UNIVERSITY of ANBAR

جامعة الانبار

Bachelor of Science Honors
(B.Sc. Honors) Biotechnology

بكالوريوس علوم - علم التقنيات الاحيائية

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جامعة الأنبار - كلية العلوم
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٢٠٢٥/٨/٤

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1. Mission & Vision Statement

Vision Statement

The biotechnology faculty at Baghdad University, envisions that students will acquire a comprehensive understanding of biotechnology through a blend of coursework, laboratory experiments, research, and practical experiences. This amalgamation of instructional techniques will enable students to develop a well-rounded comprehension of the scientific methodologies employed by biotechnologists to observe, analyze, and theorize about living organisms. The biotechnology program's intimate class sizes will promote a close working relationship between faculty members and students in an informal and supportive environment.

Mission Statement

The biotechnology faculty at Baghdad University, aims to equip students with a comprehensive understanding of biotechnology through a diverse range of instructional techniques. The program seeks to provide students with a fundamental knowledge of biotechnology, as well as a deeper understanding of selected focus areas within the field. The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as biotechnologists specializing in genetics or microbiology or pursue advanced degrees in the life sciences or health sciences. Additionally, biotechnology courses provide a key laboratory science experience for those

students seeking to complete the general education requirements. The program's small class sizes foster a close working relationship between faculty members and students in an informal and supportive environment.

Program Specification

Program **code:**	BSC-BIOT	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

Biotechnology is a fascinating and diverse field, and Baghdad University is well-equipped to provide students with a comprehensive education. The program emphasizes the interconnectedness of all aspects of biotechnology, from molecular biology to ecosystem dynamics. Students can choose to pursue a broad education in biotechnology or specialize in areas such as genetics, immunology, microbiology, or cytogenetics. At the end of their first year, all students have the opportunity to transfer to specialist degrees in these areas. The program is popular among students seeking a path to specialization or a broad understanding of biotechnology.

The Biotechnology Department offers a comprehensive program that provides students with a strong foundation in Biology at Level 1, suitable for progression to all programs within the biotechnology field. At Level 2, students will cover program-specific core topics to prepare them for research-led subject specialist modules at Levels 3 and 4. The Biotechnology Department aims to develop graduates who appreciate how research informs teaching, in line with the University and School Mission statements.

At Levels 2, 3, and 4, students are given the freedom to choose more than half of their module credits, provided that 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 biotechnology and related fields. Decisions on what to study are made with input from personal tutors.

The research codes are developed and fostered from the start via practical, which are either embedded in lecture modules or taught in dedicated practical modules, research ,seminars

and tutorials. At Level 1, there is a compulsory field course that students must pass in order to progress into Level 2, and optional field courses are available at 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, to develop their research skills.

Academic tutorials are held at Levels 1 and 2 with the same tutor, who also serves as the personal tutor, providing continuity and progressive guidance. Level 1 and 2 tutorials include a number of workshops to teach skills, such as laboratory techniques and presentation skills, followed by assessed exercises, such as reports and presentations, as opportunities to practice these skills in a biotechnology-specific context.

The Biotechnology Department offers international years and industrial placements, and individual needs are discussed with the appropriate tutor and accommodated wherever possible. The program is designed to produce graduates who are equipped with the knowledge and skills to excel in the biotechnology industry and related fields.

2. Program Goals

The biotechnology program at Baghdad University aims

1- to equip graduates with a comprehensive understanding of the field using various instructional techniques.
2- to develop graduates who possess critical-thinking and problem-solving skills,

3- to develop research projects and papers related to biotechnology. Additionally, graduates will have the ability
4- to illustrate the structure and function of cellular components, explain how they interact in a living cell, and perform laboratory experiments and field studies using scientific equipment and computer technology while observing appropriate safety protocols.

5- The program also emphasizes the development of oral and written communication skills, enabling graduates to formally communicate the results of biological investigations.

6- Furthermore, graduates will possess scientific quantitative skills, such as the ability to conduct simple data analyses. The program's small class sizes foster a supportive environment for students

7- to develop these skills and build close working relationships with faculty members. Upon completion of the program, graduates will be prepared for a wide variety of post-baccalaureate paths, including graduate school, professional training programs, or entry-level jobs in any area of biotechnology.

The biotechnology program at Baghdad University aims to provide students with a comprehensive education in biotechnology, emphasizing critical thinking and problem-solving skills. The program seeks to equip graduates with the ability to conduct laboratory experiments and field studies using scientific equipment and computer technology while adhering to safety protocols. Additionally, the program emphasizes the development of oral and written communication skills, enabling graduates to effectively communicate the results of biological investigations. Graduates will possess scientific quantitative skills, such as the ability to conduct data analyses. The program's small class sizes foster a supportive environment for students to build close working relationships with faculty members. Upon completion of the program, graduates will be prepared for a wide variety of post-baccalaureate paths in any area of biotechnology, including graduate school, professional training programs, or entry-level jobs.

3. Student Learning Outcomes

Biotechnology is a field that involves the use of living organisms, cells, and biological systems to develop new products and technologies. Graduates of biotechnology programs gain knowledge of the historical, technical, and social aspects of biotechnology and apply this knowledge to broader concepts. The program may offer a Bachelor of Science in Biotechnology with concentrations in Molecular Biology, General Biotechnology, and Pre-medicine, as well as a minor in Secondary Education that leads to a Public Instruction License. The curriculum is designed to prepare students for entry into professional health programs, graduate studies, technical careers, and education. Additionally, the program offers courses to students from other departments and supports pre-professional programs.

Students will learn specialized equipment and software commonly used in biotechnology research and development, understand principles and practices of quality control and assurance, apply knowledge of regulatory requirements and guidelines for biotechnology research and development, analyze and interpret scientific data using statistical methods and software, and conduct independent or team-based research projects in biotechnology.

Outcome 1

General Skills

1- Proficient in working in all scientific laboratories and interacting with laboratory equipment.

2- Communication and teamwork skills.

3- Proficient in the use of computers adopted in the educational system

4- Fluent in the English language in his field of specialization.

Outcome 2

Biotechnology Assistant / Scientific Researcher

The student acquires the skills of conducting research in the medical, industrial, environmental, genetic and agricultural fields through:

1- The ability to collect scientific information and prepare a plan for scientific research.

2- The ability to collect samples from medical, industrial, and environmental sources through field scientific visits, and the possibility of analyzing them and revealing samples.

3- Knowledge in preparing reports, following up on the progress of research work, and documenting the information and results obtained.

4- Assistance in finding solutions to related problems in the above fields and providing appropriate consultations and recommendations.

5- Management and leadership skills of the research team.

Outcome 3

Biotechnology Assistant/laboratory analyst

1- The ability to analyze and examine samples and medical samples from food, water, and soil sources.

2- The ability to conduct biochemical analyses and analyses of microbes and plants.

3- The ability to analyze immunological tests of all kinds, histological matching, and develop stem cells and deal with them.

4-The ability to analyze histological sections and diagnose damage to them, based on immunohistochemistry and histopathological examinations, and to assess the performance and level of genes related to specific diseases, such as cancer, with specialized pigmentation.

5-The ability to analyze microbial products and their various sources, and employ them in production processes, industrial waste treatment, and product purification and characterization.

6-The ability to analyze soil, water, and food samples contaminated with microbially and chemical pollutants

7- The ability to deal with microbial, plant, and animal cells in order to produce vital materials such as enzymes, antibiotics, hormones, modified proteins, and vaccines as medical and therapeutic materials.

8-The ability to prepare nanoparticles and how to prepare and characterize them for the purpose of using them in various medical, industrial, and environmental fields.

9- Ability to conduct genetic laboratory analyses related to diagnosing genetic diseases by extracting DNA and adopting modern molecular genetic techniques and DNA fingerprinting.

Outcome 4

Biotechnology Assistant/health inspector

Knowledge of following occupational health and safety procedures through:

1- The ability to conduct an examination and investigation for microbial contaminants in water, food, beverages, medical and industrial tools, and equipment.

2- Dealing with biological and chemical pollutants and finding appropriate treatments and recommendations for them.

3- Conduct field visits to follow up on the work of laboratories, factories, restaurants, and scientific laboratories, and prepare recommendations and proposals in this regard.

4-The ability to educate the community about occupational safety procedures through awareness leaflets, lectures, and workshops on occupational safety and public health.

4. Credits, Grading and GPA

Credits

Baghdad University 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 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			
Group	**Grade**	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C - Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	(45-49)	More work required but credit awarded
	F – Fail	(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:

   GPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ...] / 240

5.Curriculum/Modules

Semester 1 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BIOT1101	Principle of Biotechnology 1	94	81	7.00	C	
BIOT1102	General Biology of Animal	79	71	6.00	C	
COS1103	Analytical Chemeistry	94	81	7.00	S	

COS1104	Biophysics	77	73	6.00	S	
UOA1105	Human rights and democracy	32	18	2.00	B	
UOA1106	Academic English	32	18	2.00	B	

Semester 2 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BIOT1217	Principle of Biotechnology 2	94	81	7.00	C	
BIOT1208	General Biology of Plant	94	56	6.00	C	
COS1209	Organic Chemistry	94	81	7.00	S	
COS1210	Biosratistics	79	46	5.00	S	
UOA12011	Academic Arabic	33	17	2.00	B	
UOA12012	Computer skill 1	62	13	3.00	B	

Semester 3 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BIOT23013	Biochemistry 1	79	71	6.00	C	
BIOT23014	Microbiology 1	79	71	6.00	C	
BIOT23015	Histology and Microtechniques	79	46	5.00	C	
BIOT23016	Environmental Microbiology	79	46	5.00	C	
BIOT23017	Biological control	79	46	5.00	C	
UOA23018	Computer skills 2	62	13	3.00	S	

Semester 4 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BIOT24119	Biochemistry 2	79	71	6.00	C	
BIOT24120	Microbiology 2	109	66	7.00	C	
BIOT24021	Animal physiology	79	46	5.00	C	

BIOT24022	Phycology	79	46	5.00	C	
BIOT24023	Nanobiotechnology	79	46	5.00	C	
UOA24024	Academic English	33	17	2.00	B	

6.Contact

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