

## Overview

|                              |   |
|------------------------------|---|
| <b>Programme Code</b>        | 46142   |
| <b>Programme Title</b>       | Biotechnology   |
| <b>Awarding Institution</b>  | Liverpool John Moores University                          |
| <b>Programme Type</b>        | Degree with Foundation                                    |
| <b>Language of Programme</b> | All LJMU programmes are delivered and assessed in English |
| <b>Programme Leader</b>      | Kate Evans  |
| <b>Link Tutor(s)</b>         |   |

## Awards

| Award Type         | Award Description                                   | Award Learning Outcomes  |
|--------------------|---|--|
| Target Award       | Bachelor of Science with Honours (Fnd) - BSHF       | See Learning Outcomes Below  |
| Recruitable Target | Bachelor of Science with Honours (SW) (Fnd) - SBSHF | See Learning Outcomes Below  |
| Alternative Exit   | Diploma of Higher Education (Fnd) - DHEF            | Generate ideas through the analysis of concepts at an abstract level, with a command of highly specialised skills and the formulation of responses to concrete and abstract problems. Accept responsibility for group and personal work. Analyse and evaluate information, demonstrating significant judgement across a broad range of Biotechnology related areas.  |
| Alternative Exit   | Certificate of Higher Education (Fnd) - CHEF        | Apply a broad knowledge base, incorporating theoretical concepts and employing a wide range of specialised skills to real and theoretical Biotechnology applications. Evaluate information using it to plan and develop investigative strategies and to determine solutions to a wide range of scientific problems. Operate in a range of science contexts, and take responsibility for their contributions and outputs.   |
| Alternative Exit   | Bachelor of Science (SW) (Fnd) - SBSF               | Demonstrate a broad and comparative knowledge of the general scope of the subject, its different areas and applications, and its interactions with related subjects. A detailed knowledge of a defined subject or a more limited coverage of a specialist area balanced by a wider range of study. In each case, specialised study will be informed by current developments in the subject. Demonstrate a critical understanding of the essential theories, principles and concepts of the subject(s) and of the ways in which these are developed through the main methods of enquiry in the subject. |
| Alternative Exit   | Diploma in Higher Education (SW) (Fnd) - SDHEF      | Generate ideas through the analysis of concepts at an abstract level, with a command of highly specialised skills and the formulation of responses to concrete and abstract problems. Accept responsibility for group and personal work. Analyse and evaluate information, demonstrating significant judgement across a broad range of Biotechnology related areas.  |
| Alternative Exit   | Bachelor of Science (Fnd) - BSF                     | Demonstrate a broad and comparative knowledge of the general scope of the subject, its different areas and applications, and its interactions with related subjects. A detailed knowledge of a defined subject or a more limited coverage of a specialist area balanced by a wider range of study. In each case, specialised study will be informed by current developments in the subject. Demonstrate a critical understanding of the essential theories, principles and concepts of the subject(s) and of the ways in which these are developed through the main methods of enquiry in the subject. |

### Alternate Award Names

## External Benchmarks

|                                    |                       |
|------------------------------------|-----------------------|
| <b>Subject Benchmark Statement</b> | UG-Biosciences (2019) |
|------------------------------------|-----------------------|

## Programme Offering(s)

| <b>Mode of Study, Mode of Delivery</b> | <b>Intake Month</b> | <b>Teaching Institution</b> | <b>Programme Length</b> |
|--|---------------------|-----------------------------|-------------------------|
| Full-Time, Face to Face                | September           | LJMU Taught                 | 4 Years                 |
| Sandwich Year Out, Face to Face        | September           | LJMU Taught                 | 5 Years                 |

## Aims and Outcomes

### Educational Aims of the Programme

To provide for all students a defined academic programme of study with clear learning outcomes. To provide students with a wide knowledge and understanding of core subject matter to enable them to pursue a career in Biotechnology related employment. To enable students to acquire a high level of practical, analytical and research skills in biotechnology. To develop critical, analytical problem-based learning and transferable skills to prepare the student for graduate employment. To develop those learning, information technology, communication and reflective skills necessary to enable students to undertake independent study, and to participate in lifelong learning. To encourage students to engage with employability skills by completing a self-awareness statement. To provide students from a wide variety of educational backgrounds with a high quality learning experience in a supportive environment. To provide opportunities for students to gain commercial awareness, develop entrepreneurial skills and explore a wide range of career options. In addition to the aims for the main target award, the sandwich programme aim is to provide students with an extended period of work experience at an approved partner that will complement their programme of study at LJMU. This will give the students the opportunity to develop professional skills relevant to their programme of study, as well as attitude and behaviours necessary for employment in a diverse and changing environment.

## Learning Outcomes

| <b>Code</b> | <b>Description</b>   |
|-------------|--|
| PLO1        | Appreciate fundamental concepts, principles and theories relevant to biotechnology encompassing molecular, cellular and physiological processes, microbiology, biochemistry, synthetic biology and genetics. |
| PLO2        | Apply subject knowledge and understanding to address familiar and unfamiliar problems.   |
| PLO3        | Recognise the moral and ethical issues of investigations and appreciate the need for ethical standards and professional codes of conduct.  |
| PLO4        | Demonstrate competence and progressive development in the basic and core experimental skills appropriate to the study of biotechnology.  |

| Code  | Description   |
|-------|---|
| PLO5  | Design, plan, conduct and report on investigations which may involve primary or secondary data.   |
| PLO6  | Obtain, record, collate and analyse data using appropriate techniques working either individually or within a group.  |
| PLO7  | Comply with health and safety policies, Good Laboratory Practice (GLP), risk and Control of Substances Hazardous to Health (COSHH) assessments and recognise the importance of quality control and quality assurances.  |
| PLO8  | Use and interpret a variety of sources of information: textual, numerical, verbal and graphical within the laboratory setting.  |
| PLO9  | Understand the need when undertaking sample selection to ensure validity, accuracy, calibration, precision, reproducibility and the need to highlight uncertainty and potential sources of bias during data collection.   |
| PLO10 | Prepare, process, interpret and present data using appropriate qualitative and quantitative techniques, statistical programmes, spreadsheets, bioinformatics, and programmes for presenting data visually.  |
| PLO11 | Communicate scientific information effectively in written, verbal, and visual forms.  |
| PLO12 | Demonstrate competence in core experimental skills applicable to the biotechnology sector, including data analysis and interpretation of results with a critical understanding of the appropriate contexts for their use through the study of texts, original papers and reports. |
| PLO13 | Use information technology to prepare, process and present information.   |
| PLO14 | Identify and work towards targets for personal, academic, professional and career development.  |
| PLO15 | Develop skills necessary for independent life-long learning (for example working independently, working as part of a team, time management, problem solving, organisational and enterprise skills).   |
| PLO16 | Engage with current developments in biotechnology and their applications, including the philosophical and ethical issues involved.  |
| PLO17 | Critically evaluate current research in the field of biotechnology.   |
| PLO18 | Analyse, synthesise and summarise information critically from a variety of sources including published research or reports.   |
| PLO19 | Recognise and apply subject specific theories, paradigms, concepts or principles, for example the relationship between genes and proteins.  |
| PLO20 | Construct grammatically correct documents in an appropriate academic style and format, using and referencing relevant ideas and evidence.   |
| PLO21 | Understand the importance of academic and research integrity.   |
| PLO22 | Obtain and integrate several lines of subject specific evidence to formulate and test hypotheses.   |

## Programme Structure

### Programme Structure Description

Study Abroad Students will be offered the opportunity of study abroad at Level 5. Students can choose either Option A or Option B unless they undertake the Sandwich Year, in which case Option B is not available: Option A: replacement of 60 credits of Level 5 with appropriate study abroad. The programme will offer the opportunity of 60 credits of study at Level 5. Students will be enrolled on a 360 credit honours with study abroad programme. A 60 credit Level 5 study abroad module [5114BCBMOL] will normally replace the semester 2 modules on the standard programme. This study abroad should cover the same learning outcomes as the modules being replaced. The modules to be studied in the host institution must be agreed in advance. The Level 5 mean for the final award mark will be calculated based upon the 120 credits at Level 5. Option B: additional study year abroad following Level 5. The programme will offer the opportunity of an additional study year abroad following Level 5. Students will be enrolled on a 480 credit honours with study abroad programme. Of those 480 credits, 120 will be taken via a Level 5 study abroad module [5113BCBMOL], the modules to be studied in the host institution must be agreed in advance. The Level 5 mean for the final award mark will be calculated based upon the 240 credits at Level 5. Sandwich Year [5112BCBMOL] The aim is to provide students with an extended period of work experience at an approved partner that will complement their programme of study at LJMU. This will give the students the opportunity to develop professional skills relevant to their programme of study, as well as attitude and behaviours necessary for employment in a diverse and changing environment. The placement year will follow Level 5 and students will be enrolled on a 480 credit honours sandwich programme.

| Programme Structure - 480 credit points  |      |
|--|------|
| Level 3 - 120 credit points  |      |
| Level 3 Core - 120 credit points   | CORE |
| [MODULE] 3417FNDSCI Fundamental Science Skills Approved 2022.01 - 20 credit points                             |      |
| [MODULE] 3418FNDSCI Introduction to Chemistry Approved 2022.02 - 20 credit points                              |      |
| [MODULE] 3419FNDSCI Introduction to Biochemistry and Cell Biology Approved 2022.01 - 20 credit points          |      |
| [MODULE] 3420FNDSCI Further Chemistry Approved 2022.02 - 20 credit points                                      |      |
| [MODULE] 3421FNDSCI Introduction to Molecular Biology and Genetics Approved 2022.02 - 20 credit points         |      |
| [MODULE] 3412FNDSCI Human Anatomy and Physiology Approved 2022.01 - 20 credit points                           |      |
| Level 4 - 120 credit points  |      |
| Level 4 Core - 120 credit points   | CORE |
| [MODULE] 4102BCBMOL Introduction to Structural and Functional Biochemistry Approved 2022.01 - 20 credit points |      |
| [MODULE] 4104BCBMOL Physiological Biochemistry Approved 2022.01 - 20 credit points                             |      |
| [MODULE] 4110BCBMOL Introduction to Biotechnology Approved 2022.02 - 20 credit points                          |      |
| [MODULE] 4111BCBMOL Practical Skills in Biotechnology Approved 2022.01 - 20 credit points                      |      |
| [MODULE] 4112BCBMOL Microbial Biotechnology 1 Approved 2022.01 - 20 credit points                              |      |
| [MODULE] 4115BCBMOL Introduction to Molecular Biology Approved 2022.01 - 20 credit points                      |      |
| Level 5 - 120 credit points  |      |
| Level 5 Core - 120 credit points   | CORE |
| [MODULE] 5004PHASCI Sterile Pharmaceutical Products Approved 2022.01 - 20 credit points                        |      |
| [MODULE] 5104BCBMOL Structural and Functional Biochemistry Approved 2022.01 - 20 credit points                 |      |
| [MODULE] 5105BCBMOL Molecular Biology and Functional Genomics Approved 2022.01 - 20 credit points              |      |

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|--|----------|
| [MODULE] 5110BCBMOL Research Methods in Biotechnology Approved 2022.01 - 20 credit points      |          |
| [MODULE] 5111BCBMOL Synthetic Biology and Bioengineering 1 Approved 2022.01 - 20 credit points |          |
| [MODULE] 5115BCBMOL Microbial Biotechnology 2 Approved 2022.01 - 20 credit points              |          |
| <b>Optional placement - 120 credit points</b>  | OPTIONAL |
| <b>Placement Year - 120 credit points</b>  | OPTIONAL |
| [MODULE] 5112BCBMOL Sandwich Year - Biotechnology Approved 2022.01 - 120 credit points         |          |
| <b>OR Study Abroad - 120 credit points</b>   | OPTIONAL |
| [MODULE] 5113BCBMOL Study Year Abroad - Biotechnology Approved 2022.01 - 120 credit points     |          |
| [MODULE] 5114BCBMOL Study Semester Abroad - Biotechnology Approved 2022.01 - 60 credit points  |          |
| <b>Level 6 - 120 credit points</b>   |          |
| <b>Level 6 Core - 100 credit points</b>  | CORE     |
| [MODULE] 6100GNBMOL Research Project Approved 2022.01 - 40 credit points                       |          |
| [MODULE] 6105BCBMOL Current Topics in Biotechnology Approved 2022.01 - 20 credit points        |          |
| [MODULE] 6106BCBMOL Biotechnology Entrepreneurship Approved 2022.01 - 20 credit points         |          |
| [MODULE] 6107BCBMOL Synthetic Biology and Bioengineering 2 Approved 2022.01 - 20 credit points |          |
| <b>Level 6 Optional - 20 credit points</b>   | OPTIONAL |
| [MODULE] 6104BCBMOL Microbial Technology Approved 2022.01 - 20 credit points                   |          |
| [MODULE] 6107BMBMOL Biomaterials Approved 2022.01 - 20 credit points                           |          |
| [MODULE] 6108BMBMOL Work-Based Learning Approved 2022.01 - 20 credit points                    |          |

Module specifications may be accessed at <https://proformas.ljmu.ac.uk/Default.aspx>

## Teaching, Learning and Assessment

The acquisition of knowledge is fostered through a range of taught sessions including lectures, computer sessions, and practical laboratory classes. Understanding of taught material is facilitated through tutorials, problem-based learning, workshops, group work and independent study. Knowledge and understanding are assessed in a variety of ways. These include: examinations (essay style questions, MCQ, data analysis and short answers), laboratory reports, practical assessments (to assess both understanding and technical competence), essays, case-studies, oral presentations, and poster presentations. Cognitive skills are developed in many areas of the programme. For example, the ability to synthesise and analyse information critically is developed in laboratory sessions from Level 4 to 6, including in the Practical Skills in Biotechnology and the Research Project modules. Applying subject knowledge and understanding to address unfamiliar problems is developed in workshops in many modules, especially in modules that utilise interpretative examination questions. Moral and ethical issues are a key part of modern biotechnology and are developed in many taught and practical sessions. Laboratory reports, scientific communication, essays and examinations allow students to demonstrate the full range of these skills and attributes. Practical and professional skills are taught during laboratory classes (a component of most modules). Core principles and minimum standards required for effective laboratory work are introduced at Level 4, developed at Level 5, and at Level 6 the students apply these skills during their independent Research Project. If the student has chosen the Work-Based Learning module (WBL) then these practical skills will be developed in an applied work setting. These practical and professional skills are assessed through practical tests, data handling exercises, and laboratory reports, including the execution of the Research Project. Transferable and key skills are inherent within the programme, but specifically they are taught in core modules at all Levels (Practical Skills in Biotechnology and Introduction to Biotechnology at Level 4; Research Methods in Biotechnology at Level 5; Research Project at Level 6). These transferable and key skills are assessed through assessment activities at all levels, in all modules and specifically in the modules mentioned above.

## Opportunities for work related learning

The programme also offers the option of a sandwich route, which involves 1 year of work experience in a specialist field. The sandwich placement occurs at the end of level 5 and the training allows students to develop their professional and technical skills. Work related learning is delivered throughout the programme and for those students who are eligible there is a level 6 Work-Based Learning (WBL) module. The WBL module is an option module for students who undertake approximately 140 hours engagement with a workplace environment, relevant to their subject discipline, during the course of an academic year. This would usually take place during the summer before the final year of study. The Faculty Placement Learning Support Unit (PLSU) provides support for students seeking work-based placements including Sandwich placements. Work-related learning opportunities are also available through the routes of employer guest lectures/workshops, and employer-driven assignments.

## Entry Requirements

| Type                             | Description   |
|----------------------------------|---|
| Other international requirements | Applicants should have acquired passes in appropriate examinations in their country of origin and provide evidence of English language ability equivalent to 6.0 IELTS.   |
| International Baccalaureate      | Applicants must have (or expect to obtain) the full award including grade 5 in one appropriate science.   |
| BTECs                            | Applicants should be studying an appropriate Diploma and have (or expect to obtain) a pass with at least 3 merit grades at Level 3 in appropriate units.  |
| A levels                         | Applicants should have (or expect to obtain) at least 2 A2 Levels or equivalent, at least one of which should be normally in an appropriate science or social science subject. Our minimum points tariff is 88 points, this may depend on subjects being studied. |

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|---------------------------------------|---|
| Alternative qualifications considered | In common with standard University policy, applicants should have GCSE passes in Mathematics and English Language at grade C or above, or equivalent.<br>School/College leavers should be at least 17.5 years on admission. |
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| <b>Extra Entry Requirements</b> |
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