

# Medical Biotechnology

**This version of the programme is no longer recruiting. Please refer to the updated programme specification Biotechnology and Biochemistry and Biotechnology and Biochemistry with placement year.**

<b>Final award</b>	BSc (Hons)
<b>Intermediate awards available</b>	Cert HE, Dip HE, BSc
<b>UCAS code</b>	B800
<b>Details of professional body accreditation</b>	N/A
<b>Relevant QAA Benchmark statements</b>	Biosciences/ Biomedical Sciences
<b>Date specification last up-dated</b>	September 2012

## Profile

### The summary - UCAS programme profile

#### **BANNER BOX:**

This programme offers excellent employment prospects particularly for students taking the sandwich option.

#### **ENTRY REQUIREMENTS**

For students entering with AS/A2 qualification, the minimum requirement is 240 points at A2 level with a preferred minimum of 100 A2 points in Biology or Chemistry.

We also accept Access to Science, Advanced GNVQ in Science at merit grade, and BTEC National Diploma in Science with a minimum of 6 modules at merit grade or higher. All students should also have a minimum of grade C at GCSE, or equivalent, in English language, mathematics and double science.

Applicants with overseas or alternative qualifications are considered on an individual basis. For mature students, credit may be given for relevant work experience.

Direct entry to the second year of the programme is available for students with Higher National Certificate or Diploma in an appropriate area, or for those who have successfully completed study equivalent to level one at another University.

If you want to study Medical Biotechnology but have not achieved the right entry qualifications, why not start with our extended degree programme in Medical Biotechnology (feeds in at Level 1).

Students may be admitted through Accreditation of Experiential Learning (AEL) or Accreditation of Certified Learning (ACL) processes.

In the case of applicants whose first language is not English, then IELTS 6.0 (or equivalent) is required with a minimum of 5.5 in all components. International qualification will be checked for appropriate matriculation to UK Higher Education undergraduate programmes.

## **ABOUT THE PROGRAMME**

### **What is Medical Biotechnology?**

Medical Biotechnology is a set of biological techniques, in particular, recombinant DNA techniques, developed through basic research and now applied to research and product development in medicine. Biotechnology is one of the fastest growing areas of human knowledge and biotechnologists can be found working in many areas of biology. Its importance has grown as techniques for its study become more sophisticated, with applications in genetic engineering and molecular bioengineering as well as in physiological and medical areas. For instance, the production of antibiotics by the large scale fermentation of micro-organisms in the pharmaceutical industry has revolutionised healthcare; antibiotics remain one of the UK's main exports. With the advent of molecular biology and molecular genetics in recent years, biotechnology has entered a new and exciting phase of endeavour. It has produced new products and processes that have had positive influences on our lives and will continue to do so.

### **Medical Biotechnology at UEL**

- The programme at UEL aims to provide students with a broad overview of the field with a focus on applied aspects.
- Emphasis is placed on the ways in which knowledge of biotechnology may be applied for medical purposes.
- This programme offers extensive laboratory training through all years of the programme
- There is a common first year with other bioscience degrees at UEL, leaving you an option to transfer to similar degree programmes at the end of the first year.

### **Programme structure**

Students follow a 4-year sandwich degree programme or a 3-year full-time programme. The programme can also be taken in part-time mode with a minimum completion time of 4.5 years.

**At Level 1** essential biochemistry and microbiology for Medical Biotechnology is introduced in modules on Cellular Biology, Cellular Processes and Microbiology. Professional Practice provides general background and study skills. The other recommended modules are Essential Chemistry and Human Physiology.

**At Level 2** six modules are essential: Cellular Biochemistry, Molecular Biology and Genetics, Diagnostic and Forensic Genetics, Physiological Regulation, Infection and Immunity and Research methods.

The third year of study can be spent away from the University in an agreed work placement. The 4-year Sandwich programme offers a year working in a laboratory and may be in a

hospital, research institution or in a medical, industrial or food company. Though most placements are in the London area, some are available nationwide and sometimes abroad.

Successful completion of your work experience will appear on your degree transcript. You also have the opportunity to take a work-based learning module which can contribute to your final degree classification.

**At Level 3** we cover specialist areas of molecular biology and genetic engineering in greater depth. In semester A, students study Gene Cloning and DNA Analysis which aims to build on the student's knowledge and understanding of recombinant DNA technology, and molecular analysis of disease. The other taught module in this semester opens up the new field of Bioinformatics and Functional Genomics and includes the latest developments in genomics and proteomics. A double module Individual Research Project, spanning both semesters, is also begun at the beginning of semester A and completed during semester B. This is usually a small piece of laboratory-based research work carried out under the direction of a member of the academic staff and written up in the form of a scientific paper. In semester B students take two further taught modules. One of these, Medical Biotechnology, introduces protein engineering in medicine and also other applications of biotechnology such as DNA profiling and vaccine production. The second semester B module, Clinical Immunology and Blood Science, investigates clinical problems associated with the immune system and the production of recombinant antibodies.

### **Learning environment**

Learning is encouraged through participation in a wide variety of activities including lectures, seminars, workshops, laboratory-based practicals, external visits, distance learning, web-based learning etc. Each module has 5 to 6 hours contact per week, and may need up to 10 hours further individual study per week on each module.

Success at university depends on developing your ability to study independently using library resources, Computer-assisted learning (CAL), handouts and web-based study activities. The first year has a Skills module in each semester. These help you make the major shift to independent learning needed at university, compared to schools and FE colleges, and also help to develop those transferable skills so important in working life.

### **Assessment**

Students are assessed in practical work and theory. In most modules 50% of the module mark is derived from coursework during the semester (this can take a variety of forms including laboratory work, data analysis, essays, oral presentations etc.) and 50% from unseen written theory examination at the end of the semester. Some modules also include laboratory practical exams.

Level 1 (Year 1) modules introduce you to the standards and types of assessment used at university. Some have theory exams staged at intervals through the semester. Although they do not contribute to your final Honours grade, you are expected to achieve at least 40% in all Level 1 modules.

Your final Honours grade uses marks from Level 2 and Level 3 modules only. Your Level 1 modules prepare you to do your best in these later years.

If a module is not passed at the first opportunity, marks from later opportunities are capped.

### **Work experience/placement opportunities**

The 4-year Sandwich programme offers a year working in a laboratory and may be in a hospital, research institution or in a medical, industrial or food company. Though most placements are in the London area, some are available nationwide and sometimes abroad.

Your experience can be written up to pass a Work Experience module that will appear on your degree transcript. You also have the opportunity to take a work-based learning module which can contribute to your final degree classification.

Recent examples of placements include: National Blood Transfusion Centre, Colindale, London; Department of Biochemistry, Charing Cross Hospital, London; Department of Chemistry, University of Patras, Greece.

### **Project work**

- Project work is an essential component of an Honours degree programme and one that most students enjoy. Small projects and group work exercises feature throughout the programme.
- Your final year includes an individual research project, which can be one module or two modules long.
- Project work encourages students to show initiative in their individual work under supervision in a laboratory, using appropriate techniques to generate and interpret new data.
- Most projects continue developing lines of research within the School in areas such as proteomics, genomics, glycoproteins, biochemical toxicology, chemotherapy, medicinal plant extracts. Library based research projects may also be undertaken.

### **Added value**

- Extensive personal support throughout the programme.
- Sound practical as well as academic training.
- The sandwich year working in a laboratory will add value to your job prospects at the end of the programme.
- Effective careers advice and support available.

### **IS THIS THE PROGRAMME FOR ME?**

#### **If you are interested in...**

- Extensive personal support throughout the programme.
- Sound practical as well as academic training.
- The sandwich year working in a laboratory will add value to your job prospects at the end of the programme.
- Effective careers advice and support available.

#### **If you enjoy...**

- Reading or hearing about research and/ or medicine
- The challenge of increasing not just your knowledge of facts, but also your understanding of how science contributes to the search for new solutions to problems.
- Doing scientific procedures and experiments in laboratories and IT labs with precision.
- Working in laboratories using standard and novel techniques to solve problems.
- Being able to study quietly and individually away from formal staff-led sessions.

### **If you want...**

- The chance of reviewing your degree programme at the end of the first year and possibly changing to Biochemistry, Biomedical Sciences, Pharmacology, Toxicology, or a more general Biosciences degree.
- The option of a year's work experience in a laboratory away from the University.
- To be able to spend up to one third of your final year on your own individual research project at the university (usually developing laboratory skills, but IT, survey or library projects also negotiable).

### **Your future career**

The qualification opens many opportunities within and outside Medical Biotechnology. Destinations of recent graduates include:

- Laboratory based work in hospitals, research institutes, industrial and pharmaceutical laboratories.
- Research and Development Consultant.
- Higher degrees in Biotechnology (MSc, PhD).
- Further study in other disciplines, e.g. MSc (e.g. IT; Business), MBA, Nursing, Physiotherapy, Dentistry, Medicine, Pharmacy.
- Training as a teacher. (e.g. enrol on PGCE programmes at UEL)

### **How we support you**

The School of Health, Sport and Bioscience provides immediate contact with University support systems. In your first year, you are allocated a Personal Tutor (a member of staff familiar with your degree). You will see your Tutor at regular intervals to discuss progress and life in general.

Module leaders and Degree programme leaders also give support on academic matters, and advice about other specialist help available through the University.

The School also has a Help Desk to provide administrative assistance and advise how to get the right help.

Internet homepages are used by many staff to support their teaching and your learning.

Lecture and practical files, quizzes, mark summaries and much more is now available for several modules via [UELPlus Online links](#).

Throughout the programme you will find a number of scheduled support activities devoted to specific aspects e.g. how to write your project report, or more general aspects such as careers.

Support for students on a University level includes:

- Libraries and Learning Resource Centres
- Childcare for students with children aged 2 1/2 years to 5 years.
- Careers advice and information
- Counselling and Advice for practical problems
- Health Centre with a nurse regularly on duty.
- Language tuition
- Dyslexia support
- Accommodation

### **Bonus factors**

- A School of Biosciences with staff and facilities to match to the wide interests and backgrounds of students.
- Sports facilities at the Atherton Centre, which is just a few minutes walk away.
- Multiplex cinema, theatre, supermarkets, high street shops, restaurants, cafes and pubs a few minutes walk away in Stratford - a major site of new development in East London.
- Close proximity to the Olympic Park
- Central London only 20 minutes away by underground and [extensive transport links with all parts of London](#).

## **Outcomes**

### **Programme aims and learning outcomes**

#### **What is this programme designed to achieve?**

This programme is designed to give you the opportunity to:

- acquire a sound understanding of the theory and practice of Medical Biotechnology.
- critically evaluate the concepts, techniques and applications of Medical Biotechnology
- develop the practical and transferable skills necessary for a career in Medical Biotechnology and related areas.
- develop responsibility for independent learning.

#### **What will you learn?**

##### **Knowledge**

- All students gain a broad overview of the biology field at level one. Thereafter you will acquire more detailed specialist knowledge in your chosen areas.

- The programme aims to provide a background to a large number of the scientific techniques used in biological investigations.
- Students will acquire an understanding of the laboratory procedures and techniques used, which will allow the rapid acquisition of more specialist skills later in their career.
- An awareness of the wider implications of scientific research on society as a whole.

### **Thinking skills**

- The ability to comprehend, analyse and criticise published information in biology.
- The ability to formulate hypotheses with the minimum of assistance.
- The ability to use integrated approaches to problem solving.

### **Subject-Based Practical skills**

- The ability to analyse data from your own and other people's experiments and to interpret them in the light of published work.
- The ability to select and apply a range of practical skills relevant to your chosen areas of biology.
- The ability to design and carry out experimental work.
- The ability to effectively communicate your work to scientists and the general public.
- The ability to select and utilise appropriate computer software.
- The ability to carry out literature searches effectively to find information on a specific topic.

### **Skills for life and work (general skills)**

- The development of your own style of independent learning.
- The ability to communicate ideas and experiments to others and to debate relevant scientific and /or ethical issues.
- IT skills.
- Communication skills.
- Team work.
- Time management.
- Confidence.

## **Structure**

### **The programme structure**

#### **Introduction**

All programmes are credit-rated to help you to understand the amount and level of study that is needed.

One credit is equal to 10 hours of directed study time (this includes everything you do e.g. lecture, seminar and private study).

Credits are assigned to one of 5 levels:

- 0 - equivalent in standard to GCE 'A' level and is intended to prepare students for year one of an undergraduate degree programme
- 1 - equivalent in standard to the first year of a full-time undergraduate degree programme
- 2 - equivalent in standard to the second year of a full-time undergraduate degree programme
- 3 - equivalent in standard to the third year of a full-time undergraduate degree programme
- M - equivalent in standard to a Masters degree

### **Credit rating**

The overall credit-rating of this programme is 360 credits.

### **Typical duration**

The expected duration of this programme is 3 years when attended in full-time mode or 4 years in part-time mode. It is possible to move from a full-time mode of study to a part-time mode of study and vice-versa, to accommodate any external factors such as financial constraints or domestic commitments. Many of our students make use of this flexibility and this may impact on the overall duration of their study period.

### **How the teaching year is divided**

The teaching year begins in September and ends in June but some programmes also allow students to join at the start of Semester B, in February..

A typical student, in full-time attendance mode of study, will register for 120 credits in an academic year. A student in a part-time mode of study may register for up to 80 credits in any academic year.

### **What you will study when**

This programme is part of a modular degree scheme. A typical full-time student will take six 20 credit modules per year. An honours degree student will complete six modules at level one, six at level 2 and six at level 3.

It is possible to bring together modules from one subject with modules from another to produce a combined programme. The University offers subjects in a variety of combinations:

- Single - 120 credits at levels one, two and three
- Major - 80 credits at levels one, two and three
- Joint - 60 credits at levels one, two and three
- Minor - 40 credits at levels one, two and three

Modules are defined as:

- Core - Must be taken
- Option - Select from a range of identified modules within the field
- University wide option - Select from a wide range of modules across the University

The following are the core and optional requirements for the single, major, joint and minor routes for this programme

<b>LEVEL</b>	<b>UEL MODULE CODE</b>	<b>MODULE TITLE</b>	<b>SKILLS MODULES (Insert Y where appropriate)</b>	<b>CREDITS</b>	<b>STATUS SINGLE</b>	<b>STATUS MAJOR</b>	<b>STATUS JOINT</b>	<b>STATUS MINOR</b>
1	BS1005	Professional Practice	Y	20	Core	Core	Option	
1	BS1001	Cellular Biology		20	Core	Core	Core	Core
1	BS1041	Human Physiology		20	Core			
1	BS1006	Essential Chemistry		20	Core	Core		
1	BS1002	Cellular Processes		20	Core	Core	Core	Core
1	BS1022	Microbiology		20	Core		Option	
2	BS2067	Cellular Biochemistry		20	Core	Core		
2	BS2002	Molecular Biology & Genetics		20	Core	Option	Core	Core
2	BS2062	Diagnostics and Forensic Genetics		20	Core	Core	Core	Core
2	BS2060	Research Methods	Y	20	Core	Core	Option	
2	BS2064	Infection & Immunity		20	Core	Option	Option	
2	BS2066	Physiological Regulation		20	Core			
	BS2099	Work Based Learning			Option			
3	BS3066	Gene Cloning & DNA Analysis		20	Core	Core	Core	Core
3	BS3001	Bioinformatics and Functional Genomics		20	Core	Option	Option	
3	BS3004	Medical Biotechnology		20	Core	Option	Option	Core

3	BS3073	Clinical Immunology & Blood Science		20	Core	Option	
3	BS3063	Individual Research Project (double module)	Y	40	Core	Core	Option

**The Skills Modules listed in the Joint Route are Core, unless the equivalent Skills Modules are taken in your other combined subject.**

### **Requirements for gaining an award**

In order to gain an honours degree you will need to obtain 360 credits including:

- A minimum of 120 credits at level one or higher
- A minimum of 120 credits at level two or higher
- A minimum of 120 credits at level three or higher

In order to gain an ordinary degree you will need to obtain a minimum of 300 credits including:

- A minimum of 120 credits at level one or higher
- A minimum of 120 credits at level two or higher
- A minimum of 60 credits at level three or higher

In order to gain a Diploma of Higher Education you will need to obtain at least 240 credits including a minimum of 120 credits at level one or higher and 120 credits at level two or higher

In order to gain a Certificate of Higher Education you will need to obtain 120 credits at level one or higher.

In order to gain an Associate Certificate you will need to obtain a minimum of 20 credits at level one or higher.

### **Degree Classification**

Where a student is eligible for an Honours degree, and has gained a minimum of 240 UEL credits at level 2 or level 3 on the programme, including a minimum of 120 UEL credits at level 3, the award classification is determined by calculating:

$$\frac{\text{The arithmetic mean of the best 100 credits at level 3}}{\times 2/3} + \frac{\text{The arithmetic mean of the next best 100 credits at levels 2 and/or 3}}{\times 1/3}$$

and applying the mark obtained as a percentage, with all decimal points rounded up to the nearest whole number, to the following classification

70% - 100% First Class Honours  
60% - 69% Second Class Honours, First Division  
50% - 59% Second Class Honours, Second Division  
40% - 49% Third Class Honours  
0% - 39% Not passed

## **Assessment**

### **Teaching, learning and assessment**

#### **Teaching and learning**

Knowledge is developed through

- Lectures
- Tutorials
- Workshops
- Practicals
- Reading
- Internet, UELPlus andCAL

Thinking skills are developed through

- Computer aided learning
- Presentations
- Preparing for tutorials and seminars/workshops
- Completing coursework assignments (including data analysis essays, presentations etc)
- Independent reading

Practical skills are developed through

- Laboratory Practical and/or fieldwork
- Computer simulations and use of IT

Skills for life and work (general skills) are developed through

- Managing time
- Presenting ideas and arguments in a structured manner - written and oral communication
- Problem solving
- Team work

#### **Assessment**

A wide variety of assessment methods are used including

- Written examinations

- Practical reports
- Essays
- Data analysis
- Poster presentations
- Oral presentations
- Portfolios
- Final year research project and dissertation
- MCQ tests
- Database searches
- Library exercises

Knowledge and Thinking Skills are assessed by

- Evidence of reading and comprehension of the topics covered in the module being assessed. This will be particularly apparent in essay work and examinations.
- Ability to describe, explain and discuss various aspects of the programme material in the context of class tutorials, group work, presentations and other pieces of assessed coursework for the module.
- In the final year particularly, thinking skills will be assessed by the ability to take information presented in any module out of its original context and to utilise this information in the construction of arguments, comparisons, hypotheses etc as required to address the specific assessments in each module.

Practical skills are assessed by

- The ability to carry out laboratory practical work effectively, within the timeframe allocated.
- The ability to interpret and report on work carried out in the laboratory.
- The ability to complete assignments using appropriate resources.
- Evidence of logical planning and management of time in the preparation of materials for assessment.

Skills for life and work (general skills) are assessed by

- The ability to work to strict deadlines
- The ability to select and utilise appropriate problem solving skills
- Demonstration of effective oral and written communication skills
- Evidence of interpersonal skills such as teamwork and /or team leadership
- Evidence of general numeracy skills

## **Quality**

### **How we assure the quality of this programme**

#### **Before this programme started**

Before this programme started, the following was checked:

- there would be enough qualified staff to teach the programme;

- adequate resources would be in place;
- the overall aims and objectives were appropriate;
- the content of the programme met national benchmark requirements;
- the programme met any professional/statutory body requirements;
- the proposal met other internal quality criteria covering a range of issues such as admissions policy, teaching, learning and assessment strategy and student support mechanisms.

This is done through a process of programme approval which involves consulting academic experts including some subject specialists from other institutions.

### **How we monitor the quality of this programme**

The quality of this programme is monitored each year through evaluating:

- external examiner reports (considering quality and standards);
- statistical information (considering issues such as the pass rate);
- student feedback.

Drawing on this and other information, programme teams undertake the annual Review and Enhancement Process which is co-ordinated at School level and includes student participation. The process is monitored by the Quality and Standards Committee.

Once every six years an in-depth review of the whole field is undertaken by a panel that includes at least two external subject specialists. The panel considers documents, looks at student work, speaks to current and former students and speaks to staff before drawing its conclusions. The result is a report highlighting good practice and identifying areas where action is needed.

### **The role of the programme committee**

This programme has a programme committee comprising all relevant teaching staff, student representatives and others who make a contribution towards the effective operation of the programme (e.g. library/technician staff). The committee has responsibilities for the quality of the programme. It provides input into the operation of the Review and Enhancement Process and proposes changes to improve quality. The programme committee plays a critical role in the quality assurance procedures.

### **The role of external examiners**

The standard of this programme is monitored by at least one external examiner. External examiners have two primary responsibilities:

- To ensure the standard of the programme;
- To ensure that justice is done to individual students.

External examiners fulfil these responsibilities in a variety of ways including:

- Approving exam papers/assignments;

- Attending assessment boards;
- Reviewing samples of student work and moderating marks;
- Ensuring that regulations are followed;
- Providing feedback through an annual report that enables us to make improvements for the future.

### **Listening to the views of students**

The following methods for gaining student feedback are used on this programme:

- Module evaluations
- Student representation on programme committees (meeting each semester)
- Personal tutor, module leader, programme leader, field co-ordinator

Students are notified of the action taken through:

- Circulating the minutes of the field committee and the annual quality improvement report
- Verbal feedback to specific groups
- Providing details on the appropriate noticeboard

### **Listening to the views of others**

The following methods are used for gaining the views of other interested parties:

- Feedback from former students
- Industrial liaison committee
- Liaison with sandwich placement employers

## **Further Information**

### **Alternative locations for studying this programme**

<b>Location</b>	<b>Which elements?</b>	<b>Taught by UEL staff</b>	<b>Taught by local staff</b>	<b>Method of Delivery</b>
-	-	-	-	-

### **Where you can find further information**

Further information about this programme is available from:

- The UEL web site <http://uel.ac.uk>
- The student handbook for this programme
- Module study guides
- UEL Manual of Regulations and Policies <http://www.uel.ac.uk/qa>
- UEL Quality Manual <http://www.uel.ac.uk/qa/>
- Regulations for the Academic Framework <http://www.uel.ac.uk/academicframework/>
- School web pages <http://www.uel.ac.uk/hsb/>