

Programme Specification

MSci Clinical Biochemistry



1. Programme title	MSci Clinical Biochemistry
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	
5. Final qualification	MSci Clinical Biochemistry
6. Academic year	2020-21
7. Language of study	English
8. Mode of study	FT/PT/TKSW

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:

1. A2 – 112 UCAS points including Biology or Chemistry at grade C or better as well as a second science related subject.
2. QCF Extended Diploma in Applied Science (from 2010). Extended Diploma/Diploma at DMM/ D* D*
3. HNC/HND Applied Biology (new award since 2010). HNC Students may be eligible to enter year 2 with a Level 5 pass
4. ACCESS 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.
5. Mature students will be interviewed by the programme leader to discuss suitability for study at level 4.
6. 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.
7. Entry to year 2 or year 3 of the programme – students are welcome to apply with appropriate prior qualifications.

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
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.

Teaching/learning methods

Students gain knowledge and understanding through attendance and participation in either online or face to face on campus lectures, seminars, workshops, laboratory classes (COVID-19 permitting), excursions, group discussions. Blended learning is utilised in modules integrating taught, self-directed and e-learning. Critical discussion during practical and seminar work forms an important vehicle for learning.

Participating in different formats of assessment will also advance knowledge.

Assessment methods

Formative assessment such as online learning exercises, peer evaluation, in-course tests and feedback of sample work will be used.

	<p>Students' knowledge and comprehension are assessed by seen and unseen examinations, laboratory reports, portfolios, essays, case studies, and oral and poster presentations.</p>
<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 associated with biochemistry research and applications 7. Critically evaluate the role of clinical biochemistry in diagnosis, monitoring and treatment 	<p>Teaching/learning methods</p> <p>Students learn cognitive skills through participation in seminars, workshops, group discussions, peer review of oral presentations and written documents, problem solving exercises and engaging in assessment activities.</p> <p>Assessment methods</p> <p>Formative assessment includes working with case studies, laboratory activities, engaging in workshops and seminars, designing and giving seminars.</p> <p>Students' cognitive skills are summatively assessed examinations, group work, problem solving exercises and case studies, laboratory reports and portfolios and a dissertation.</p>
<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 participation in laboratory classes (COVID-19 permitting), virtual labs and video demonstrations and project work for the dissertation.</p> <p>Assessment methods</p> <p>Students' practical skills are assessed formatively and summatively by laboratory reports and portfolios, data evaluation exercises, case studies, placement reports and the dissertation.</p>

<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 7. Reflect on personal and career development 	<p>Teaching/learning methods</p> <p>Graduate skills are taught and embedded throughout the programme. Students are introduced to skills in BIO1118 Professional Skills for Biochemistry and these skills are utilised and developed within modules at each level.</p> <p>Students learn graduate skills through participation in the programme, group work, practical exercises and engagement with E-learning. Some skills are formally taught in specific modules and then embedded in all modules. Emphasis is placed on ICT and numeracy skills in particular. Students will keep a personal development portfolio and attend career tutorials to enhance their personal and career development.</p> <p>Assessment methods</p> <p>Students' graduate skills are integrated into both summative and formative assessment, which include written reports, case study analysis, portfolio, group and individual presentation, through examination and individual research projects. Skills may also be assessed through online exercises and presentations (blogs, videos).</p>
<p>12. Programme structure (levels, modules, credits and progression requirements)</p>	
<p>12.1 Overall structure of the programme</p> <p>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 4 years. Part-time students normally undertake 60-90 credits of learning per year and so will complete their study in 5-7 years.</p> <p>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</p>	

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
Students must take all of the following: BIO1118 (30 credits) BIO1401 (15 credits) BIO1525 (15 credits) BIO1625 (15 credits) BIO1608 (30 credits) BIO1636 (15 credits)		Successful students who have passed 120 credits can progress to year 2. Students with credit deficit may be required to repeat modules or pass outstanding assessment before progressing.

Level 5 (2)

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: BIO2005 (30 credits) BIO2400 (30 credits) BIO2413 (15 credits) BIO2419 (15 credits) BIO2514 (15 credits) BIO2556 (15 credits)		Successful students who have passed 120 credits can progress to year 3. 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. Students with credit deficit may be required to repeat modules or pass outstanding assessment before progressing.

Level 6 (3)

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: BIO3400 (15 credits) BIO3413 (15 credits) BIO3419 (15 credits)	Students must also choose at least 30 credits from the following: BIO3226 (15 credits) BIO3227 (15 credits)	Students may progress to the MSci stage of the award if they meet the following two conditions:

BIO3556 (15 credits) BIO3888 (30 credits)	BIO3232 (15 credits) BIO3403 (15 credits) BIO3899 (30 credits)	1. to have attained the equivalent of a 2.2 award across level 5 and 6 and 2. a minimum of a 2.2 grade in BIO3888 Dissertation. 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.
Level 7 (4)		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: BMS4117 (15 credits) BMS4137 (15 credits) BMS4147 (15 credits) BMS4887 (15 credits) BMS4997 (60 credits)		Students who have gained a total of 480 credits with 120 at each of level 4, 5, 6 and 7, will be awarded the MSci Clinical Biochemistry.
12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)		
Module level	Module code	
Level 4	BIO1401, BIO1608, BIO1625	
Level 5	BIO2005, BIO2400, BIO2556	
Level 6	BIO3400, BIO3413, BIO3888	
Level 7	BIO4887, BIO4997	
13. Curriculum map		
See below		
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

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 Placement Office to help secure relevant placements and are supported in the placement by the placement 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 placement 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. The year long placement will not be offered in the academic year of 2020.21

16. Future careers

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

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.

Each student will be allocated a personal tutor for the duration of their programme.

18. JACS code (or other relevant coding system)

C790

19. Relevant QAA subject benchmark group(s)

Biosciences (2015)

20. Reference points

Middlesex University Regulations 2018.19

Middlesex University Learning, Quality and Enhancement Handbook, 2018.19

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 4: 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

Module Title	Module Code by Level	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	
		1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	1	2	3	4	5	1	2	3	4	5	6	7	
Professional Skills for Biochemistry	BIO1118	√	√								√		√											√		√	√	√	√	√
Metabolic Biochemistry	BIO1401	√	√		√		√											√	√	√		√		√						
Cell Biology	BIO1525	√	√								√							√		√				√			√			
Fundamentals of Chemistry	BIO1608	√	√									√								√								√		
Genetics	BIO1625	√	√									√		√				√						√				√		
Physiology and Anatomy	BIO1636	√	√											√				√	√											
Research Methods and Project Planning	BIO2005										√	√	√	√	√	√				√	√					√	√	√		√
Functional Biochemistry	BIO2400	√			√						√	√	√		√					√				√			√		√	
Immunology and Endocrinology	BIO2413	√	√		√						√	√	√							√										
Pharmaceutical Chemistry	BIO2419	√		√		√						√		√										√	√			√		
Medical Diagnostic Techniques	BIO2514	√				√	√						√						√			√			√	√	√		√	
Molecular Biology	BIO2556	√	√		√						√	√	√			√		√		√		√						√		
Gene Technology	BIO3226	√			√						√		√			√				√	√									
Current Topics in Bioscience	BIO3227					√							√											√			√		√	
Bioinformatics	BIO3232					√						√		√						√						√		√		
Biochemistry of Human Disease	BIO3400	√		√	√							√	√			√								√	√					
Clinical Biochemistry and Diagnostics	BIO3413					√	√				√			√						√								√		
Pharmacology and Toxicology	BIO3419	√		√		√																					√			
Gene Expression and Control	BIO3556	√	√		√							√	√											√						
Dissertation	BIO3888	√			√						√	√	√	√	√	√			√	√		√				√		√	√	
Biology Work Experience	BIO3899					√							√					√		√				√			√		√	√
Biology Placement	BIO3999					√					√		√					√		√				√			√		√	√
Clinical Disorders	BMS4117	√	√					√	√	√				√			√													
Endocrinology and Metabolism	BMS4137	√	√		√				√	√			√	√						√							√	√		
Bioanalysis and Clinical Toxicology	BMS4147			√			√		√	√						√		√	√	√		√			√	√		√		
Experimental Design and Statistics	BMS4887							√	√	√	√				√	√			√								√			
Research Project	BMS4997					√						√	√		√			√	√	√	√	√		√			√	√	√	√

