Programme Specification and Curriculum Map

MSci Pharmaceutical Chemistry

1. Programme title	Pharmaceutical Chemistry Pharmaceutical Chemistry (Sandwich)
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	
5. Final qualification	MSci Pharmaceutical Chemistry MSci Pharmaceutical Chemistry (Sandwich) MSci Pharmaceutical Chemistry with Foundation Year MSci Pharmaceutical Chemistry (Sandwich) with Foundation Year
6. Academic year	
7. Language of study	English
8. Mode of study	Full-time and Part-time

9. Criteria for admission to the programme

The admission criteria for the MSci Pharmaceutical Chemistry courses include:

I. A Levels minimum two, including Chemistry at grade B or above (BBB)

II. Edexcel BTEC Level 3 Extended Diploma minimum two subjects in Applied Science (DMM)

III. Access to HE Diploma in science or natural and physical sciences (Pass with 45 credits at level 3, of which 30 must be at Distinction and 15 credits at Merit or higher)

IV. One A level, or equivalent level qualification in depth and size, in Chemistry at grade B or above

V. International Baccalaureate (30 points)

VI. GCSE English and Maths with a minimum of Grade C are required

VII. Applications from mature candidates without formal qualifications are welcomed provided they can demonstrate appropriate levels of relevant ability and experience

VIII. Overseas candidates must also be competent in English to study this course. The most commonly accepted evidence of English language ability is IELTS 6.5 (with minimum 6.0 in all four components)

Applicants with a disability can enter the programme following assessment to determine if they can work safely in the laboratory. The programme team have experience of adapting teaching provision to accommodate a range of disabilities and welcome applications from students with disabilities.

10. Aims of the programme

The programme aims:

- To stimulate in students an enthusiasm for chemistry and an appreciation of its application in the prevention, diagnosis and treatment of disease
- To provide students with a sound knowledge and understanding of core chemistry concepts as well as specialised concepts of pharmaceutical chemistry
- To enable students to apply their knowledge of chemistry to drug discovery including drug design, lead optimisation and drug delivery
- To give students an understanding of mode(s) of action of drugs and their pharmacology
- To develop the student's laboratory skills that are important in drug discovery, such as synthetic, analytical and computational skills
- To develop the student's practical skills so that they can appreciate and assess risks and work safely and competently in the laboratory
- To develop the student's ability to apply scientific methods and approaches to research, product development and innovation
- To help students develop a range of graduate skills required for lifelong learning, effective communication, problem solving, team-working and innovation
- To prepare students for employment in the pharmaceutical industry
- To enable students to acquire the knowledge and skills required for postgraduate studies in chemistry or pharmaceutical chemistry
- To acquire advanced knowledge and skills in the field of Pharmaceutical Chemistry

11. Programme outcomes	
A. Knowledge and understanding On completion of this programme the successful student will have knowledge and understanding of: 1. Chemistry core concepts i.e inorganic, physical, analytical, computational, organic and synthetic chemistry 2. Specialised concepts of pharmaceutical chemistry 3. Synthesis, isolation, purification and characterisation techniques 4. The principles of drug design, development, delivery and action 5. Information technology and processing of chemical information and data 6. Ethics, societal responsibilities, environmental impact and sustainability 7. The importance of research in the advancement of pharmaceutical chemistry 8. Current topics in pharmaceutical chemistry and cheminformatics 9. Advanced synthetic chemistry and bioanalytical techniques or nanotechnology	**Teaching/learning methods** Students gain knowledge and understanding through lectures, seminars and laboratory work, self-study (both directed and self-directed) and online learning. Blended learning is utilised in modules integrating taught, self-directed, e-learning and learning technologies. **Assessment Method** Students' knowledge and understanding is assessed by both summative and formative assessments. Formative assessments include online learning exercises, peer evaluation, in-course tests and feedback of sample work. Summative assessments include seminar presentations, written assignments including laboratory reports, portfolios, seen and unseen examinations.
B. Cognitive (thinking) skills On completion of this programme the successful student will be able to: 1. Develop ideas through the evaluation of appropriate research evidence, scientific concepts or principles 2. Apply knowledge of chemical concepts to solve theoretical and practical problems 3. Apply numeracy and computer skills to solve problems in chemistry 4. Present, analyse and critically evaluate chemical information and data 5. Initiate, plan and execute a piece of independent work using the appropriate media, methods and techniques	**Teaching/learning methods** Students learn cognitive skills through lectures, seminars, discussions, peer presentations, a research project and debates and problem solving exercises. **Assessment Method** Students' cognitive skills are assessed by formative and summative assessment as written work, examinations, online quizzes, case studies, laboratory reports and portfolios.
C. Practical skills On completion of the programme the successful student will be able to: 1. Perform a wide range of common chemical laboratory techniques or procedures following risk assessment and in accordance with health and safety guidelines 2. Present chemical information using models 3. Apply practical skills to the study of chemistry related sciences 4. Competently perform advanced laboratory techniques following a comprehensive risk assessment and in accordance with health and safety guidelines	**Teaching/learning methods** Students learn practical skills through laboratory practical classes, virtual labs and video demonstrations, and undertaking a research project. **Assessment Method** Students' practical skills are assessed formatively and summatively by laboratory reports, portfolios, placement reports and dissertation.
D. Graduate Skills On completion of this programme the successful student will be able to: 1. Communicate their ideas clearly using a variety of media 2. Work both collaboratively and with an appreciation of the skills required for leadership 3. Demonstrate an autonomous and reflective approach to lifelong learning 4. Use a range of information technologies to support their learning 5. Manage a research project and demonstrate a high level of research skills 6. Demonstrate a high level of numeracy and problem-solving skills 7. Creativity, innovation or business acumen	**Teaching/learning methods** Graduate skills are taught and embedded throughout the programme. Students are introduced to employability, numeracy and computer skills in BMS1774 Professional Development for Pharmaceutical Chemistry and these skills are utilised and developed within modules at each level. Students acquire graduate skills through reading, group work, problem-based learning exercises, structured and directed learning, analysis of case studies, and through reflection, placement and development of portfolio material. **Assessment method** Students' graduate skills are assessed formatively and summatively using written work in the form of portfolios,

	and also in case studies, presentations, project and research work, and online examinations.

12. Programme structure (levels, modules, credits and progression requirements)

12. 1 Overall structure of the programme

All programmes can be studied over four or five years on a full time basis, or part-time over a minimum of five years. They are also modularised with each module, except the placement module, having a credit value of either 15 or 30 credits. The placement module carries 120 credit points and is normally taken in the third year of the four-year sandwich programme. The total credit points required for each award are as follows:

- MSci Pharmaceutical Chemistry – 480 credit points
- MSci Pharmaceutical Chemistry (Sandwich) – 600 credit points

Students admitted to MSci will need to have a 2ii grade profile or better (i.e. at least 50% of the module grades must be 2ii or higher) in order to remain on this programme by the end of year two. If their grade profile is a third, students will be required to transfer to the BSc at the end of year two.

The final year of MSci comprises 120 credit points of level 7 modules, covering advanced and specialist topics in synthetic, analytical, computational and pharmaceutical chemistry.

12.2 Levels and modules

Level 4		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
All students must take all of the following: BMS1714 (15 credits) BMS1724 (30 credits) BMS1774 (30 credits) BIO1400 (15 credits) BIO1608 (30 credits)	There are no optional modules.	Normally all modules must be passed but a marginal failed module may be compensatable in accordance with University regulations. This does not apply to the non-compensatable module BMS1724
Level 5		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
All students must take all of the following: BMS2007 (30 credits) BMS2765 (15 credits) BMS2715 (15 credits) BMS2725 (30 credits) BIO2417 (15 credits) BIO2419 (15 credits)	There are no optional modules.	Normally all modules must be passed but a marginal failed module may be compensatable in accordance with University regulations. This does not apply to the non-compensatable module BMS2725
Level 6		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students on the BSc programmes must also take the following: BMS3336 (30 credits) BMS3726 (15 credits) BMS3736 (30 credits) BMS3746 (15 credits) BIO3417 (15 credits) BMS3006 (Only for the Sandwich programmes)	There are optional modules. Students must choose one from the list below. BMS3776 (15 credits) BIO3419 (15 credits) BMS3716 (15 credits)	All modules must be passed.
Level 7		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Msci students must take the following: BMS4367 (60 credits) BMS4727 (15 credits) BMS4747 (15 credits) BMS4717 (15 credits)	There are optional modules. Students must choose one from the list below. BMS4737 (15 credits) BMS4977 (15 credits)	All modules must be passed.

12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)	
Module level	***Module code***
4	BMS1724
5	BMS2725
6	All
7	All

13. A curriculum map relating programme learning outcomes to modules

See Curriculum Map attached.

14. Information about assessment regulations

The assessment regulations are the general university regulations.

Each module has one or more pieces of assessment. A minimum of 40% is required on each piece of assessment to pass. Within module, where there is more than one component to a module assessment, and all pieces of work are at a pass grade, the marks are aggregated and the grade is given using the Middlesex University 20 point scale.

There are opportunities for re-assessment in failed components of work and specific details are given in the module handbooks. At levels 5, 6 and 7, where a student has failed a piece of work, the mark of the resubmitted work is capped at 40%.

Students must adhere to module assessment deadlines. Where a student cannot meet the deadline for extenuating reasons an extension can be formally requested.

In some modules, especially those with seminars and laboratories, participation in the sessions is essential in order to achieve the learning of the module. Students who do not attend sufficiently may not be able to submit the relevant assessment for the module.

15. Placement opportunities, requirements and support

Students can go on a year-long placement in year 3 but they must secure a placement by the end of year 2. Possible placements include research or project work in chemical and pharmaceutical laboratories both in industry and academia.

In preparation for securing a placement, they will normally be provided with help with CV writing and interview techniques. Employability service and academic staff may notify students of employers who are seeking placements. However, it is the student's responsibility to identify and contact suitable placement providers.

Whilst on placement, students will be nominated a placement supervisor, who is responsible to ensure that the student achieves the agreed learning outcomes. Additionally, an academic tutor will be appointed to monitor student's progress whilst the student is on placement. The academic will normally visit the student at least once if feasible and have regular contact with the student and supervisor using email, telephone or another type of communication media. Both mentor and student will have a guide handbook to explain the requirements and students will keep an ongoing reflective diary of their experiences and also produce a critical appraisal of the organisation they work in.

16. Future careers

Pharmaceutical chemistry graduates can gain employment in a wide variety of settings, particularly laboratory-based work. The degree is directly related to employment in pharmaceutical industry as analytical, computational or pharmaceutical chemist as well as research and development scientist.

Other career opportunities include sales and marketing of chemical or pharmaceutical products, science writing, research grant or pharmaceutical regulations officer and in education at all levels.

Graduates with an MSci degree in Pharmaceutical Chemistry may have the additional benefit of progressing directly onto a PhD in a relevant field.

17. Particular support for learning (if applicable)

- Middlesex University has specialist laboratory facilities for the development of practical skills
- Middlesex University Library will provide access to specialist journals. For ease of access for students based at Hendon, the library has facilities for inter-library photocopying of any articles required. Other articles may be obtained from the British Library in London where a similar arrangement for photocopying articles exists
- A student may undertake a research project at their workplace where relevant and possible
- Applicants with a disability can enter the programme following an assessment of their needs, and to determine if they can work safely in the laboratory
- Learning resource services and facilities at Middlesex include a CAL suite and internet access as well as English learning and Language Support
- Learning resources and other support for modules is delivered via myUniHub. In the specific module area, students can find all module materials as well as other information to support learning including video material, links to reading lists, quizzes and discussion boards

- Departmental Graduate Academic Assistants support students with their coursework and subject understanding in small group tutorials or on a 1:1 basis
- Student Learning Assistants provide peer-learning support and can help students with their work in class as well as by meeting them individually or in small groups

18. JACS code (or other relevant coding system)	Chemistry F111
19. Relevant QAA subject benchmark group(s)	Chemistry

20. Reference points

The following reference points were used in designing the Programme:

i. Middlesex University (2006) *Learning Framework Document*
ii. Middlesex University (2016) *Middlesex University Regulations.* MU
iii. QAA (2014) *Subject Benchmark Statement in Chemistry*. QAA
iv. Royal Society of Chemistry (2015*) Accreditation of degree programs*. Royal Society of Chemistry

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the student programme handbook and the University regulations.

Curriculum map

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

Programme Learning Outcomes

Knowledge and understanding		Practical skills	
A1	Chemistry core concepts i.e inorganic, physical, analytical, computational organic and synthetic chemistry	C1	Perform a wide range of common chemical laboratory techniques or procedures following risk assessment and in accordance with health and safety guidelines
A2	Specialised concepts of pharmaceutical chemistry	C2	Present chemical information using models
A3	Synthesis, isolation, purification and characterisation techniques	C3	Apply practical skills to the study of chemistry related sciences
A4	The principles of drug design, development, delivery and action	C4	Competently perform advanced laboratory techniques following a comprehensive risk assessment and in accordance with health and safety guidelines
A5	Information technology and processing of chemical information and data		
A6	Ethics, societal responsibilities, environmental impact and sustainability		
A7	The importance of research in the advancement of pharmaceutical chemistry		
A8	Advanced topics in pharmaceutical chemistry or nanotechnology and cheminformatics		
A9	Advanced synthetic chemistry and bioanalytical techniques		
Cognitive skills		Graduate skills	
B1	Develop ideas through the evaluation of appropriate research evidence, scientific concepts or principles	D1	Communicate their ideas clearly using a variety of media
B2	Apply knowledge of chemical concepts to solve theoretical and practical problems	D2	Work both collaboratively and with an appreciation of the skills required for leadership
B3	Apply numeracy and computer skills to solve problems in chemistry	D3	Demonstrate an autonomous and reflective approach to lifelong learning
B4	Present, analyse and critically evaluate chemical information and data	D4	Use a range of information technologies to support their learning
B5	Initiate, plan and execute a piece of independent work using the appropriate media, methods and techniques	D5	Manage a research project and demonstrate a high level of research skills

		D6	Demonstrate a high level of numeracy and problem-solving skills
		D7	Creativity, innovation or business acumen

Module Title	Module Code by Level	Programme outcomes																								
		A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6	D7
Chemistry	BIO0800	X										X	X													
SMART	SAT0100																									
Foundation Mathematics	MSO0200																								X	
Foundation Project	SAT0300											X	X	X		X	X			X	X				X	
Foundations of Practical Chemistry	BMS1724			X								X	X	X		X		X							X	
Fundamentals of Chemistry	BIO1608	X	X		X			X				X	X	X		X	X	X								
Analytical Chemistry	BMS1714	X										X														
Metabolic Biochemistry	BIO1400				X							X														
Professional Development	BMS1774					X	X	X			X		X				X			X	X	X	X	X	X	X
Advanced Organic Chemistry I	BIO2417	X										X		X		X		X								
Pharmaceutical Chemistry	BIO2419		X		X			X				X					X				X					
Practical Chemistry	BMS2725			X								X	X	X		X		X								
Research Methods and Professional Practice	BMS2007						X	X			X		X	X						X		X	X	X	X	X
Applied Inorganic Chemistry	BMS2765	X					X					X	X				X								X	
Applied Physical Chemistry	BMS2715	X										X	X												X	
Placement for Employability	BMS3006										X		X	X		X		X		X	X	X			X	
Computational Chemistry	BMS3746	X				X						X	X	X			X	X								
Advanced Organic Chemistry II	BIO3417	X										X														
Drug Development	BMS3736		X		X		X	X				X					X				X					X
Organic Synthesis	BMS3726	X		X								X		X		X		X								
Dissertation	BMS3336			X			X	X			X	X	X	X		X	X	X		X		X	X	X	X	X
Natural Product Chemistry	BMS3776	X					X					X														
Pharmacology and Toxicology	BIO3419		X		X							X														
Structural Methods in Inorganic and Physical Chemistry	BMS3716	X				X						X	X	X												
Cheminformatics	BMS4747		X			X			X			X	X	X			X	X								

Advanced Organic Synthesis Techniques	BMS4727	X		X						X		X		X		X		X	X							
Advanced Bioanalytical Techniques	BMS4977	X		X						X		X		X		X		X	X							
Msci Project	BMS4367	X	X	X		X	X	X			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Current Trends in Pharmaceutical Chemistry	BMS4717	X	X		X		X	X	X												X	X					X
Nanotechnology	BMS4737		X		X				X													X					

MSci Pharmaceutical Chemistry / MSci Pharmaceutical Chemistry (Sandwich)

Programme outcomes																								
A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6	D7
Highest level achieved by all graduates																								
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7