APPENDIX 2: Curriculum of the Joint Program

DRAFT Curriculum - ITU Dual Degree Program in Bioengineering											
							ITU credits: 74	ITU ECTS: 126			
							IUS credits: 52,5	IUS ECTS: 114			
	YEAR 1: International University of Sarajevo						Total:125	Total:240			

FALL SEMESTER / SPRING SEMESTER

Course Code	Course Title	Prereq.		Hours	ECTS	Course Code	Course Title	Prereq.		Hours	ECTS
BE101	Intro to Bioengineering			(2 + 0)	3	MATH102	Calculus II	MATH101		(3 + 2)	6
NS104	General Chemistry			(3 + 2)	6	NS122	Physics II	NS102		(3 + 0)	6
MATH101	Calculus I			(3 +2)	6	NS207	Organic Chemistry	NS104		(3 + 2)	6
NS102	Physics I (with Lab)			(3 + 2)	6	ELIT200	Critical Reading and Writing			(2 + 1)	6
	Foreign Language Elective I			(0+2)	3	NS112	Understanding Science and Technology			(2 + 0)	3
ELIT100	Academic English and Effective Communication			(2 + 1)	6		Foreign Language Elective II	For. Lang. Ele. I		(0 +2)	3
		Total Credit Hours			30			Total Credit Hours			30

	YEAR 2: Istanbul Technical University										

FALL SEMESTER / SPRING SEMESTER

Course Code	Course Title	Prereq.	Credits	Hours	ECTS	Course Code	Course Title	Prereq.	Credits	Hours	ECTS
BES210	Engineering Mathematics	MATH101, MATH102	4	(4 + 0)	6	BES202	Numerical Analysis with Computer Programming	BES210 and CMP103	3	(3 + 0)	6
CMP103	Intr.to Comp.&Info.Sys.		2	(1 + 2)	3	BEN102	Microbiology (with Lab)	BIO101 & NS207	3	(2 + 2)	6
BES211	Mass and Energy Balances in Bioengineering	NS104, NS207	3	(3 + 0)	6	BES204	Fluid Mechanics	BES210	3	(3 + 0)	6
BIO101	General Biology		3	(3 + 0)	3	BEN351	Bioengineering Thermodynamics	BES211	3	(3 + 0)	6
ATA101	History of the Turkish Revolution I		2	(2 + 0)	3	TUR102	Turkish II		2	(2 + 0)	3
MTH271	Probability and Statistics	MATH101, MATH102	3	(3 + 0)	6	ATA102	History of the Turkish Revolution II		2	(2 + 0)	3
TUR101	Turkish I		2	(2 + 0)	3	BEN323	Materials Science		3	(3 + 0)	6
		Total Credit Hours	19		30			Total Credit Hours	19		36

	YEAR 3: Istanbul Technical University										

FALL SEMESTER / SPRING SEMESTER

Course Code	Course Title	Prereq.	Credits	Hours	ECTS	Course Code	Course Title	Prereq.	Credits	Hours	ECTS
BES207	Cell Biology (with lab)	BIO101	4	(3 + 2)	6	BES328	Biochemistry II (with Lab)	BES315	4	(3 + 2)	6
BES315	Biochemistry I (with Lab)	NS207	4	(3 + 2)	6	BEN324	Bioengineering Lab I	BEN352 and BEN321	3	(0 +6)	6
BEN321	Reaction Kinetics and Design in Biotech.	BEN351	3	(3 + 0)	6	BEN326	Genetics	BIO101	3	(3 + 0)	6

Course Code	Course Title	Prerequisites	Credit	Hours	ECTS	Course Code	Course Title	Prerequisites	Credit	Hours	ECTS
BEN352	Transport Processes in Bioengineering	BES204, BEN351	3	(3 + 0)	6		Technical Elective		3	(3 + 0)	6
	Bioengineering Elective		3	(3 + 0)	3		Bioengineering Elective		3	(3 + 0)	3
						BES311	Process Control	BES210	3	(3 + 0)	6
		Total Credit Hours	**17**		**27**			**Total Credit Hours**	**19**		**33**

YEAR 4: International University of Sarajevo

FALL SEMESTER						SPRING SEMESTER					
Course Code	Course Title			Hours	ECTS	Course Code	Course Title			Hours	ECTS
BIO415	Genetic Engineering	Senior Standing		(3 +0)	6	BIO407	Protein Engineering	Senior Standing		(3 +0)	6
	Program Elective I	Table 2			6	ENS309	Ethics in Engineering and Science			(3+1)	6
BIO370	Work Placement / Internship			(0+14)	6		Program Elective II	Table 2			6
IE408	Project Management			(2+2)	6	BIO312	Techniques in Molecular Biology	BIO301 (Molecular Biology)		(2+2)	6
						ENS490	Graduation Project	Senior Standing		(2+2)	6
		Total Credit Hours			**24**			**Total Credit Hours**			**30**

POSSIBLE ELECTIVES : Istanbul Technical University

Table 2: Program Electives

Code	Title		Credit	Hours	ECTS	Code	Title	Prerequisites			ECTS
BEN312	Enzymology		3	(3 +0)	6	BIO308	Plant Structure and Physiology	Junior standing			6
BEN322	Exper.Desg.&Modell.in Bioeng.		3	(3 +0)	6	BIO401	Biotechnology	Junior standing			6
BEN332	Environmental Biotechnology		3	(3 +0)	6	BIO402	Molecular Evolution	Junior standing			6
BEN341	Biomaterials		3	(3 +0)	6	BIO403	Plant Pathogenesis	Senior standing			6
BEN337	Biofuel&Bioenergy		3	(3 +0)	6	BIO404	Agricultural Biotechnology	Senior standing			6
BEN335	Biosensors		3	(3 +0)	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

COURSE DESCRIPTIONS

BE101 Introduction to Bioengineering

The course provides a contemporary perspective on significant advancements in biomedical engineering, exploring the integration of biology, mathematics, and engineering to address challenges in engineering to drive innovation. The course addresses essential concepts, techniques, and applications, equipping students to employ engineering principles in biological systems. This foundation sets the stage for future progress in healthcare, biotechnology, and other related fields. Additionally, the course presents practical examples of commonly employed techniques. This approach will allow students to develop a comprehensive understanding of the various key areas in which bioengineers are involved.

NS104 General Chemistry

Chemistry and Measurements, Matter and Energy, Atoms and Elements, Ionic compounds; Molecular compounds; Chemical quantities and reactions; Balancing of chemical reactions; Gases; Acids and Bases/Equilibrium; Introduction to Hydrocarbons.