

# College of Science and General Studies Degree Programs

## College of Science and General Studies Degree Programs

### Bachelor of Science (B.Sc.) in Life Sciences

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## Program History

The Life Sciences program at Alfaisal University is an interdisciplinary program at the interface of Biology, Chemistry, Environmental, and Biomedical Sciences. The program received the Ministry of Education's approval in 2013. The program aims to serve the national policy in developing a knowledge-based economy in key science areas such as biological, biomedical, chemical, environmental, and technology disciplines. The Kingdom has ample need for growth in basic science instruction to produce competent students who will contribute to sustainable development and economic growth. The program curriculum and training prepare the students to pursue further graduate studies in various fields, including biological sciences, biomedical sciences, environmental sciences, chemical sciences, and in biotechnology & nanotechnology fields.

## Curriculum & Study Plan

The Bachelor of Science in Life Sciences offers two tracks for students to choose from: *Biological Sciences & Nanotechnology*, and *Environmental Sciences & Sustainability*. The first two years are common for all tracks, and in the 3<sup>rd</sup> year students start taking courses that are specific for the track of their choice. Student also have access to a variety of advanced electives courses to choose from including cancer biology, forensic science, medicinal chemistry, bioinformatics, and special topics. The Life Sciences Program requires a total of 134 credit hours for completing the program. This includes general education requirement & elective courses (23 credits), college requirement courses (25 credits), program requirement courses (53 credits), track requirement courses (18 credits), program electives (15 credits), and summer internship (0 credits). Student who meets requirement conditions may take one or more graduate courses to fulfill program graduation requirements (maximum of nine credit-hours).

	Course Code	Course Title	Credit Hours (CRHs)			Pre-Requisite Courses	Co-Requisite Courses
			Total	Lect.	Lab		
<b>Gen. Edu. Requirements</b> <b>(14 Credit Hours)</b>	ARB 101	Arabic Language I	2	2	0		
	ARB 112	Arabic Language II	2	2	0	ARB 101	
	ENG 101	Freshmen English I	3	3	0		
	ENG 112	Freshmen English II	3	3	0	ENG 101	
	ISL 101	Islamic Studies I	2	2	0		
	ISL 112	Islamic Studies II	2	2	0	ISL 101	

	Course Code	Course Title	Credit Hours (CRHs)			Pre-Requisite Courses	Co-Requisite Courses
			Total	Lect.	Lab		
<b>Free Electives</b>	<b>Total Credit Hours = 6</b>						
	* Any courses offered at Alfaisal						
	* Transferred courses offered by other institutions (pre-approvals by CoS and SA are required)						
<b>Hum. &amp; Soc. Sci. Electives (1 course, 3 Credit Hours)</b>	ANT 101	Anthropology	3	3	0		
	HIS 101	Islamic Civilization & Mediaeval Europe	3	3	0		
	PSY 101	Introduction to Psychology	3	3	0		
	SOC 101	Introduction to Sociology	3	3	0		
	*Any other Humanity & Social Sciences courses (FRE 101, GER 101, SPN 101, etc.)						
<b>Science Core Courses (25 Credit Hours)</b>	BIO 101	General Biology I	4	3	1		BIO 101L
	BIO 112	General Biology II	4	3	1	BIO 101	BIO 112L
	CHM 101	General Chemistry I	4	3	1		CHM 101L
	CHM 112	General Chemistry II	4	3	1	CHM 101/ or CHM 102	CHM 112L
	CSC 101	Introduction to Computer Science	3	3	0		
	MAT 105	Calculus for Biomedical Sciences I	3	3	0		
	MAT 116	Calculus for Biomedical Sciences II	3	3	0	MAT 105	
<b>Life Sciences Core Courses (53 Credit Hours)</b>	BIO 223	Microbiology	4	3	1	BIO 112 CHM 112	BIO 223L
	BIO 224	Human Physio. & Anat.	4	3	1	BIO 112	BIO 224L
	BIO 346	Biochemistry I	4	3	1	BIO 224 CHM 212 PHU216 STA211	BIO 346L
	BIO 440	Biotechnology	3	3	0	BIO 223 ENV 205	
	CHM 211	Organic Chemistry I	4	3	1	CHM 112	CHM 211L
	CHM 212	Organic Chemistry II	4	3	1	CHM 211	CHM 212L
	CHM 310	Instrumental Analysis	4	3	1	CHM 212 PHU216 MAT116	CHM 310L
	ENV 205	Environ. Sci. & Sustainability	3	3	0	CHM 112	
	LSR 302	Research Methodology	3	3	0	ENG 112/ ENG 113	
	LSR 390	Life Sci. Summer Internship	0	0	0	LSR 302	
	LSR 421	Life Sci. Research Project I	3	0	3	LSR 302	
	LSR 422	Life Sci. Research Project II	3	0	3	LSR 421	
	LSR 423	Life Sci. Research Seminar	3	3	0	LSR 421	
	PHU 205	Mechanics & Waves for Life Sciences	4	3	1		PHU 205L
	PHU 216	Electromagnetism & Optics for Life Sciences	4	3	1	PHU 205	PHU 216L
STA 211	Probability & Statistics	3	3	0	MAT 116		
<b>BSN Track</b>	<b>Biological Sciences &amp; Nanotechnology (BSN) Track</b>						
	BIO 345	Molecular Biology I	4	3	1	BIO 223	BIO 345L

	Course		Credit Hours (CRHs)			Pre-Requisite	Co-Requisite
	Code	Course Title	Total	Lect.	Lab	Courses	Courses
<b>(18 Credit Hours)</b>	BIO 357	Molecular Biology II	4	3	1	BIO 345	BIO 357L
	BIO 358	Biochemistry II	4	3	1	BIO 346	BIO 358L
	BIO 405	Human Genetics	3	3	0	BIO 345	
	BSN 430	Nanomaterials & Nanotechnology	3	3	0	CHM 310	
<b>ESS Track (18 Credit Hours)</b>	<b>Environmental Sciences &amp; Sustainability (ESS) Track</b>						
	BIO 325	Conservation Biology	3	3	0	BIO 223	
	ENV 305	Environmental Health	3	3	0	BIO 223	
	ENV 330	Energy & Sustainability	3	3	0	ENV 205	
	ENV 410	Environmental Monitoring	3	3	0	CHM 310	
	ENV 420	Waste Management	3	3	0	ENV 205	
<b>Program Electives (5 Courses, 15 Credit Hours)</b>	CHM 213	Analytical Chemistry	3	3	0	CHM 112	
	CHM 232	Physical Chemistry	3	3	0	CHM 112	
	CHM 331	Medicinal Chemistry	3	3	0	CHM 212	
	CHM 332	Environmental Chemistry	3	3	0	CH M 211	
	ENV 310	Environ. Toxicology	3	3	0	ENV 205	
	ENV 315	Earth Systems	3	3	0	ENV 205	
	SCI 310	Forensic Science	3	3	0	ENG 112/ ENG 113	
	SCI 321	Immunology	3	3	0	BIO 224	
	SCI 322	Cancer Biology	3	3	0	BIO 224	
	SCI 323	Signal Transduction	3	3	0	BIO 224	
	SCI 325	Bioinformatics & Computational Genomics	3	3	0	BIO 224 STA 211	
	SCI 326	Virology	3	3	0	BIO 223	
	LST 421	Life Sci. Special Topics I	3	3	0	BIO 346	
	LST 422	Life Sci. Special Topics II	3	3	0	BIO 346	
* Student may take courses from other tracks or a graduate course with approval.							

## Life Sciences 4-Year Study Plans

### 4-Year Curriculum: 134 Credit Hours (CRHs)

Study Plan: Biological Sciences & Nanotechnology						
	Fall (19 CRHs)			Spring (19 CRHs)		
	Course Code	Course Title	CRHs	Course Code	Course Title	CRHs
<b>1<sup>st</sup> Year</b>	BIO 101	General Biology I	(3+1)	BIO 112	General Biology II	(3+1)
	CHM 101	General Chemistry I	(3+1)	CHM 112	General Chemistry II	(3+1)
	CSC 101	Introduction to Computer Science	(3+0)	***	Humanity Course Elective	(3+0)
	MAT 105	Calculus for Biomedical Sciences I	(3+0)	MAT 116	Calculus for Biomedical Sciences II	(3+0)
	ENG 101	Freshmen English I	(3+0)	ENG 112	Freshmen English II	(3+0)
	ISL 101	Islamic Studies I	(2+0)	ISL 112	Islamic Studies II	(2+0)
		<b>Fall (17 CRHs)</b>			<b>Spring (20 CRHs)</b>	
<b>2<sup>nd</sup> Year</b>	Course Code	Course Title	CRHs	Course Code	Course Title	CRHs

	BIO 223	Microbiology	(3+1)	BIO 224	Human Physiology & Anatomy	(3+1)
	CHM 211	Organic Chemistry I	(3+1)	CHM 212	Organic Chemistry II	(3+1)
	PHU 205	Mech. & Waves for Life Science	(3+1)	PHU 216	Electro. & Optics for Life Science	(3+1)
	STA 211	Probability & Statistics	(3+0)	ENV 205	Environmental Science & Sustainability	(3+0)
	ARB 101	Arabic Language I	(2+0)	ARB 112	Arabic Language II	(2+0)
				***	Free Elective	(3+0)
	<b>Fall (17 CRHs)</b>			<b>Spring (18 CRHs)</b>		
<b>3<sup>rd</sup> Year</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>
	BIO 346	Biochemistry I	(3+1)	*BIO 358	Biochemistry II	(3+1)
	CHM 310	Instrumental Analysis	(3+1)	LSR 302	Research Methodology	(3+0)
	*BIO 345	Molecular Biology I	(3+1)	*BIO 357	Molecular Biology II	(3+1)
	***	Advanced Prog. Elective I	(3+0)	***	Advanced Prog. Elective III	(3+0)
	***	Advanced Prog. Elective II	(3+0)	***	Free Elective	(3+0)
	LSR 390	<b>Life Sciences Summer Internship (0 CRHs)</b>				
	<b>Fall (12 CRHs)</b>			<b>Spring (12 CRHs)</b>		
<b>4<sup>th</sup> Year</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>
	*BIO 405	Human Genetics	(3+0)	***	Advanced Sci. Elective IV	(3+0)
	*BSN 430	Nanomaterials & Nanotechnology	(3+0)	***	Advanced Sci. Elective V	(3+0)
	LSR 421	Life Science Research Project I	(0+3)	LSR 422	Life Science Research Project II	(0+3)
	BIO 440	Biotechnology	(3+0)	LSR 423	Integrative Life Science Research Seminar	(3+0)

\*Track specific courses

\*\*\* Multiple courses to choose from (see program curriculum for the list of courses)

<b>Study Plan: Environmental Sciences &amp; Sustainability</b>						
	<b>Fall (19 CRHs)</b>			<b>Spring (19 CRHs)</b>		
	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>
<b>1<sup>st</sup> Year</b>	BIO 101	General Biology I	(3+1)	BIO 112	General Biology II	(3+1)
	CHM 101	General Chemistry I	(3+1)	CHM 112	General Chemistry II	(3+1)
	CSC 101	Introduction to Computer Science	(3+0)	***	Humanity Course Elective	(3+0)
	MAT 105	Calculus for Biomedical Sciences I	(3+0)	MAT 116	Calculus for Biomedical Sciences II	(3+0)
	ENG 101	Freshmen English I	(3+0)	ENG 112	Freshmen English II	(3+0)
	ISL 101	Islamic Studies I	(2+0)	ISL 112	Islamic Studies II	(2+0)
		<b>Fall (17 CRHs)</b>			<b>Spring (20 CRHs)</b>	
<b>2<sup>nd</sup> Year</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>
	BIO 223	Microbiology	(3+1)	BIO 224	Human Physiology & Anatomy	(3+1)
	CHM 211	Organic Chemistry I	(3+1)	CHM 212	Organic Chemistry II	(3+1)
	PHU 205	Mech. & Waves for Life Science	(3+1)	PHU 216	Electro. & Optics for Life Science	(3+1)
	STA 211	Probability & Statistics	(3+0)	ENV 205	Environmental Science & Sustainability	(3+0)
	ARB 101	Arabic Language I	(2+0)	ARB 112	Arabic Language II	(2+0)
				***	Free Elective	(3+0)
	<b>Fall (19 CRHs)</b>			<b>Spring (16 CRHs)</b>		
<b>3<sup>rd</sup> Year</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>
	BIO 346	Biochemistry I	(3+1)	*BIO 325	Conservation Biology	(3+0)

	CHM310	Instrumental Analysis	(3+1)	LSR302	Research Methodology	(3+0)
	*ENV 305	Environmental Health	(3+0)	*ENV 330	Energy & Sustainability	(3+0)
	***	Advanced Prog. Elective I	(3+0)	*ENV 410	Environmental Monitoring	(3+0)
	***	Advanced Prog. Elective II	(3+0)	***	Advanced Prog. Elective III	(3+0)
			(3+0)	***	Free Elective	
	<b>LSR 390</b>	<b>Life Sciences Summer Internship (0 CRHs)</b>				
	<b>Fall (12 CRHs)</b>			<b>Spring (12 CRHs)</b>		
<b>4<sup>th</sup> Year</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>	<b>Course Code</b>	<b>Course Title</b>	<b>CRHs</b>
	*ENV 420	Waste Management	(3+0)	***	Advanced Prog. Elective IV	(3+0)
	*ENV 425	Environ. Policy & Economics	(3+0)	***	Advanced Sci. Elective V	(3+0)
	LSR 421	Life Science Research Project I	(0+3)	LSR 422	Life Science Research Project II	(0+3)
	BIO 440	Biotechnology	(3+0)	LSR 423	Integrative Life Science Research Seminar	(3+0)

\*Track specific courses

\*\*\* Multiple courses to choose from (see program curriculum for the list of courses)

