

# UNIVERSITY of Techn

الجامعة التكنولوجية



## Bachelor of Science (B.Sc.) - Biotechnology

بكالوريوس علوم - علم التقنيات الاحيائية

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### 1. Mission & Vision Statement

#### ***Vision Statement***

The Biotechnology academic staff of the Natural and Behavioral Sciences Division at University of technology believe that students come to understand the discipline of biotechnology through a combination of course work, laboratory experiences, research, and fieldwork. The combination of instructional methods leads students to a balanced understanding of the scientific methods used by biologists to make observations, develop insights and create theories about the living organisms that populate our planet. Small class sizes within the Biotechnology program foster a close working relationship between academic staff and students in an informal and nurturing atmosphere.

#### ***Mission Statement***

The Biotechnology academic staff pursues a multifaceted charge at University of technology. The Program seeks to provide all Biotechnology students with fundamental knowledge of Biotechnology, as well as a deeper understanding of a selected focus area

within the biological sciences. The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as field biologists specializing in botany or wildlife, or to pursue advanced degrees in the life sciences or health sciences. The Biotechnology program also provides the necessary fundamental knowledge of the life sciences to support the Nursing degree, the Environmental Studies degree, and the Associate of Science degree in Forest Technology. In addition, Biotechnology courses provide a key laboratory science experience for those students seeking to complete the general education requirements.

## 2. Program Specification

<b>Programme code:</b>	BSc-BIO	<b>ECTS</b>	240
<b>Duration:</b>	4 levels, 8 Semesters	<b>Method of Attendance:</b>	Full Time

Biotechnology is a wonderfully wide-ranging subject, and Leeds, with one of the UK's largest and most diverse Biotechnology teaching groups, is well equipped to deliver. The emphasis of the programme is the whole organism to which everything is related, be it the molecules that form proteins or communities of organisms in an ecosystem. The degree is popular - for some it's the breadth of the subject that appeals, for others it's a path to specialisation. All students have the opportunity to transfer onto our specialist degrees in Genetics, Zoology, and Ecology at the end of the first year.

Level 1 exposes students to the fundamentals of Biotechnology, suitable for progression to all programmes within the Biotechnology programme group. Programme-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4. A Leeds Biotechnology graduate is therefore trained to appreciate how research informs teaching, according to the University and School Mission statements.

At Levels 2, 3 and 4 students are free to choose more than half of their module credits with the proviso a range of modules are selected that reflect the complexity of life forms from molecules, through organisms, both plants and animals, to populations to ensure the breadth of knowledge expected of a graduate with a Biotechnology degree. This allows students to develop their own wide-ranging interests in organismal Biotechnology. Decisions on what to study are made with input from personal tutors.

The research ethos is developed and fostered from the start via practicals, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3 and 4. At Level 4 all students carry out an independent research project, which may be a xx credit library or data analysis project, or a xx credit field or laboratory based project.

Academic tutorials are held at Levels 1 and 2 with the same tutor, who is also the personal tutor, providing continuity and progressive guidance. Level 1 and 2 tutorials include a number of workshops to teach skills, e.g. library use and presentation skills, followed by assessed exercises, e.g. essays and talks, as opportunities to practice these skills in a subject-specific context.

International years and Industrial placements are also offered and individual needs are discussed with the appropriate tutor and accommodated wherever possible.

### **3. Program Goals**

1. To provide a comprehensive education in Biotechnology that stresses scientific reasoning and problem solving across the spectrum of disciplines within Biotechnology

2. To prepare students for a wide variety of post-baccalaureate paths, including graduate school, professional training programs, or entry level jobs in any area of Biotechnology
3. To provide extensive hands-on training in electronic technology, statistical analysis, laboratory skills, and field techniques
4. To provide thorough training in written and oral communication of scientific information
5. To enrich students with opportunities for alternative education in the area of Biotechnology through undergraduate research, internships, and study-abroad

#### **4. Student Learning Outcomes**

Biotechnology is the study of the organization and operation of life at the molecular, cellular, organism, and population levels. Graduates obtain information on the historical, technical and social aspects of Biotechnology and utilize basic knowledge toward realizing broader concepts. The Department offers a Bachelor of Science in Biotechnology with a concentration in General Biotechnology; Pre-medicine / Pre-dentistry; Biotechnology / Molecular Biotechnology and a minor in Secondary Education that leads to a Public Instruction License. Additionally, the Department offers courses to a large number of students from other departments and supports pre-professional programs. The Biotechnology curriculum and experiences are designed to prepare students, in part, for entry into professional health programs, graduate studies, technical careers and education

##### **Outcome 1**

###### *Identification of Complex Relationships*

Graduates will be able to illustrate the structure and function of cellular components and explain how they interact in a living cell.

**Outcome 2**

*Oral and Written Communication*

Graduates will be able to formally communicate the results of biological investigations using both oral and written communication skills.

**Outcome 3**

*Laboratory and Field Studies*

Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.

**Outcome 4**

*Scientific Knowledge*

Graduates will be able to demonstrate a balanced concept of how scientific knowledge develops, including the historical development of foundational theories and laws and the nature of science.

**Outcome 5**

*Data Analyses*

Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.

**Outcome 6**

*Critical Thinking*

Graduates will be able to use critical-thinking and problem solving skills to develop a research project and/or paper.

**5. Academic Staff**

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## 1.

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### Credits, Grading and GPA

#### *Credits*

University of technology is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per

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semester. 1 ECTS is equivalent to 25 student workload, including structured and unstructured workload.

### **Grading**

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

### **Calculation of the Grade Point Average (GPA)**

1. The GPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

GPA of a 4-year B.Sc. degrees:

$$\text{GPA} = [(1\text{st module score} \times \text{ECTS}) + (2\text{nd module score} \times \text{ECTS}) + \dots] / 240$$

## 2. Curriculum/Modules

### Semester 1 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	General biology (Animal)	108	92	8.00	C	
	Principle of Biotechnology	108	92	8.00	C	
	Analytical chemistry	108	42	6.00	B	
	computer Science	63	37	4.00	B	
	workshops	45	5	2.00	S	
	Human rights	33	17	2.00	S	

### Semester 2 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	Biophysics	108	92	8.00	B	
	organic chemistry	108	42	6.00	B	
	English Language	33	17	2.00	B	
	biostatistic	63	37	4.00	B	
	General biology (plant)	108	92	8.00	C	
	workshops	45	5	2.00	S	

**Semester 3 | 30 ECTS**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	General microbiology					
	Biochemsitry					
	Bioethical safety					
	Cell biology					
	English					

**Semester 4 | 30 ECTS**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	Viruses and Fungi					
	Tissue and microscopy techniques					
	Anmial and microbial phisylogy					
	Technologies in biotechnology					

**Semester 5 | 30 ECTS**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	hematology					
	pathogenic bacteria					
	molcular biology					
	Industrial and food biotechnology					
	English					

**Semester 6 | 30 ECTS**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	Immunity					
	toxins and vaccines					
	Experimental design					
	General and cellular genetics					
	Environmental technologies					



**Semester 7 | 30 ECTS**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	pharmaceutical biotechnologies and pharmacognosy					
	Plant and animal tissue culture					
	genetic engineering					
	medical techniques					
	English					

**Semester 8 | 30 ECTS**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
	bioinformatics					
	nanobiotechnology					
	proteins and enzymes biotechnology					
	project					
	gene therapy					

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