently being sought for this programme	
This programme currently has PSRB accreditation	

SECTION E PROGRAMME STRUCTURE AND REGULATIONS

See Programme Regulations Form, for questions 39 and 40 in Appendix

SECTION F ADMISSIONS, LEARNING ENVIRONMENT AND SUPPORT

41. What are the admissions requirements?

The University's standard admissions requirements can be found in the university regulations. Programme-specific requirements which are in addition to those regulations are given below.

Our typical offer is 112 UCAS points from a minimum of two A Levels or equivalent (e.g. 1 x AVCE double award) including chemistry. Please note we do not accept General Studies AS or A Level. Read more on the new UCAS Tariff point system for 2017.

We accept a maximum of 20 points from Level 3 Key Skills qualifications. We also require three passes at GCSE grade C or above, which must include Mathematics and English Language, or a minimum of Level 2 Key Skills in Communication, Application of Number and Information Technology.

At the end of Stage 2 transfer from the standard 3 year degree programmes to the 4-year Sandwich degree programmes is possible and is subject to certain transfer criteria. Students must have 120 credits at Level 4 and 120 credits at Level 5 in order to transfer.

Access Courses: We would require successful completion of an Access to Higher Education course that is accredited by the Quality Assurance Agency. We would also require a minimum of grade C in GCSE in Mathematics and English Language or the equivalent as part of your course.

If English is your second language we require a minimum of IELTS 6.0 (or equivalent).

Can students enter with advanced standing?	**Yes**	

If yes, to which Stages?

Stage 1	X
Stage 2	X
Stage 3	X
Stage 4	

The University has a process by which applicants whose experience to date already covers one or more modules of the programme they are applying for may seek Accreditation of Prior Learning (APL). Full details can be found here but if you think that this may be relevant to you, please contact the department which offers the programme you are interested in. Eligibility for APL is decided on a case by case basis by the Admissions Tutor.

42. What kind of support and help will there be?

The university has several initiatives for providing help and support for students across the academic programme. The majority of our support processes are individually tailored to specific faculties, school and programmes so that personalised help can be offered wherever possible.

a) In the department – the Personal Tutoring System

The personal tutor is a source of personal and academic support where the student finds themselves in academic difficulty, and a source of 'referrals on' where s/he encounters personal difficulties. Personal tutorial meetings are primarily concerned with looking at the progress the student is making and identifying areas where they need to improve on the basis of overall module feedback and results. The meetings are also intended to ensure that the student has all of the information necessary to follow his/her programme and gain the most from it, and that s/he is aware of technical requirements (eg. module choices, policy on extensions). Students are assigned to a personal tutor who will remain with them for the duration of their programme. All personal tutors are equipped to provide specific and personal guidance about pastoral issues and will readily support students who might be finding a particular element of the programme challenging or unmanageable. Depending on the nature of issues with which students present, the personal tutor can become a channel for communication between academic and clinical or industrial placement provisions and can liaise directly with the relevant programme or module leaders, and can escalate concerns as required.

The personal tutor system is supported by the central University of Sunderland Support Services and it may be that following discussion, more specialist help needs to be provided for students, for example student counselling, to which students can be referred confidentially. Students will be advised that they can contact their personal tutor for one-to-one support if they wish to discuss issues in confidence, a service provided as and when required across the programme. Otherwise, personal tutor meetings should occur three times during the course of the year.

Industrial Placements

Students are allocated an industrial mentor, as well as the placement module leader who is responsible for support within the placement area and provides tripartite support.

b) In the university:

The University provides a range of professional support services including health and well-being, counselling, disability support, and a Chaplaincy. Click on the links for further information.

c) in a partner college:

Please see the relevant college prospectus or website for details of student support if you are planning to study in one of our partner colleges.

43. What resources will I have access to?

On campus	x	In a partner college		By distance learning	

On campus

General Teaching and Learning Space	X
IT	X
Library	X
VLE	X
Laboratory	X
Studio	
Performance space	
Other specialist	
Technical resources	X

The programme has excellent teaching resources including our new multi-million pound development in the Sciences Complex which includes:

- The latest teaching and learning facilities, including a problem-learning facility and IT suites, simulation areas linked to seminar rooms to facilitate use of state of the art simulation technology (eg. 'sim man' which will enable interactive learning of human physiology and pharmacology).
- A brand new MALDI-TOF MS and nanoHPLC MALDI spotter for both 2D-gel based proteomics and bacterial identification.
- A number of flow cytometers, including a brand new BD Accuri bench top flow cytometer for cell based assays
- Imaging suite including facilities for light, confocal and electron microscopy
- Social learning spaces including
    - Student learning lounge
    - Open access computers with PC help area (with access to relevant software)
- Exhibition space to promote science to industry and health professionals
- The Point of Care Centre provides a true interdisciplinary education environment reflecting advances in laboratory medicine. The centre includes the technology to monitor many physiological and biochemical variables, including devices such as a biphasic defibrillator, ECG monitors, audiometry equipment, as well as hand-held and bench-top biochemical analysers.

Further information about the University's facilities can be found here.

Please see the relevant college prospectus or website for details of college learning resources if you are planning to study in one of our partner colleges.

44. Are there any additional costs on top of the fees?

No, but all students buy some study materials such as books and provide their own basic study materials.	X
Yes (optional) All students buy some study materials such as books and provide their own basic study materials. In addition there are some are additional costs for optional activities associated with the programme (see below)	
Yes (essential) All students buy some study materials such as books and provide their own basic study materials. In addition there are some are essential additional costs associated with the programme (see below)	

45. How are student views represented?

All taught programmes in the University have student representatives for each Stage (year-group) of each programme who meet in a Student-Staff Liaison Committee (SSLC) where they can raise students' views and concerns. The Students' Union and the faculties together provide training for student representatives. SSLCs and focus groups are also used to obtain student feedback on plans for developing existing programmes and designing new ones. Feedback on your programme is obtained every year through module questionnaires and informs the annual review of your programme. Student representatives are also invited to attend Programme and Module Studies Boards which manage the delivery and development of programmes and modules. Various Faculty committees, particularly Faculty Student Success Committee, Academic Development Committee and Quality Management Sub-Committee also have student representation. This allows students to be involved in higher-Level plans for teaching and learning. There is a parallel structure at university Level on which students are represented by sabbatical officers who are the elected leaders of the Students' Union. The University's student representation and feedback policy can be found here.

There is a current Biopharmaceutical Science Society associated with the Biopharmaceutical Science programme. This society could service students on the Medicinal Chemistry programme.

The internal Royal Society of Chemistry Student Society works with the academic teaching staff to provide input into the programme and external activities allied with chemistry and pastoral care.

Undergraduate programmes only: Final-year students are also invited to complete a National Student Survey (NSS) which asks a standard set of questions across the whole country. The results of this are discussed at Programme Studies Boards and at Faculty Student Success Committee to identify good practice which can be shared and problems which need to be addressed. We rely heavily on student input to interpret the results of the NSS and ensure that we make the most appropriate changes.

Programmes offered in partner colleges: If you are studying in one of our partner colleges the college will have its own mechanisms for obtaining student feedback. Some of these may be the same as that on-campus at the University but others may be different. You should ask your college for further information.

SECTION G QUALITY MANAGEMENT

46. National subject benchmarks

The Quality Assurance Agency for Higher Education publishes benchmark statements which give guidance as to the skills and knowledge which graduates in various subjects and in certain types of degree are expected to have. These can be found here.

Are there any benchmark statements for this programme?	**YES**	

The subject benchmark(s) for this programme are:
Subject Benchmark Statements: Chemistry (2014)

The QAA also publishes a Framework for Higher Education Qualifications (FHEQ) which defines the generic skills and abilities expected of students who have achieved awards at a given Level and with which our programmes align. The FHEQ can be found here.

47. How are the quality and standards of the programme assured?

The programme is managed and quality assured through the University's standard processes. Programmes are overseen by Module and Programme Studies Boards, which include student representatives. Each year each module leader provides a brief report on the delivery of the module, identifying strengths and areas for development, and the programme team reviews the programme as a whole. The purpose of this is to ensure that the programme is coherent and up-to-date, with suitable progression from one Stage to another, and a good fit (alignment) between what is taught and how students learn and are assessed - the learning outcomes, content and types of teaching, learning and assessment. Student achievement, including progress between Stages of the programme and degree classification, is kept under review. The programme review report is sent to the Faculty Quality Management Sub-Committee which in turn reports issues to the University's Quality Management Sub-Committee (QMSC) and Academic Development Committee (ADC).

External examiners are appointed to oversee and advise on the assessment of the programme. They ensure that the standards of the programme are comparable with those of similar programmes elsewhere in the UK and are also involved in the assessment process to make sure that it is fair. They are invited to comment on proposed developments to the programme. Their reports are sent to the Deputy Vice-Chancellor (Academic) as well as to the Faculty so that issues of concern can be addressed.

All programmes are reviewed by the University on a six-yearly cycle to identify good practice and areas for enhancement. Programmes are revalidated through this review process. These reviews include at least one academic specialist in the subject area concerned from another UK university. The University is subject to external review by the Quality Assurance Agency for Higher Education on a six-year cycle. Their review reports for Sunderland can be found here.

Further information about our quality processes can be found here.

Please also complete the SITS form.

APPENDICES

Transferable skills matrix
Teaching, Learning and Assessment Matrix

Teaching, Learning and Assessment Matrix
Medicinal Chemistry Programme

Table 1: Level 4 (Core)

Learning Outcomes						Level 4 (Skills)						Level 4 (Knowledge)				
	Module Title	Module Type	Credits	Mode of Teaching & Learning	Modes of Assessment	Communicate concepts and ideas using a variety of appropriate methods	Demonstrate the skills required for the production of laboratory reports involved in scientific research	Recognise safety and ethical issues within a scientific investigation	Apply the principles of data collection, analysis and basic statistical methods to experimental investigation	Demonstrate an understanding of the use of instrumentation applicable to the study of chemistry and biology	Identify and reflect upon interpersonal, transferable, and study skills	A broad and balanced appreciation of key chemical concepts of general chemistry and biochemistry	Knowledge of the process and regulations involved in drug approval and manufacture including principles of good practice such as COSHH, GMP and GLP	Understanding of the widespread and varied applications of analytical science and the principles of analytical techniques used with reference to biological, chemical and pharmaceutical science	An understanding of the source of pharmaceuticals and the rationale for their development	An understanding of the function, regulation and structure of prokaryotic and eukaryotic cell structure.
						S1	S2	S3	S4	S5	S6	K1	K2	K3	K4	K5
BPS110	**Introduction to biological and pharmaceutical chemistry**	CORE	20	L, DS, W, PBL, TBL, IS	Ex, AS, MCQ	**TD**		**TD**	**T**	**T**	**TD**	**TDA**		**TD**		
BPS111	**Introduction to cell biology and biochemistry**	CORE	20	L, DS, W, PBL, TBL, IS	Ex, AS, MCQ	**TD**		**TD**	**TD**	**T**		**TDA**		**TD**	**TD**	**TDA**
BPS112	**Introduction to analytical chemistry**	CORE	20	L, DS, W, PBL, TBL, IS	Ex, TI, MCQ	**TD**				**T**	**TD**			**TDA**		
BPS113	**Introduction to pharmaceutics, pharmacology and pharmaceutical regulation**	CORE	20	L, DS, W, PBL, TBL, IS	Ex, AS, MCQ	**TD**				**TDA**			**TDA**	**TD**	**TDA**	
BPS114	**Research and practical skills in biopharmaceutical science**	CORE	40	LP, W, IS, GW	Pr, LR, P, E	**TD**	**TDA**		**TDA**	**TD**	**TDA**	**TDA**	**TDA**	**TDA**	**TDA**	**TDA**

Key

Modes of T&L: DS = Directed Study, GW = Group Work, IS = Independent Study, L = Lecture, LP = Laboratory practical, W = Workshop

Modes of Assessment: Ex = Examination, LR = Laboratory Report, P = Portfolio, Pr = Presentation, TI = Technical Interview, AS = Assessed Seminar, E = Essay

T = Taught, D = Developed, A = Assessed

Table 2: Level 5 (Core)

Learning Outcomes						Level 5 (Skills)						Level 5 (Knowledge)					
	Module Title	Module Type	Credits	Mode of Teaching & Learning	Modes of Assessment	Apply modern analytical methods to the characterisation of chemical and biological molecules	Use synthetic procedures to prepare, purify and analyse drug substances	Apply the concepts of recombinant DNA technologies to prepare biological molecules	Present experimental work in laboratory reports and oral presentations	Evaluate and synthesise information, arguments and analyses using evidence from appropriate sources	Identify the skills and knowledge obtained in the workplace relevant to enhanced employability and their application in practice	Explain and use general organic and chemical synthetic pathways to theoretically produce small organic and pharmaceutical molecules	Recognise and appraise the how drugs are administered, adsorbed, metabolised, distributed and excreted	Describe the drug development process from selection of lead chemical and biological compounds through to clinical testing and manufacture	Discuss the ways in which metabolic biochemistry has helped in our understanding of the development of disease processes and how these may be monitored in the clinical setting	Relate the structure and physical properties of drugs to their pharmacological activity	Theoretically underpin the principles of biomolecular sciences in a workplace environment
						S7	S8	S9	S10	S11	S12	K6	K7	K8	K9	K10	K11
BPS210	Organic Chemistry	CORE	20	L, DS, W, PBL, TBL, IS, GW	Ex, AS, TBL		TDA			D		TDA		TDA			
BPS211	Genetics and molecular biology	CORE	20	L, DS, W, PBL, TBL, IS, GW	Ex, AS, D	TD		TDA		D		TDA		TDA		TDA	
BPS212	Further analytical sciences	CORE	20	L, DS, W, PBL, TBL, IS, GW	Ex, AS, MCQ	TD			DA	D				DA		TDA	
BPS215	Introduction to medicinal chemistry	CORE (MED CHEM)	20	L, DS, W, PBL, TBL, IS, GW	Ex, AS, MCQ	TD				D			TDA		TDA		
BPS214	Further research and practical skills in biopharmaceutical science	CORE	40	LP, W, IS, GW	TI, Pr, LR, Pr, P, E, TI, SC	DA	DA	DA	DA	DA		TDA	TDA	TDA	TDA	TDA	
BPS205	Pharmaceutical Sciences Industrial Placement	OPTIONAL	120	DS, WBT	R, Pr, EA						TDA						TDA

Key

Modes of T&L: DS = Directed Study, GW = Group Work, IS = Independent Study, L = Lecture, LP = Laboratory practical, W = Workshop, WBT - Workplace training

Modes of Assessment: D = Dissertation/Literature Review, Ex = Examination, LR = Laboratory Report, P = Portfolio, Pr = Presentation, SC= Science Communication exercise, TI = Technical Interview, AS = Assessed Seminar, E = Essay, EA = Employer

T = Taught, D = Developed, A = Assessed

Table 3: Level 6

Learning Outcomes						Level 6 (Skills)				Level 6 (Knowledge)					
	Module Title	Module T	Credi	Mode of Teaching & L	Modes of Asses	Apply research and data analysis methods to a	Evaluate the significance and relevance of scien	Evaluate the application of a range of analytical te characterisation of disease and therapeutic	Utilise synthetic and computational methods for the les molecul	Theoretically underpin a research project in chemical or r	Explain how advanced analytical chemistry methods and chemical and biological an	Compose synthetic pathways to functional or	Summarize and critically review modern chemical and in methodolo	Discuss examples of pharmaceutical drug discovery in patterns and lessons from discovery of these examples unseen exam	Demonstrate an understanding of concepts such as a bioavailability and pharmacokinetics and the role of med improving these para
						S13	S14	S15	S16	K12	K13	K14	K15	K16	K17
BPS310	Research project	CORE	40	L, LS, DS, W, PBL, TBL, T	Ex, E, AS	DA	DA	DA		TDA					
BPS311	Advanced Chemistry and Pharmaceutics	CORE	20	L, LS, DS, W, PBL, TBL, LP	Ex, AS, LR, PBL TBL	TDA		TDA			DA	TDA	TDA		
BPS312	Advanced Biotechnology and biochemistry	CORE	20	L, LS, DS, W, PBL, TBL, LP	Ex, AS, LR, PBL TBL		DA	TDA			DA		TDA		
BPS313	Advanced Medicinal Chemsitry	MED CHEM	20	L, LS, DS, W, PBL, TBL	Ex, AS, E, TBL, PBL		DA		TDA		DA	DA	TDA	TDA	DA
BPS317	Advanced Pharmacology	MED CHEM	20	L, LS, DS, W, PBL, TBL	Ex, AS, PBL		DA		TDA				TDA	TDA	TDA

Key

Modes of T&L: DS = Directed Study, GW = Group Work, IS = Independent Study, LE = Lecture, LP = Laboratory practical, W = Workshop, WBT = Workplace training, RT = Research Training

Modes of Assessment: DI = Dissertation/Literature Review, Ex = Examination, LR = Laboratory Report, P = Portfolio, Pr = Presentation, SC = Science Communication exercise, TI = Technical Interview, AS = Assessed Seminar, E = E

T = Taught, D = Developed, A = Assessed

Table 4: Transferable Skills Mapping : BSc Medicinal Chemistry

		Transferable Skills												
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
Module Code	Module Title	Numeracy	Problem solving	Team working	Independent working	Critical Review of information	Information technology	Communication Skills	Appreciation of ethics in biomolecular science	Literature searching	Employability Skills	Application of statistics in scientific research	Hypothesis testing	Time management and organisational skills
BPS110	Introduction to biological and pharmaceutical chemistry	⊗	⊗	⊗										
BPS111	Introduction to cell biology and biochemistry	⊗	⊗		⊗									
BPS112	Introduction to analytical chemistry	⊗	⊗			⊗								
BPS113	Introduction to pharmaceutics, pharmacology and pharmaceutical regulation	⊗	⊗				⊗							
BPS114	Research and practical skills in biopharmaceutical science	⊗	⊗	⊗	⊗	⊗	⊗							
BPS210	Organic Chemistry	⊗	⊗	⊗				⊗						
BPS211	Genetics and molecular biology	⊗	⊗	⊗	⊗		⊗	⊗	⊗	⊗				
BPS212	Further analytical sciences	⊗	⊗			⊗				⊗				
BPS215	Introduction to medicinal chemistry	⊗	⊗				⊗							
BPS214	Further research and practical skills in biopharmaceutical science	⊗	⊗	⊗	⊗	⊗	⊗			⊗	⊗			
BPS205	Pharmaceutical Sciences Industrial Placement	⊗	⊗	⊗	⊗	⊗		⊗	⊗		⊗			
BPS310	Research project	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
BPS311	Advanced chemistry and pharmaceutics		⊗	⊗	⊗	⊗		⊗		⊗	⊗	⊗		⊗
BPS312	Advanced biotechnology and biochemistry		⊗	⊗	⊗	⊗				⊗	⊗	⊗		⊗
BPS313	Advanced medicinal chemistry		⊗	⊗	⊗	⊗			⊗	⊗	⊗		⊗	⊗
BPS317	Advanced pharmacology		⊗	⊗	⊗	⊗	⊗	⊗		⊗	⊗	⊗	⊗	⊗

PART B - Programme Regulation/s

Name of programme: **Medicinal Chemistry**
Title of final award: BSc with Honours
Interim awards[2]: Certificate in Higher Education Biopharmaceutical Science; Diploma in Higher Education in medicinal chemistry; Ordinary degree in Medicinal Chemistry

Accreditation: None.

University Regulation (please state the relevant University Regulation)
https://docushare.sunderland.ac.uk/docushare/dsweb/Get/Document-8312/AQH-F1-1%20Undergraduate%20Academic%20Regulations%202013-14.pdf

Programme specific regulations to meet Professional Body requirements:
None

Regulations apply to students commencing their studies from (please state the date / intake that these regulations will apply to students for each Stage)**:**

Regulations apply to students	Date the regulations apply	Intakes affected
Stage 1	September 2018	2018 onwards
Stage 2	September 2018	2018 onwards
Stage 3	September 2018	2018 onwards

Stage 1

Level 4			
Module	**Code**	**Credits**	**Module Leader**
Introduction to pharmaceutical and biological chemistry	BPS110	20	Mark Ashton
Introduction to cell biology and biochemistry	BPS111	20	Shafiq Ahmed
Introduction to analytical science	BPS112	20	John Lough
Introduction to pharmaceutics and pharmacology	BPS113	20	Cheng Chaw
Research and practical skills in biopharmaceutical science	BPS114	40	Mark Carlile

Stage 2

Module	Code	Credits	Module Leader
Organic Chemistry	BPS210	20	Nicolas Haroune
Biochemistry, Genetics and Biotechnology	BPS211	20	Shafiq Ahmed
Further Analytical Chemistry	BPS212	20	Lee Williams
Introduction to medicinal chemistry	BPS215	20	Mark Ashton
Further research and practical skills in biopharmaceutical science	BPS214	40	Mark Carlile

INDUSTRIAL PLACEMENT SCHEME

Industrial placement	BPS205	120	Mark Carlile

[2] Same as main award unless agreed otherwise at validation – eg to meet PSRB requirements
[2] This will be the norm – university regulations apply

Stage 3

Level 6			
Module	**Code**	**Credits**	**Module Leader**
Research project	BPS310	40	Ken McGarry
Advanced chemistry and pharmaceutics	BPS311	20	Mark Ashton
Advanced biotechnology and biochemistry	BPS312	20	Amal Elkordy
Advanced medicinal chemsitry	BPS313	20	Mark Gray
Advanced pharmacology	BPS317	20	Gabriel Boachie-Ans

THE END