

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

**First Cycle Curriculum - Computer Sciences and Engineering Program (2017 - 2018)**

Approved by the Senate on June 23, 2017

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

Semester I					
Code	Title	Prerequisites	T	P	ECTS
ELIT100	Academic English and Effective Communication		2	1	6
MATH101	Calculus I		3	2	6
CS103	Introduction to Programming		3	2	6
NS102	Physics		3	2	6
xxx	University Elective I *	See Table 1			3
xxx	Foreign Language Elective I		2	0	3
<b>Semester Total =</b>					<b>30</b>

Semester III					
Code	Title	Prerequisites	T	P	ECTS
MATH203	Introduction to Probability and Statistics	MATH101	3	2	6
MATH204	Discrete Mathematics	MATH101	3	2	6
CS303	Digital Design		3	2	6
CS305	Programming Languages	CS105	3	2	6
xxx	Faculty Elective I	See Table 2			6
<b>Semester Total =</b>					<b>30</b>

Semester V					
Code	Title	Prerequisites	T	P	ECTS
CS302	Algorithms and Data Structures	MATH204, CS105	3	2	6
ELIT200	Critical Reading and Writing		2	1	6
CS307	Operating Systems	CS304	3	2	6
MATH202	Differential Equations	MATH102	3	2	6
xxx	Faculty Elective III	See Table 2			6
<b>Semester Total =</b>					<b>30</b>

Semester VII					
Code	Title	Prerequisites	T	P	ECTS
CS412	Web Application Development	CS105	3	2	6
CS313	Theory of Computation	CS105, MATH204	3	2	6
CS370	Work placement/Internship		0	14	6
xxx	Program Elective II (Senior standing)	See Table 3	3		6
xxx	Program Elective III (Senior standing)	See Table 3	3		6
<b>Semester Total =</b>					<b>30</b>

**Abbreviations: T (Theory), P (Practice), ECTS credit**

**Total Credits Required for Graduation** 240

**Total Credits of Electives** 84

Semester II					
Code	Title	Prerequisites	T	P	ECTS
MATH102	Calculus II	MATH101	3	2	6
CS105	Advanced Programming	CS103	3	2	6
ENS203	Electrical Circuits I	MATH101	3	2	6
xxx	University Elective II *	See Table 1			6
xxx	University Elective III *	See Table 1			3
xxx	Foreign Language Elective II		2	0	3
<b>Semester Total =</b>					<b>30</b>

Semester IV					
Code	Title	Prerequisites	T	P	ECTS
MATH201	Linear Algebra	MATH101	3	2	6
CS304	Computer Architecture	CS103	3	2	6
EE325	Embedded Systems	CS103	3	2	6
CS306	Database Management	CS105	3	2	6
xxx	Faculty Elective II	See Table 2			6
<b>Semester Total =</b>					<b>30</b>

Semester VI					
Code	Title	Prerequisites	T	P	ECTS
CS308	Software Engineering	CS105	3	2	6
MATH205	Numerical Analysis	MATH102	3	2	6
SE308	Communication Systems and Networks	CS105	3	2	6
xxx	Free Elective I				6
xxx	Program Elective I (Junior standing)	See Table 3			6
<b>Semester Total =</b>					<b>30</b>

Semester VIII					
Code	Title	Prerequisites	T	P	ECTS
xxx	Free Elective II				6
xxx	Free Elective III				6
xxx	Program Elective IV (Senior standing)	See Table 3			6
xxx	Program Elective V (Senior standing)	See Table 3			6
CS490	Graduation Project (Senior standing)		2	2	6
<b>Semester Total =</b>					<b>30</b>

**No. of Courses** 42

**Min. ECTS Credits for Applied/Practical Component of the Curriculum** 66

**Elective Ratio** 35%

University Electives and 2 Foreign Language Elective courses are taken from the pool of University Elective courses, see Table 1.

3 Faculty Elective courses are taken from the pool of Faculty Elective courses, see Table 2. Faculty Elective may be selected from other FENS programmes with the approval of Program Coordinator.

5 Program Electives are taken from the pool of Program Elective courses, see Table 3. 2 Program Electives may be selected from other FENS programmes (including FENS graduate level courses) with the approval of Program Coordinator.

3 Free Elective courses are taken from any faculty. It is strongly recommended that the students take MAN303 Entrepreneurship and Small Business Management

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

This new curriculum is being implemented for the new freshman students who entered the freshman class in the year 2017/2018 or after.

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

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

Work placement/Internship is typically practiced in summer for a period of at least 30 work days.

Table 1: University Electives					
Code	Title	Prerequisites	T	P	ECTS
<b>Social Sciences Subpool</b>					
CULT101	Understanding Cultural Encounters		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
ECON105	Understanding Politics, Economy and Management		3	0	6
ECON111	Introduction to Microeconomics		3	0	6
ELIT101	Introduction to Literature		2	1	6
IR101	Introduction to International Relations		3	0	6
MAN102	Management		3	0	6
POLS102	Introduction to Political Science		3	0	6
PSY103	Introduction to Psychology		3	0	6
SOC102	Introduction to Sociology		3	0	6
SPS103	Law and Ethics		3	0	6
SPS120	Critical Thinking		3	0	6
SPS150	World History		3	0	6

<b>Natural Sciences Subpool</b>					
CS100	Computer Skills		0	2	3
ENS105	The Brain		3	0	6
NS103	Biology		3	0	6
NS104	General Chemistry		3	2	6
<b>Arts Subpool</b>					
ARCH107	Understanding Art and Architecture		2	0	3
VA121	History of Art I		3	0	6
<b>Language Elective Subpool</b>					
xxx	Foreign Language Elective I (&)		2	0	3
xxx	Foreign Language Elective II (&)		2	0	3

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

Table 2: Faculty Electives			
Code	Title	Pre-requisites	ECTS
BIO301	Molecular Biology	NS103	6
BIO415	Genetic Engineering	BIO301	6
EE201	Analog Electronics I	ENS203	6
EE202	Electrical Circuits II	ENS203	6
EE305	Instrumentation and Measurements	ENS203	6
EE311	Control System Design	ENS206	6
EE321	Electrical Machines	EE202	6
EE322	Power Systems	EE202	6
ENS201	Electromagnetics	MATH102	6
ENS202	Thermodynamics	MATH102, NS102	6
ENS205	Materials Science		6
ENS206	System Modeling	MATH202	6
ENS207	Engineering Graphics		6
ENS208	Intro. to Manufacturing Systems	MATH101	6
ENS209	Statics	MATH101	6
ENS211	Signals and Systems	MATH102	6
ENS221	Introduction to Engineering		6
ENS302	Engineering Optics	NS102	6
MATH207	Vector Calculus	MATH101	6
MATH209	Discrete Mathematics II	MATH 204	6
MATH306	Statistical Modeling	MATH203	6
ME208	Dynamics and Vibrations	ENS209	6
ME304	Fluid Mechanics	MATH202	6
ME306	Heat and Mass Transfer	MATH202	6
NS205	Cell Biology	NS103	6
NS207	Organic Chemistry	NS104	6
NS209	Genetics I		6
IE301	Production Planning I	MATH203	6
IE303	Operations Research I	MATH201	6
IE304	Operations Research II	IE303	6
IE307	Quality and Reliability Engineering		6
IE408	Project Management		6

Faculty Elective may be selected from other FENS programmes with the approval of Program Coordinator.

Table 2: Program Electives			
Code	Title	Prerequisites	ECTS
BIO310	Bioinformatics	NS103 or Program Coord. approval	6
CS299	Social, Legal, and Ethical Issues in Computing		6
CS309	Advanced Logic Design	CS303	6
CS310	Human Computer Interaction	CS105	6
CS402	Introduction to Design of Compilers	CS105, MATH204	6
CS403	Distributed Systems	CS307	6
CS404	Artificial Intelligence	MATH204	6
CS405	Computer Graphics	CS302, MATH201	6
CS413	Developing the Interactive Web	CS105	6
CS414	Computer Vision	MATH201, CS103	6
CS415	Pattern Recognition	MATH201	6
CS416	Cryptography	MATH204, CS302	6
CS417	Introduction to Data Mining	CS302	6
CS420	Network Programming	CS105, SE308	6
CS421	Management Systems	CS306	6
CS422	Wireless Mobile Networks	SE308	6
CS423	Parallel Computing	CS302, CS307	6
CS426	Software Engineering II	CS308	6
CS427	Computer and Network Security	CS307, SE308	6
CS498	Special Topics in Computer Science I		6
CS499	Special Topics in Computer Science II		6
EE307	Microcomputer Systems		6
EE331	Introduction to Communication Systems		6
EE418	Introduction to Machine Learning		6
EE434	Digital Communications	EE331	6
EE435	Microprocessors-I		6
EE436	Programmable Logic Controllers	CS303	6
EE437	Introduction to Robotics		6
MAN461	Management Information Systems		6
SE211	Software Construction	CS103	6
SE302	Software Testing and Maintenance	SE211 or CS105	6
SE304	Tools and Methods of CASE Technologies	CS105	6
SE322	Software Requirements Analysis	SE211 or CS105	6
SE401	SCADA Systems	MATH101, CS105 or SE211	6
SE402	Programming of CNC Machines	CS105	6
SE403	Development of Science and Technology	CS105	6
SE404	Psycho Cibernetics	CS105	6
SE406	Software Engineering Management	SE211 or CS105	6
SE407	Software Quality Management	SE211 or CS105	6
SE421	CAD Systems	CS105	6
SE423	Automatics and Robotics	CS105	6

2 Programe Electives may be selected from other FENS programmes (including FENS graduate level courses) with the approval of Program Coordinator.

**Pool of elective courses for the modules of Industrial Engineering (IE), Genetics and Bioengineering (GBE), Mechanical Engineering (ME) or Electrical and Electronics Engineering (EE).**

**The courses which are already required courses for CSE curriculum are shown in bold.**

Course Code	Course Name	Prerequisite	ECTS	
IE301	Production Planning I	<b>MATH203</b>	6	
IE303	Operations Research I		6	**Industrial Engineering (IE) Module
IE304	Operations Research II	IE303	6	
IE307	Quality and Reliability Engineering		6	
IE408	Project Management		6	
NS103	Biology		6	**Genetics and Bioengineering (GBE) Module
NS104	General Chemistry		6	
NS205	Cell Biology		6	
NS209	Genetics		6	
BIO301	Molecular Biology		6	
BIO310	Bioinformatics	NS103	6	
BIO415	Genetic Engineering		6	
EE305	Instrumentation and Measurements	<b>ENS203</b>	6	**Mechanical Engineering (ME) Module
ENS202	Thermodynamics	<b>MATH102</b> , NS102	6	
ENS205	Materials Science		6	
ME304	Fluid Mechanics	<b>MATH202</b>	6	
ME306	Heat and Mass Transfer	<b>MATH202</b>	6	
EE201	Analog Electronics I		6	**Electrical and Electronics Engineering (EE) Module
EE202	Electrical Circuits II	<b>ENS203</b>	6	
EE311	Control System Design		6	
EE321	Electrical Machines	EE202	6	
EE322	Power Systems	EE202	6	
<b>ENS203</b>	<b>Electrical Circuits I</b>		6	
ENS206	System Modeling		6	