International University of Sarajevo, Faculty of Engineering and Natural Sciences (FENS)

First Cycle Curriculum - Genetics and Bioengineering Study Program

Academic year: 2023-2024

Click on the course code or title to see the syllabus.

Semester I

Code	Title	Prerequisites	T	P	ECTS
ELIT100	Academic English and Effective Communication		2	1	6
NS104	General Chemistry		3	2	6
MATH101	Calculus I		3	2	6
NS102	Physics		3	2	6
xxx	University Elective I See Table 1				3
xxx	Foreign Language Elective I See Table 1		0	2	3
	Semester Total =				**30**

Semester II

Code	Title	Prerequisites	T	P	ECTS
NS103	Biology		3	0	6
MATH102	Calculus II	MATH101	3	2	6
NS207	Organic Chemistry		3	2	6
ELIT200	Critical Reading and Writing		2	1	6
NS112	Understanding Science and Technology		2	0	3
xxx	Foreign Language Elective II See Table 1	For. Lang. Ele. I	0	2	3
	Semester Total =				**30**

Semester III

Code	Title	Prerequisites	T	P	ECTS
MATH202	Differential Equations	MATH102	3	2	6
NS205	Cell Biology		3	1	6
ENS205	Materials Science		3	1	6
MATH203	Introduction to Probability and Statistics	MATH101	3	2	6
NS202	Biochemistry I	NS207	3	2	6
	Semester Total =				**30**

Semester IV

Code	Title	Prerequisites	T	P	ECTS
NS209	Genetics I		3	2	6
ENS213	Programming for Engineers (+)		3	2	6
BIO305	Biochemistry II	NS207	3	2	6
xxx	University Elective II See Table 1				6
	Free Elective				6
	Semester Total =				**30**

Semester V

Code	Title	Prerequisites	T	P	ECTS
BIO310	Bioinformatics	NS103	3	1	6
BIO301	Molecular Biology		3	0	6
BIO303	Genetics II		3	0	6
ENS202	Thermodynamics	MATH102, NS102	3	2	6
IE408	Project Management		2	2	6
	Semester Total =				**30**

Semester VI

Code	Title	Prerequisites	T	P	ECTS
BIO312	Techniques in Molecular Biology	BIO301	2	2	6
BIO306	General Microbiology		3	2	6
ENS309	Ethics in Engineering and Science		3	1	6
xxx	Program Elective I See Table 2				6
xxx	Program Elective II See Table 3				6
	Semester Total =				**30**

Semester VII

Code	Title	Prerequisites	T	P	ECTS
BIO415	Genetic Engineering	Senior Standing	3	0	6
	Free Elective II				6
	Program Elective III See Table 2				6
	Program Elective IV See Table 2				6
BIO370	Work Placement / Internship	Junior Standing	0	14	6
	Semester Total =				**30**

Semester VIII

Code	Title	Prerequisites	T	P	ECTS
BIO407	Protein Engineering	Senior Standing	3	1	6
	Program Elective V See Table 2				6
	Program Elective VI See Table 2				6
	Program Elective VII See Table 2				6
	Program Elective VIII See Table 2				6
	Semester Total =				**30**

Abbreviations: T (Theory), P (Practice), ECTS credit					
Total Credits Required for Graduation				**240**	**No. of Courses**				**42**
Total Credits of Electives				**69**	**Minimum ECTS Credits for Applied/Practical Component of the Curriculum**				**51**
					Elective Ratio				**29%**

8 Program Electives are taken from Table 2.

2 University Electives for a total of 9 ECTS credits can be taken from Table 1: University Elective Courses List.

2 Language Elective courses are taken from the list of language courses provided (can not be the student's native language).

2 Free Elective courses are taken from any faculty or program.

(+) CS103 Introduction to Programming can also be taken instead of ENS213. See Table 1.

This new curriculum is being implemented for the new freshman students who entered the freshman class in the year 2020 or after.

For the existing sophomore, junior and senior students, the Faculty Board will make plans for proper adaptation to the new curriculum.

In exceptional cases only, Faculty Council may make a decision for a student bypass a prerequisite for any course.

Work placement/Internship is typically practiced in summer for a period of at least 25 work days, totalling at least 150 hours.

Junior standing: successfully completed at least 108 ECTS; Senior standing: successfully completed at least 168 ECTS.

Table 1: University Electives					
Code	**Title**	**Prerequisites**	**T**	**P**	**ECTS**
IUS Pool of 3 ECTS University Courses					
ARCH107	Understanding Art and Architecture		2	0	3
CS100	Computer Skills		0	2	3
CULT101	Understanding Cultural Encounters		2	0	3
ECON105	Understanding Business		2	0	3
ECON107	Python		1	1	3
ECON108	Matlab		1	1	3
HUM100	Social Responsibility and Sustainable Development		2	0	3
IBF105	Financial Literacy		2	0	3
IR100	Understanding the Contemporary World through Current Events		2	0	3
NS111	Understanding Nature and Knowledge		2	0	3
NS112	Understanding Science and Technology		2	0	3
SPS140	Understanding Religion		2	0	3
	Foreign Language Elective I (&)		0	2	3
	Foreign Language Elective II (&)		0	2	3
IUS Pool of 6 ECTS University Courses					
CS103	Introduction to Programming		3	2	6
ECON102	Globalization and Business		3	0	6
ECON111	Intro. to Microeconomics		3	0	6
ECON112	Intro. to Macroeconomics		3	0	6
ELIT101	Introduction to Literature		2	1	6
ENS105	The Brain		3	0	6
IBF205	Principles of International Business		3	0	6
LAW110	Introduction to Law I		3	0	6
LAW109	Law and Ethics		3	0	6
MAN102	Introduction to Management		3	0	6
IR101	Introduction to International Relations **		3	0	6
NS102	Physics		3	2	6
NS104	General Chemistry		3	2	6
NS103	Biology		3	0	6
POLS102	Introduction to Political Science		3	0	6
PSY103	Introduction to Psychology		3	0	6
SPS120	Critical Thinking		3	0	6
SPS150	World History		3	0	6
SOC102	Introduction to Sociology		3	0	6
VA121	History of Art I		3	0	6

(&) Scholarship students will take either Spoken Turkish I and II or Spoken Bosnian I and II. **

Equivalent to former IR102

Table 2: Program Electives			
Code	**Title**	**Prerequisites**	**ECTS**
BIO308	Plant Structure and Physiology	Junior standing	6
BIO401	Biotechnology	Junior standing	6
BIO402	Molecular Evolution	Junior standing	6
BIO403	Plant Pathogenesis	Senior standing	6
BIO404	Agricultural Biotechnology	Senior standing	6
BIO405	Biological Data Analysis with Python	CS103 or ENS213	6
BIO408	Modeling and Simulation of Biomolecular Processes	Senior standing	6
BIO409	Immunology	NS205	6
BIO410	Ecology and environmental engineering	Junior standing	6
BIO411	Mammalian physiology	NS205	6
BIO412	Special Topics in Bioengineering	Senior standing	6
BIO414	Pharmaceutical Biotechnology	Senior standing	6
BIO416	Population Genetics	Junior standing	6
BIO417	Molecular Diagnostics	Senior standing	6
BIO418	Virology	Senior standing	6
BIO420	Biophysics	Senior standing	6
BIO422	Mechanism of Signal Transd	BIO301	6
BIO424	Introduction to Forensic Science	Junior standing	6
BIO425	Bioengineering Principles	Junior standing	6
BIO426	Bioethics	Junior standing	6
BIO427	Cell and Tissue Culture Engineering	Junior standing	6
BIO428	Structural Biology	Junior standing	6
ENS490	Graduation Project	Last Semester	6
PSY310	Introduction to Psychopharmacology	Junior standing	6

Pool of elective courses for the modules of Industrial Engineering (IE), Computer Science (CS) or Bioengineering (BE).

The courses which are already required courses for GBE curriculum is shown as bold red color.

Course Coc	Course Name	Prerequisite	ECTS	
MATH201	**Linear Algebra**		6	
MATH306	Statistical Modelling	**MATH203**	6	**Industrial Engineering (IE) Module
IE304	Operations Research II	IE303	6	
IE301	Production Planning I	**MATH203**	6	
IE307	Quality and Reliability Engineering		6	
IE408	Project Management		6	
ENS213/CS103	**Progr. for Engineers or Intro. to Programming**	**MATH101**	6	
CS105	Advanced Programming	**ENS213**	6	
MATH204	Discrete Mathematics	**MATH101**	6	
CS302	Algorithms and Data Structures	CS105, MATH204	6	**Computer Science (CS) Module
CS306	Database management	CS105	6	
	Any of the following courses:		6	
CS308	Software Engineering	CS105	6	
CS412	Web App. Development	CS105	6	
ENS202	**Thermodynamics**	**MATH102, NS102**	6	
ENS203	Elecrical Circuits I	**MATH101**	6	
ENS205	Material Science		6	**Bio-Engineering (BE) Module
EE305	Instrumentation and Measurements	ENS203	6	
ME304	Fluid Mechanics	**MATH202**	6	
ME306	Heat and Mass Transfer	**MATH202**	6	

**Module	Courses that need to be completed for concentration for the respective field
IE module	MATH306, IE303, IE304, IE301, IE307, IE408
CS module	ENS213, CS105, MATH204, CS302, CS306, CS308 or CS412
ME module	ENS202, ENS203, EE305, ENS205, ME304, ME306