

Programme Specification for
MSci Clinical Biochemistry



1. Programme title	MSci Clinical Biochemistry
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Details of accreditation by professional/statutory/regulatory body	
5. Final qualification	MSci (Honours)
6. Year of validation Year of amendment	
7. Language of study	English
8. Mode of study	Full-time/ Part-time/ Thick Sandwich Programme

9. Criteria for admission to the programme

5 GCSEs (Grade C or above) or 5 GCEs (Grade C or above) including English Language, Mathematics.

And one of the following:

- A2 – 280 UCAS points including Biology or Chemistry at grade C or better as well as a second science related subject;
- QCF Extended Diploma in Applied Science (from 2010). Extended Diploma/Diploma at DMM/ D* D*;
- HNC/HND Applied Biology (new award since 2010). HNC Students may be eligible to enter Year 2 with a Level 5 pass;
- CCESS to science course in relevant science subject (biology, chemistry, physics, science pathway) with a minimum of a pass mark. Should include significant amount of biology and chemistry;
- Mature students will be interviewed by the programme leader to discuss suitability for study at Level 4;
- Students who do not have the standard entry qualifications but who have relevant professional experience may apply to enter the programme using APEL

(accreditation of prior experiential learning) – discuss your application with the programme leader;

- Entry to Year 2 or Year 3 of the programme – students are welcome to apply with appropriate prior qualifications. Year 2 available from 2018 and Year 3 from 2019.

Overseas students are required to demonstrate competence in English e.g. TOEFL of 550 or IELTS 6.0 with a minimum of 5.5 in each component.

The programme is open to students with disabilities. Students who have a disability are welcome to contact the programme leader prior to applications to discuss any specific needs.

10. Aims of the programme

The programme aims to:

- develop critical awareness of science fostering an interest in the ever changing nature of knowledge, significance of new developments within the field of clinical biochemistry and subsequent impact on society;
- introduce students to the cross disciplinary nature of biochemistry and its applications in research and medicine;
- develop competence in scientific methods of enquiry and problem solving;
- provide experience of current diagnostic techniques and practical skills relevant to biochemistry and appropriate for employment;
- provide students with sufficient detailed information about the modern technologies used in diagnostics and research to enable them to apply these to complex problem solving in the investigation of disease;
- give students the ability to critically evaluate current research literature in biomedical science, and an acquisition of the skills for lifelong learning;
- provide students with the tools to acquire essential facts, concepts, principles and theories relevant to chosen research project;
- provide a thorough grounding in the fundamental mechanisms underpinning the major pathological processes;
- produce postgraduates able to carry out research and within an ethical framework;
- prepare students for work at doctoral level and/or for employment in relevant fields.

11. Programme outcomes

A. Knowledge and understanding

On completion of this programme the successful student will have knowledge and understanding of :

1. Underpinning scientific principles.

Teaching/learning methods

Students gain knowledge and understanding through:

- attendance and participation in lectures, seminars, workshops,

<ol style="list-style-type: none"> 2. Biological concepts, from molecular to cellular to whole organism. 3. Chemical concepts, from atoms to molecules to reactions. 4. Biochemical concepts including metabolism, immunology and gene technology. 5. Applications of biochemistry on health, medical diagnostics and pharmacy. 6. Use of analytical and diagnostic techniques and their applications. 7. Aetiology and pathology of common diseases. 8. The role clinical biochemistry plays in the screening, diagnosis and treatment. 9. Complex clinical problems, their diagnosis and recommendations. 	<p>laboratory classes, excursions, group discussions;</p> <ul style="list-style-type: none"> • blended learning which is utilised in modules integrating taught, self-directed and e-learning; • critical discussion during practical and seminar work; • different formats of assessment. <p>Assessment methods</p> <p>Students' knowledge and understanding is assessed by:</p> <ul style="list-style-type: none"> • formative assessment such as online learning exercises, peer evaluation, in-course tests and feedback of sample work; • seen and unseen examinations; • laboratory work reports; • portfolios; • essays; • case studies; • oral and poster presentations.
<p>B. Cognitive (thinking) skills</p> <p>On completion of this programme the successful student will be able to:</p> <ol style="list-style-type: none"> 1. Review evidence and evaluate new information. 2. Analyse and apply theories. 3. Critically evaluate information collated by experiment or in literature. 4. Problem solving. 5. Design a research project and collect, analyse, interpret and evaluate data. 6. Appreciate ethical problems 	<p>Teaching/learning methods</p> <p>Students learn cognitive skills through:</p> <ul style="list-style-type: none"> • participation in seminars, workshops, group discussions, peer review of oral presentations and written documents, problem solving exercises and engaging in assessment activities. <p>Assessment methods</p> <p>Students' cognitive skills are assessed by:</p> <ul style="list-style-type: none"> • case studies; • laboratory activities; • engaging in workshops and seminars; • designing and giving seminars; • assessed summative examinations; • group work;

<p>associated with biochemistry research and applications.</p> <p>7. Critically evaluate the role of clinical biochemistry in diagnosis, monitoring and treatment.</p>	<ul style="list-style-type: none"> • problem solving exercises and case studies; • laboratory reports; • portfolios; • a dissertation.
<p>C. Practical skills</p> <p>On completion of the programme the successful student will be able to:</p> <ol style="list-style-type: none"> 1. Competently perform laboratory techniques. 2. Appropriately calibrate and use key equipment and record results. 3. Interpret and evaluate data. 4. Recognise and respond to ethical and health and safety issues. 5. Apply practical skills to study of biochemistry and related sciences. 	<p>Teaching/learning methods</p> <p>Students learn practical skills through:</p> <ul style="list-style-type: none"> • participation in laboratory classes, virtual labs and video demonstrations and project work for the dissertation. <p>Assessment methods</p> <p>Students' practical skills are assessed by:</p> <ul style="list-style-type: none"> • formative and summative assessment such as laboratory reports and portfolios, data evaluation exercises, case studies, placement reports and the dissertation.
<p>D. Graduate skills</p> <p>On completion of this programme the successful student will be able to:</p> <ol style="list-style-type: none"> 1. Effectively communicate through a range of different methods. 2. Work effectively in teams. 3. Use information technology to support their learning. 4. Retrieve, collate and present information drawing on a range of sources and methods. 5. Analyse data and carry out appropriate numerical calculations. 6. Engage in effective learning. 	<p>Teaching/learning methods</p> <p>Students acquire graduate skills through:</p> <ul style="list-style-type: none"> • participation in the programme; • group work; • practical exercises; • engagement with E-learning; • ICT and numeracy; • personal development portfolio; • career tutorials to enhance their personal and career development. <p>Assessment methods</p> <p>Students' graduate skills are assessed by:</p> <ul style="list-style-type: none"> • summative and formative assessment, which include written reports, case study analysis, portfolio, group and individual presentation,

7. Reflect on personal and career development.	examination and individual research projects; <ul style="list-style-type: none"> • online exercises and presentations (blogs, videos).
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12. Programme structure (levels, modules, credits and progression requirements)

12.1 Overall structure of the programme

An undergraduate BSc honours degree is comprised of 360 credits of learning. In each year you will take 120 credits of learning and this will enable you to complete your award as a full-time student in four years. Part-time students normally undertake 60-90 credits of learning per year and so will complete their study in five-seven years.

The learning units are comprised of 15 and 30 credit modules. In your first year you will undertake a core programme of study of 120 credits. In subsequent years you will have some core and some optional modules. The 30 credit modules are normally studied over the whole academic year of 24 weeks of learning followed by an assessment period. The 15 credit modules are normally studied for 12 weeks in term 1, or 12 weeks in term 2. Some modules may be taught in blocks of learning.

Not all optional modules or combinations thereof might be available each year.

At Level 7 students will undertake four 15 credit taught modules, two each in the autumn and spring terms. In addition, students will undertake a 60 credit research project module in the summer term on successful completion of the taught Level 7 modules.

There are no optional modules at Level 7.

12.2 Levels and modules

Level 4 (1)

COMPULSORY

OPTIONAL

PROGRESSION
REQUIREMENTS

<p>Students must take all of the following:</p> <p>BIO1113 <i>30 credits</i></p> <p>BIO1400 <i>15 credits</i></p> <p>BIO1524 <i>15 credits</i></p> <p>BIO1604 <i>15 credits</i></p> <p>BIO1608 <i>30 credits</i></p> <p>BIO1636 <i>15 credits</i></p>		<p>Successful students who have passed 120 credits can progress to Year 2.</p> <p>Students with credit deficit may be required to repeat modules or pass outstanding assessment before progressing.</p>
Level 5 (2)		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
<p>Students must take all of the following:</p> <p>BIO2005 <i>30 credits</i></p> <p>BIO2400 <i>30 credits</i></p> <p>BIO2413 <i>15 credits</i></p> <p>BIO2419 <i>15 credits</i></p> <p>BIO2514 <i>15 credits</i></p> <p>BIO2556 <i>15 credits</i></p>		<p>Successful students who have passed 120 credits can progress to Year 3.</p> <p>Students must attain a minimum of 75 credits at grade 2.2 and above in order to remain on the MSci award, students with less than this will be transferred to BSc Medical Biochemistry.</p> <p>Students with credit deficit may be required to repeat modules or pass outstanding assessment before progressing.</p>
Level 6 (3)		

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
<p>Students must take all of the following:</p> <p>BIO3400 <i>15 credits</i></p> <p>BIO3413 <i>15 credits</i></p> <p>BIO3419 <i>15 credits</i></p> <p>BIO3556 <i>15 credits</i></p> <p>BIO3888 <i>30 credits</i></p>	<p>Students must also choose at least 30 credits from the following:</p> <p>BIO3226 <i>15 credits</i></p> <p>BIO3227 <i>15 credits</i></p> <p>BIO3232 <i>15 credits</i></p> <p>BIO3403 <i>15 credits</i></p> <p>BIO3899 <i>30 credits</i></p>	<p>Students may progress to the MSci stage of the award if they meet the following two conditions:</p> <p>1) to have attained the equivalent of a 2.2 award across Levels 5 and 6;</p> <p>2) a minimum of a 2.2 grade in BIO3888 Dissertation.</p> <p>Students who cannot progress to the MSci will exit with an award in BSc Medical Biochemistry, providing they have attained 360 credits with 120 credits at each of Levels 5 and 6.</p>
Level 7 (4)		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS

<p>Students must take all of the following:</p> <p>BMS4117 <i>15 credits</i></p> <p>BMS4137 <i>15 credits</i></p> <p>BMS4147 <i>15 credits</i></p> <p>BMS4887 <i>15 credits</i></p> <p>BMS4997 <i>60 credits</i></p>		<p>Students who have gained a total of 480 credits with 120 at each of Levels 4, 5, 6 and 7, will be awarded the MSci Clinical Biochemistry.</p>
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12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)

Module level	Module code
Level 4	BIO1113, BIO1400, BIO1608
Level 5	BIO2005, BIO2400, BIO2514, BIO2556
Level 6	BIO3400, BIO3413, BIO3888
Level 7	BIO4887, BIO4997

13. Curriculum map

See attached.

14. Information about assessment regulations

The regulations for assessment are common to the University.

Each module has one or more pieces of assessment. A minimum of 40% is required on each piece of assessment to pass. Within modules, where there is more than one component to a module assessment, and all pieces of work are at pass grade, the marks are aggregated and a grade 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 for the resubmitted work is capped at 40%.

Students must adhere to module assessment deadlines. Where a student cannot meet the deadline for extenuating reasons (for example illness, accidents, bereavement, family problems), an extension can be formally requested. Failure to participate in assessment without permission will result in a fail grade for the module.

In some modules, especially those with seminars and laboratories, participation in the sessions is essential in order to achieve the learning for 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 (if applicable)

There are two opportunities to gain relevant work experience. Students may take a one year long placement of 120 credits or a 30 credit work experience module. Both provide excellent opportunities to gain employability skills, transferable skills and experience of working in science. This may be in an industrial, research laboratory or hospital based environment for example.

The 30 credit (**BIO3899**) Work Experience module is taken either as a day release in year 3 or as a block during the summer months between Years 2 and 3. Students would be expected to have successfully completed Year 2 before they go in to a work experience module. Students can use the Employability Office to help secure relevant placements and are supported in the placement by the office. The module enables work of about 150 hours (25 days) in a relevant organisation.

The Thick Sandwich Year with a 120 credit placement (**BIO3999**) can be taken by students who have successfully completed Year 2. There are no University fees for the placement year.

Students will be supported in finding a placement through the University Employability Office. The placement is taken following successful completion of Year 2. Students will be visited in their placement at least twice and supported by an in-placement mentor, the placement office and a member of the programme team. 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 (if applicable)

Skills and knowledge development through the programme coupled with the acquisition of analytical and critical appraisal skills enables graduates to enter a wide range of

careers and further study programmes. Successful graduates from this programme are well qualified and may progress to undertake doctorate level research. Graduates could be employed in medical diagnostic, forensic or research laboratories in hospitals, universities, private or public health facilities; the pharmaceutical or chemical industry; or the veterinary or agriculture sector.

Graduates will be in a strong position to pursue careers in science (Biology/Chemistry) teaching in secondary schools or colleges as well as other careers in education.

Employment may be sought on graduate training programmes, in laboratory or technical work, sales, marketing or technical support for biochemical and diagnostic products or laboratory equipment or in other disciplines such as journalism.

17. Particular support for learning (if applicable)

The University has a number of points of support for students:

- Academic support is provided by the Learning Enhancement Team (LET) advising students on literacy, English language and numeracy.
- The Disability Support Service offers support to disabled students during their time at Middlesex.
- There is an on-line learning platform to provide module and programme support. In the specific module area, students can find all module materials as well as other information to support learning include 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, especially during their first year at Middlesex.
- First year students will be offered programme progression interviews and small group tutorials.

18. JACS code (or other relevant coding system)	C741
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19. Relevant QAA subject benchmark group(s)	Biosciences (2015)
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20. Reference points

- Middlesex University Regulations 2015/16
- Middlesex University Learning, Quality and Enhancement Handbook, 2015/16
- QAA for Higher Education, Subject Benchmarks, Biosciences, 2015

- Society of Applied Biology, 2012, Guidelines for Biology courses

21. Other information

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 rest of your programme handbook and the university regulations.

Appendix 2: Curriculum Map

Curriculum map for MSci Clinical Biochemistry

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	Underpinning scientific principles.	C1	Competently perform laboratory techniques.
A2	Biological concepts, from molecular to cellular to whole organism.	C2	Appropriately calibrate and use key equipment and record results.
A3	Chemical concepts, from atoms to molecules to reactions.	C3	Interpret and evaluate data.
A4	Biochemical concepts including metabolism, immunology and gene expression and control.	C4	Recognise and respond to ethical and health and safety issues.
A5	Applications of biochemistry to industry and the environment.	C5	Apply practical skills to study of biochemistry and related sciences.
A6	Use of analytical techniques and their applications.		
A7	Aetiology and pathology of common diseases.		
A8	The role clinical biochemistry plays in the screening, diagnosis and treatment.		
A9	Complex clinical problems, their diagnosis and recommendations.		
Cognitive skills		Graduate Skills	
B1	Review evidence and evaluate new information.	D1	Effectively communicate through a range of different methods.
B2	Analyse and apply theories.	D2	Work effectively in teams.
B3	Critically evaluate information collated by experiment or in literature.	D3	Use information technology to support their learning.
B4	Problem solving.	D4	Retrieve, collate and present information drawing on a range of sources

			and methods.
B5	Design a research project and collect, analyse, interpret and evaluate data.	D5	Analyse data and carry out appropriate numerical calculations.
B6	Appreciate ethical problems associated with biochemistry research and applications.	D6	Engage in effective learning.
B7	Critically evaluate the role of clinical biochemistry in diagnosis, monitoring and treatment.	D7	Reflect on personal and career development.

Programme outcomes																											
A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	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	7	7	7

Module Title	Module Code by Level	Programme outcomes																												
		A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6	D7	
Biological Techniques	BIO1113	X	X				X											X	X		X	X	X			X	X	X	X	
Metabolic Biochemistry	BIO1400	X			X																		X							
Principles of Microbiology	BIO1524		X										X										X				X	X		
Cell Biology and Genetics	BIO1604	X	X		X									X									X							
Introduction to Chemistry	BIO1608	X		X										X							X						X			
Physiology and Anatomy	BIO1636	X	X											X				X	X											
Research Methods and Project Planning	BIO2005													X	X	X	X	X	X							X	X	X		X
Functional Biochemistry	BIO2400	X			X									X	X	X		X				X			X			X		
Immunology and Endocrinology	BIO2413	X	X		X									X	X	X						X								

Pharmaceutical Chemistry	BIO2419	X		X		X						X	X							X	X			X		
Medical Diagnostic Techniques	BIO2514	X				X	X					X					X			X		X	X	X		X
Molecular Biology	BIO2556	X	X		X						X	X	X			X		X		X					X	
Gene Technology	BIO3226	X			X						X		X				X	X								
Current Topics in Bioscience	BIO3227					X						X									X			X		X
Bioinformatics	BIO3232					X						X		X						X				X		X
Biochemistry of Human Disease	BIO3400	X		X	X							X	X				X				X	X				
Clinical Biochemistry and Diagnostics	BIO3413					X	X				X			X											X	
Pharmacology and Toxicology	BIO3419	X		X		X																		X		
Gene Expression and Control	BIO3556	X	X		X							X	X								X					
Dissertation	BIO3888	X			X						X	X	X	X	X	X			X	X		X		X		X
Biology Work Experience	BIO3899					X						X					X	X			X			X		X
Biology Placement	BIO3999					X					X		X				X	X			X			X		X
Clinical Disorders	BMS4117	X	X				X	X	X				X			X										
Endocrinology and Metabolism	BMS4137	X	X		X			X	X			X	X							X				X	X	
Bioanalysis and Clinical Toxicology	BMS4147			X			X	X						X		X	X	X		X		X	X		X	
Experimental Design and Statistics	BMS4887						X	X	X	X			X	X					X						X	
Research Project	BMS4997					X						X	X		X		X	X	X	X	X	X		X	X	X