

CURRICULA AND ECTS CREDITS 2020/2021 academic year

Degree: BACHELOR

FACULTY OF CHEMICAL AND SYSTEM ENGINEERING

Curriculum: CHEMICAL ENGINEERING

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory	Seminars	Total					Lectures	Laboratory	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b111	Inorganic Chemistry – I part	I	И	30	9	21	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b56	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b66	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total						315								158			30

	of the semester:																	
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b111	Inorganic Chemistry – II part	II	И	30	30	0	60	2.0	3.0	II	И	18	20	0	38	1.5	3.5	5
b412	Physics	II	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9
b1000	Sports	II			60													
	Total of the semester:						315								166			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b396	Electrical Engineering and Electronics	III	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
	Elective subjects – one of:																	
b050	– Numerical Methods	III	T	15	30	0	45	1.6	2.4	III	И	9	14	0	23	1.2	2.8	4
	– Mathematical Logics	III	T	15	30	0	45	1.6	2.4	III	И	9	14	0	23	1.2	2.8	4
	Electives – one of the languages:																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						350								176			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7
b311	Physical Chemistry – I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b238	Organic Chemistry	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
b261	Unit Operations – I part (Hydrodynamic Processes)	IV	И	25	10	15	50	1.6	2.4	V	И	12	5	8	25	1.2	2.8	4
b867	Practical Training in Unit Operations – I part	IV	T	0	15	0	15	0.4	0.6	V	И	0	8	0	8	0.3	0.7	1

	<i>Electives – one of the languages:</i>																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						320								161			30
	<i>Humanitarian elective subjects – one of:</i>																	
b138	– Communication in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b814	Modelling and Optimization of Technological Plants	V	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b312	Physical Chemistry – II part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b262	Unit Operations – II part (Mechanical and Hydromechanical Processes)	V	И	30	0	30	60	2.0	3.0	VI	И	15	0	15	30	1.5	3.5	5
b864	Practical Training in Unit Operations – II part	V	T	0	15	0	15	0.4	0.6	VI	И	0	8	0	8	0.3	0.7	1
b266	Unit Operations – III part (Heat Transfer Processes)	V	И	30	10	20	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b865	Practical Training in Unit Operations – III part	V	T	0	15	0	15	0.4	0.6	VII	И	0	8	0	8	0.3	0.7	1
b191	Processes and Equipment for Solid Waste Treatment	V	T	30	0	30	60	2.0	3.0	VI	И	15	0	15	30	1.5	3.5	5
b1000	Sports	V			30													
	Total of the semester:						360								181			30
b399	Thermal Engineering	VI	И	20	20	0	40	1.2	1.8	V	И	9	11	0	20	0.9	2.1	3
b029	Industrial Automation	VI	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b621	Fundamentals of Chemical and Metallurgical Technologies	VI	И	30	45	0	75	2.4	3.6	VII	И	15	23	0	38	1.8	4.2	6
b267	Unit Operations – IV part (Mass Transfer Processes)	VI	И	30	25	25	80	3.2	4.8	VII	И	15	15	0	30	2.4	5.6	8
b322	Practical Training in Unit Operations – IV part	VI	T	0	15	0	15	0.8	1.2	VII	И	0	8	0	8	0.6	1.4	2
b230	Bioreactor Technics	VI	И	30	0	30	60	2.4	3.6	VI	И	15	15	0	30	1.8	4.2	6
b1000	Sport	VI			30													
	Total						330								156			30

		of the semester:																
b021	Corrosion	VII	T	25	25	0	50	2.0	3.0	VII	И	12	13	0	25	1.5	3.5	5
b525	Mass Transfer Processes: Fluid – Fluid	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b539	Mass Transfer Processes: Fluid - Solid	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b229	Wastewater Treatment	VII	И	30	0	30	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b277	Chemical Reactors – I part	VII	И	30	0	30	60	2.0	3.0	VIII	И	15	0	15	30	1.5	3.5	5
b323	Design of Chemical-Technological Installations	VII	T	30	0	30	60	2.0	3.0	VIII	И	15	0	15	30	1.5	3.5	5
	Total of the semester:						350								175			30
b251	Modelling and Scale up	VIII	И	20	0	20	40	1.2	1.8	IX	И	10	0	10	20	0.9	2.1	3
b201	Project before BSc Thesis	VIII	T	0	0	15	15	0.4	0.6	IX	И	0	0	8	8	0.3	0.7	1
b278	Chemical Reactors – II part	VIII	И	30	0	30	60	2.0	3.0	IX	И	15	0	15	30	1.5	3.5	5
b228	Flue Gases Purification	VIII	И	30	0	30	60	2.0	3.0	IX	И	15	0	15	30	1.5	3.5	5
b253	Separation of Multicomponent Systems	VIII	И	20	20	0	40	1.2	1.8	IX	И	10	10	0	20	0.9	2.1	3
	<i>Elective subjects – one of:</i>																	
b691	– Design of Chemical Apparatuses	VIII	T	20	20	0	40	1.2	1.8	IX	И	10	10	0	20	0.9	2.1	3
b590	– Chemical Apparatuses and Exploitation	VIII	T	20	20	0	40	1.2	1.8	IX	И	10	10	0	20	0.9	2.1	3
b924	– Special Chemical Processes and Operations	VIII	T	20	20	0	40	1.2	1.8	IX	И	10	10	0	20	0.9	2.1	3
	Total of the semester:						255								128			20
b1022	Practice in Industry		защ.				200				защ.				100			

Curriculum: CHEMICAL ENGINEERING (Studies in German)

Subject code	SUBJECTS	FULL-TIME Tuition							PART-TIME Tuition							Total credits
		Semester	Course Loads					Credits of self-	Semester	Course Loads					Credits of self-	
			Assessment	Teaching Loads						Assessment	Teaching Loads					
				Lectures	Laboratory	Seminars	Total				Lectures	Laboratory	Seminars	Total		

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b538	Mass Transfer Processes (Fluid-Fluid)	VIII	E	45	0	30	75	3,0	3,0									6
b540	Mass Transfer Processes (Fluid-Solid)	VIII	E	45	0	30	75	3,0	3,0									6
	<i>Subjects from the optional modules of the specialty</i>	VIII					45	1,5	1,5									3
	Diploma Thesis – 12 weeks	VIII	DT															10
	Hours per semester						300											32
	OPTIONAL MODULES																	
	UNIT OPERATIONS																	
b251	Modelling and Scale-up	VII	E	30	0	15	45	2,0	2,0									4
b252	Transfer Phenomena	VII	E	45	30	15	90	3,5	3,5									7
b347	Design of Heat and Mass Transfer Equipment	VIII	E	30	0	15	45	1,5	1,5									3
	ENVIRONMENTAL ENGINEERING																	
b228	Flue Gases Purification	VII	E	30	0	30	60	2,5	2,5									5
b229	Industrial Wastewater Treatment	VII	E	45	0	30	75	3,0	3,0									6
b649	Solid Waste Processing	VIII	E	30	0	15	45	1,5	1,5									3
	BIOCHEMICAL ENGINEERING																	
b230	Bioreactors	VII	E	30	0	30	60	2,5	2,5									5
b147 6	Genetic Engineering	VII	E	45	0	30	75	3,0	3,0									6
b147 7	Downstream Processing	VIII	E	30	0	15	45	1,5	1,5									3

Curriculum: DIGITAL AND CONVENTIONAL PRINTING TECHNOLOGIES AND DESIGN

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory	Seminars	Total					Lectures	Laboratory	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	II	45	0	45	90	3.6	5.4	I	II	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	II	9	14	0	23	1.2	2.8	4

b190	General Chemistry	I	И	30	15	15	60	2.4	3.6	I	И	15	6	9	30	1.8	4.2	6
b676	Programming in C/C++	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Introduction to Graphical Engineering	I	Т	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	- Ecology and Technical Civilization	I	Т	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	- Engineering Psychology and Ergonomics	I	Т	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	- Career Development and Entrepreneurship	I	Т	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	22	0	23	45	2.7	6.3	9
b344	Technical Mechanics	II	И	30	0	30	60	2.4	3.6	II	И	15	0	15	30	1.8	4.2	6
b412	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b824	Object Oriented Programming in C++	II	Т	20	30	0	50	1.6	2.4	II	И	10	15	0	25	1.2	2.8	4
	Fundamentals of Printing Communications and Graphic Design	II	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b1000	Sports	II			60													
	Total of the semester:						320								130			30
b313	Physical Chemistry	III	И	45	45	0	90	3.2	4.8	IV	И	21	24	0	45	2.4	5.6	8
b396	Electrical Engineering and Electronics	III	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	1.6	2.4	VII	И	12	0	13	25	1.2	2.8	4
	Technology of Text Processing and Workflow in Graphic Industry	III	И	40	40	0	80	2.8	4.2	III	И	20	20	0	40	2.1	4.9	7
	Elective subjects – one of:																	
	– Web-based Programming (Java script, HTML, XML, Flash, PHP)	III	И	20	0	30	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
	– Multimedia Programming	III	И	20	0	30	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
	– 2D and 3D computer graphics	III	И	20	0	30	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
	Electives – one of the languages:																	
b148	– English	III	—	0	30	0	30	0.8	1.2	IV	—	0	15	0	15	0.6	1.4	2
b153	– Russian	III	—	0	30	0	30	0.8	1.2	IV	—	0	15	0	15	0.6	1.4	2
b155	– French	III	—	0	30	0	30	0.8	1.2	IV	—	0	15	0	15	0.6	1.4	2
b168	– German	III	—	0	30	0	30	0.8	1.2	IV	—	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						360								180			30
b089	Instrumental Methods in Analytical Chemistry	IV	И	35	40	0	75	2.8	4.2	IV	И	18	20	0	38	2.1	4.9	7

	Organic Chemistry	IV	И	45	45	0	90	3.6	5.4	VI	И	21	24	0	45	2.7	6.3	9
	Colour and Colour Reproduction	IV	И	40	40	0	80	2.8	4.2	V	И	20	20	0	40	2.1	4.9	7
	Interactive Computer Graphics and Design	IV	И	20	30	0	50	1.6	2.4	V	И	10	15	0	25	1.2	2.8	4
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						325								163			30
	Unit Operations	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b325	Industrial Safety	V	T	20	25	0	45	1.6	2.4	VI	И	9	14	0	23	1.2	2.8	4
b109	Marketing	V	И	40	0	40	80	2.8	4.2	V	И	20	0	20	40	2.1	4.9	7
	Properties of Fibrous Materials, Paper and Cardboards	V	И	35	35	0	70	2.8	4.2	V	И	17	18	0	35	2.1	4.9	7
	Technics and Technology of Prepress and Platemaking Processes	V	И	40	40	0	80	2.8	4.2	VI	И	20	20	0	40	2.1	4.9	7
b1000	Sports	V			30													
	Total of the semester:						335								168			30
b029	Industrial Automation	VI	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b445	Conventional Printing Technology and Equipment	VI	И	40	40	0	80	2.8	4.2	VII	И	20	20	0	40	2.1	4.9	7
b025	Materials for Graphic Industry	VI	И	35	35	0	70	2.8	4.2	VII	И	17	18	0	35	2.1	4.9	7
b179	Value Added Printing and Effects in Production of Flexible and Cardboard Packages	VI	И	40	40	0	80	2.8	4.2	VII	И	20	20	0	40	2.1	4.9	7
	Elective subjects – one of:																	
b.....	– proposed by Department of Organic Chemistry	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Department of Physics	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Department of Inorganic Chemistry	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Department of Analytical Chemistry	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Department of Mathematics	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Department of Physical Chemistry	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Department of Informatics	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Department of Technical Mechanics	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b1000	Sports	VI			30													
	Total of the semester:						335								168			30

	Postpress Technology and Equipment	VII	И	45	45	0	90	3.2	4.8	VIII	И	22	23	0	45	2.4	5.6	8
b387	Project in Standardization and Quality Control in Graphic Industry	VII	защ.	20	20	0	40	1.6	2.4	VIII	защ.	10	10	0	20	1.2	2.8	4
b601	Innovative Technologies and Materials in Graphic Industry	VII	И	35	35	0	70	2.4	3.6	VIII	И	17	18	0	35	1.5	4.5	6
b530	Packaging Technology	VII	И	30	30	0	60	2.4	3.6	VIII	И	15	15	0	30	1.8	4.2	6
b589	Digital Printing Technology and Equipment	VII	И	40	40	0	80	2.4	3.6	VIII	И	20	20	0	40	1.8	4.2	6
Total of the semester:							340								170			30
b560	Desktop Publishing, Prepress Workflow and Design in Graphic Industry	VIII	И	35	35	0	70	3.2	4.8	IX	И	17	18	0	35	1.8	5.2	8
b156	Specifications and Requirements for Design in Printing and Packaging Industry	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	5.2	6
Elective subjects – one of:																		
b192	– Software for Vector Graphics	VIII	И	20	0	25	45	1.2	1.8	IX	И	11	0	12	23	0.8	2.2	3
b239	– Software for Image Processing	VIII	И	20	0	25	45	1.2	1.8	IX	И	11	0	12	23	0.8	2.2	3
b1186	– Page Layout Software	VIII	И	20	0	25	45	1.2	1.8	IX	И	11	0	12	23	0.8	2.2	3
Project – one of:																		
b.....	– Project on Prepress Processes	VIII	защ.	0	0	30	30	1.2	1.8	IX	защ.	0	0	15	15	0.3	0.7	3
b.....	– Project on Printing Processes	VIII	защ.	0	0	30	30	1.2	1.8	IX	защ.	0	0	15	15	0.3	0.7	3
b.....	– Project on Postpress Processes	VIII	защ.	0	0	30	30	1.2	1.8	IX	защ.	0	0	15	15	0.3	0.7	3
Total of the semester:							225								113			20
b1022	Practice in Industry		защ.				200				защ.				100			

Curriculum: ECOLOGICAL ENGINEERING AND ENVIRONMENTAL PROTECTION

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory	Seminars	Total					Lectures	Laboratory	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	II	45	0	45	90	3.6	5.4	I	II	21	0	24	45	2.7	6.3	9

b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
b013	Climatology and Hydrology	I	И	30	30	0	60	2.0	3.0	I	И	15	15	0	30	1.5	3.5	5
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	-	15	0	15	30	1.2	1.8	II	-	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b111	Inorganic Chemistry – II part	II	И	36	39	0	75	3.2	4.8	II	И	18	20	0	38	2.4	5.6	8
b412	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b1000	Sports	II			60													
	Total of the semester:						300								151			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b089	Analytical Chemistry	III	И	25	25	0	50	1.6	2.4	III	И	12	13	0	25	1.2	2.8	4
b313	Physical Chemistry	III	И	45	45	0	90	3.2	4.8	IV	И	21	24	0	45	2.4	5.6	8
b396	Electrical Engineering and Electronics	III	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
	Measuring Technics in Environmental Protection	III	T	15	15	0	30	0.8	1.2	IV	И	7	8	0	15	0.6	1.4	2
	<i>Electives – one of the languages:</i>																	
b148	– English	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2
b153	– Russian	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2
b155	– French	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2
b168	– German	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						370								185			30
b238	Organic Chemistry	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.2	6.8	9
b621	Fundamentals of Chemical and Metallurgical Technologies	IV	И	30	45	0	75	2.4	3.6	VI	И	15	23	0	38	2.0	6.0	6
b146	Industrial Safety and Risk Analysis	IV	И	30	45	0	75	2.4	3.6	III	И	15	23	0	38	1.5	4.5	6

b922	Instrumental Methods in Analytical Chemistry	IV	И	20	20	0	40	1.6	2.4	V	И	9	12	0	21	1.2	2.8	4
	Fundamentals of the Circular Economy	IV	T	15	15	0	30	0.8	1.2	V	И	7	8	0	15	0.5	1.5	2
	<i>Electives – one of languages</i>																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3
b1000	Sports	IV			30													
	Total of the semester:						340								172			30
b242	Unit Operations – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	4.5	5
b814	Modelling and Optimization of Technological Plants	V	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.0	3.0	5
b453	Ecological Auditing and Optimal Decisions in Environmental Protection	V	И	30	45	0	75	2.4	3.6	V	И	18	20	0	38	1.5	4.5	6
b765	Environmental Monitoring – I part	V	И	30	45	0	75	2.4	3.6	VI	И	18	20	0	38	1.0	3.0	6
	<i>Humanitarian elective subjects – one of:</i>																	
b138	– Communications in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.5	1.5	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.5	1.5	3
	<i>Elective subjects – one of:</i>																	
b925	– Renewable Energy Sources	V	И	30	30	0	60	1.5	1.5	VI	И	15	15	0	30	1.0	2.0	5
b163	– Ecological Problems in Metallurgy	V	И	30	30	0	60	1.5	1.5	VI	И	15	15	0	30	1.0	2.0	5
b1000	Sports	V			30													
	Total of the semester:						360								181			30
b244	Unit Operations – II part and Project on UO	VI	И	30	15	30	75	2.8	4.2	VII	И	15	8	15	38	1.5	4.5	7
b029	Industrial Automation	VI	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	4.5	5
b399	Thermal Engineering	VI	И	20	20	0	40	1.2	1.8	V	И	10	10	0	20	0.8	2.2	3
b766	Environmental Monitoring – II part	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.0	3.0	5
b771	Ecology and Sustainable Development	VI	И	30	30	0	60	2.4	3.6	VII	И	15	15	0	30	1.5	4.5	6
	<i>Elective subjects – one of:</i>																	
b.....	– Applied Software for Data Processing	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– Chemistry of Natural Compounds	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4

b.....	– Physical Methods for Characterization of Materials Microstructure	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	– 3D Modelling and Computer Simulation	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b1000	Sports	VI			30													
	Total of the semester:						340								171			30
b157	Air Contamination and Treatment	VII	И	45	45	0	90	3.2	4.8	VIII	И	21	24	0	45	2.0	6.0	8
b161	Water Contamination and Treatment	VII	И	45	45	0	90	3.2	4.8	VIII	И	21	24	0	45	2.0	6.0	8
b905	Environmental Impact Assessment and Legislation	VII	И	30	30	0	60	2.4	3.6	VIII	И	15	15	0	30	1.0	3.0	6
b162	Pure Technologies and Materials Life Cycle	VII	И	30	30	0	60	2.4	3.6	VIII	И	15	15	0	30	1.5	3.5	6
	Project – one of:																	
b.....	– Project on Wastewater Treatment	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
b.....	– Project on Solid Waste Management	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
	– Project on Pure Technologies	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
	Total of the semester:						320								160			30
b038	Solid Waste Management	VIII	И	45	45	0	90	2.8	4.2	IX	И	21	24	0	45	2.0	6.0	7
b037	Soils Contamination and Restoration	VIII	И	45	45	0	90	2.8	4.2	IX	И	21	24	0	45	2.0	6.0	7
	Elective subjects – one of:																	
b805	– Ecological Problems of Fuel Processes	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.0	3.0	5
b741	– Simulation of Pollutants Dispersion	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.0	3.0	5
	Project – one of:																	
b.....	– Project on Wastewater Treatment	VIII	защ.	0	0	10	10	0.4	0.6	IX	защ.	0	0	5	5	0.3	0.7	1
b.....	– Project on Solid Waste Management	VIII	защ.	0	0	10	10	0.4	0.6	IX	защ.	0	0	5	5	0.3	0.7	1
	– Project on Pure Technologies	VIII	защ.	0	0	10	10	0.4	0.6	IX	защ.	0	0	5	5	0.3	0.7	1
	Total of the semester:						250								125			20
b1022	Practice in Industry		защ.				200				защ.				100			

Curriculum: INDUSTRIAL MANAGEMENT

Sub ject	SUBJECTS	FULL-TIME STUDIES	PART-TIME STUDIES	To
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code		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	tal credits
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory	Seminars	Total					Lectures	Laboratory	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	23	0	22	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b190	General Chemistry	I	И	30	15	15	60	2.4	3.6	I	И	15	6	9	30	1.8	4.2	6
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b961	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	- Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	- Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	- Career Development and Staff Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	22	0	23	45	2.7	6.3	9
b344	Technical Mechanics	II	И	30	0	30	60	2.4	3.6	II	И	15	0	15	30	1.8	4.2	6
30	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b770	Business Culture	II	T	30	0	30	60	2.0	3.0	III	И	15	0	15	30	1.5	3.5	5
b1000	Sports	II			60													
	Total of the semester:						315								158			30
b396	Electrical Engineering and Electronics	III	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b961	Macroeconomy	III	И	30	0	30	60	2.8	4.2	III	И	15	0	15	30	2.1	4.9	7
b333	Industrial Statistics	III	И	30	0	30	60	2.8	4.2	III	И	15	0	15	30	2.1	4.9	7
	Microeconomy	III	И	45	45	0	90	3.6	5.4	III	И	22	23	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2

b153	– Russian	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2
b155	– French	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2
b168	– German	III	-	0	30	0	30	0.8	1.2	IV	-	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						300								150			30
b621	Fundamentals of Chemical and Metallurgical Technologies	IV	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b265	Accounting	IV	И	30	45	0	75	3.2	4.8	IV	И	15	23	0	38	2.4	5.6	8
b1021	Business Logistics	IV	И	30	0	45	75	3.2	4.8	IV	И	15	0	23	38	2.4	5.6	8
b179	Quantitative Methods in Management	IV	И	30	30	0	60	2.4	3.6	IV	И	15	15	0	30	1.8	4.2	6
	<i>Electives – one of the languages:</i>																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						300								151			30
b232	Unit Operations	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b325	Industrial Safety	V	T	20	25	0	45	1.6	2.4	VI	И	9	14	0	23	1.2	2.8	4
b109	Marketing	V	И	40	0	40	80	2.8	4.2	V	И	20	0	20	40	2.1	4.9	7
b180	Trade and Financial Right	V	И	40	0	40	80	2.8	4.2	V	И	20	0	20	40	2.1	4.9	7
b167	Management	V	И	40	0	40	80	2.8	4.2	V	И	20	0	20	40	2.1	4.9	7
b1000	Sports	V			30													
	Total of the semester:						345								173			30
b029	Industrial Automation	VI	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b025	Finances	VI	И	40	0	40	80	3.2	4.8	VI	И	20	0	20	40	2.4	5.6	8
b445	Human Resource Management	VI	И	40	0	40	80	3.2	4.8	VII	И	20	0	20	40	2.4	5.6	8
	<i>Elective subjects – one of:</i>																	
b1020	– Commodity Knowledge	VI	И	30	0	30	60	2.0	3.0	VII	И	15	0	15	30	1.5	3.5	5
b1070	– Organization and Public Orders Management	VI	И	30	0	30	60	2.0	3.0	VII	И	15	0	15	30	1.5	3.5	5
	<i>Elective subjects – one of:</i>																	
b192	– Business Psychology	VI	И	15	0	30	45	1.6	2.4	VII	И	8	0	15	23	1.2	2.8	4

b239	— Industrial Property and Legislation	VI	И	15	0	30	45	1.6	2.4	VII	И	8	0	15	23	1.2	2.8	4
b1186	— Insurance Activity	VI	И	15	0	30	45	1.6	2.4	VII	И	8	0	15	23	1.2	2.8	4
b1000	Sports	VI			30													
	Total of the semester:						325								163			30
b437	Manufacture Organization	VII	И	40	0	40	80	3.2	4.8	VIII	И	20	0	20	40	2.4	5.6	8
b387	Quality Management	VII	И	40	0	40	80	3.2	4.8	VIII	И	20	0	20	40	2.4	5.6	8
b530	Innovation Management	VII	И	40	0	40	80	2.8	4.2	VIII	И	20	0	20	40	2.1	4.9	7
b589	Engineering	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
	Total of the semester:						320								160			30
b601	Analysis of the Manufacture-Trade Activity	VIII	И	40	0	40	80	2.4	3.6	IX	И	20	0	20	40	1.8	4.2	6
b560	Manufacture Management	VIII	И	45	45	0	90	3.2	4.8	IX	И	22	23	0	45	2.4	5.6	8
b156	Business Planning and Control	VIII	И	40	0	40	80	2.4	3.6	IX	И	20	0	20	40	1.8	4.2	6
	Total of the semester:						250								125			20
b1022	Practice in Industry		защ.				200				защ.				100			

Curriculum: AUTOMATION AND INFORMATION TECHNOLOGIES

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b190	General Chemistry	I	И	30	15	15	60	2.4	3.6	I	И	15	6	9	30	1.8	4.2	6
	Programming in C/C++	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Algorithms and Data Structures	I	И	25	25	0	50	1.6	2.4	И	И	12	13	0	25	1.2	2.8	4

[illegible]

	Total I of the semester:						345								173			30
b166	Electronics	IV	И	30	30	0	60	2.4	3.6	IV	И	15	15	0	30	1.8	4.2	6
b165	Applied Statistics	IV	T	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b012	Fundamentals of the Automatic Control	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
	Operation Systems	IV	И	30	30	0	60	2.0	3.0	V	И	15	15	0	30	1.5	3.5	5
	Data Base Systems	IV	И	30	30	0	60	2.0	3.0	V	И	15	15	0	30	1.5	3.5	5
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total II of the semester:						330								165			30
	Industrial Safety	V	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b672	Experiments Design and Data Analysis	V	T	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
	Digital Control Systems	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b851	Industrial Measurements and Sensors	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	Elective subjects – one of:																	
	– Programming in Python – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	– Programming in C# - I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	– Programming in Java – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	– Software Engineering	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	Elective subjects – one of:																	
b036	– Electrical Measurements	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b014	– Fundamentals of the Artificial Intelligence	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b1000	Sports	V				30												
	Total of the semester:						345								173			30

b791	Fundamentals of Chemical and Metallurgical Technologies	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b279	Digital and Microprocessor Technics	VI	И	30	30	0	60	2.4	3.6	VI	И	15	15	0	30	1.8	4.2	6
	Decision Making and Optimization	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b019	Industrial Controllers and Actuators	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
	<i>Elective subjects – one of:</i>																	
	– Object-oriented Modelling	VI	И	20	25	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	– Programming in Python – II part	VI	И	20	25	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	– Programming in C# - II part	VI	И	20	25	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	– Programming in Java – II part	VI	И	20	25	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	<i>Elective subjects – one of:</i>																	
b043	– Identification	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
	– Programmable Logic Controllers	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b1000	Sports	VI			30													
	Tot al of the semester:						345								173			30
b196	Economics and Management	VII	И	25	0	25	50	1.6	2.4	VII	И	12	0	13	25	1.2	2.8	4
b072	Modelling of Dynamic Technological Unit Operations	VII	И	45	45	0	90	3.6	5.4	VIII	И	21	24	0	45	2.7	6.3	9
	Robotics	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b008	Automation of Technological Processes – I part	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
	<i>Elective subjects – one of:</i>																	
b148	– Cloud Technologies	VII	И	20	20	0	40	1.6	2.4	VIII	И	10	10	0	20	1.2	2.8	4
b153	– Internet Technologies	VII	И	20	20	0	40	1.6	2.4	VIII	И	10	10	0	20	1.2	2.8	4
b155	– Mobile Technologies	VII	И	20	20	0	40	1.6	2.4	VIII	И	10	10	0	20	1.2	2.8	4
	<i>Elective subjects – one of:</i>																	
	– Embedded Systems	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	– Knowledge Based Systems	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
b281	– Management of Projects	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	Tot al of the semester:						340								170			30

	Automation of Technological Processes – II part	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	Quality Control	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
b028	Industrial Control Systems	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	<i>Elective subjects – one of:</i>																	
b621	– Industrial Internet of Things	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– NoSQL Data Bases	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– Web Design	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– Cybersecurity	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	<i>Elective subjects – one of:</i>																	
	– Intelligent Production Systems	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
b048	– Cyberphysical Systems	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– Modern Methods for Data Analysis	VIII	T	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	Total of the semester:						240								120			20
b1022	Practice in Industry		защ.				200				защ.				100			
	BSc Thesis – 8 weeks	VIII	ДЗ							IX	ДЗ							10

Curriculum: INFORMATICS ENGINEERING

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory	Seminars	Total					Lectures	Laboratory	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	II	45	0	45	90	3.6	5.4	I	II	21	0	24	45	2.7	6.3	9
b190	General Chemistry	I	II	30	15	15	60	2.4	3.6	I	II	15	6	9	30	1.8	4.2	6

	Programming in C+/C++	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Algorithms and Data Structures	I	И	25	25	0	50	1.6	2.4	II	И	12	13	0	25	1.2	2.8	4
	<i>Humanitarian elective subjects – one of:</i>																	
b056	- Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	- Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	- Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sport	I			60													
	Total of the semester:						320								160			30
b053	Mathematics – II part	II	И	45	0	45	90	3.2	4.8	II	И	21	0	24	45	2.4	5.6	8
b344	Technical Mechanics	II	И	30	0	30	60	2.4	3.6	II	И	15	0	15	30	1.8	4.2	6
b412	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
	Computer Architectures	II	И	30	30	0	60	2.4	3.6	II	И	15	15	0	30	1.8	4.2	6
	Object-oriented Programming in C++	II	T	20	30	0	50	1.6	2.4	II	И	10	15	0	25	1.2	2.8	4
b1000	Sports	II			60													
	Total of the semester:						320								160			30
b806	Electrical Engineering	III	И	45	45	0	90	3.2	4.8	III	И	21	24	0	45	2.4	5.6	8
	Digital Processing of Signals	III	И	30	30	0	60	2.4	3.6	IV	И	15	15	0	30	1.8	4.2	6
b039	Modelling and Simulation	III	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
	Computer Networks	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
	<i>Elective subjects – one of:</i>																	
b050	– Numerical Methods	III	T	15	30	0	45	1.6	2.4	III	И	9	14	0	23	1.2	2.8	4
	– Mathematical Logics	III	T	15	30	0	45	1.6	2.4	III	И	9	14	0	23	1.2	2.8	4
	<i>Electives – one of the languages:</i>																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2

	Total of the semester:						345								173			30
b279	Digital and Microprocessor Technics	VI	И	30	30	0	60	2.4	3.6	VI	И	15	15	0	30	1.8	4.2	6
	Object-oriented Modelling	VI	И	30	30	0	60	2.4	3.6	VII	И	15	15	0	30	1.8	4.2	6
b791	Decision Making and Optimization	VI	Т	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b791	Project on Programming / Software Engineering	VI	И	0	0	30	30	1.6	2.4	VII	И	0	0	15	15	1.2	2.8	4
	Elective subjects – one of:																	
	– Programming in Python – II part	VI	И	20	25	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	– Programming in C# - II part	VI	И	20	25	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	– Programming in Java – II part	VI	И	20	25	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	Elective subjects – one of:																	
b043	– Identification	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
	– Programmable Logic Controllers	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b019	– Industrial Controllers and Actuators	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b1000	Sports	VI			30													
	Total of the semester:						315								158			30
b196	Economics and Management	VII	И	25	0	25	50	1.6	2.4	VII	И	12	0	13	25	1.2	2.8	4
b072	Modelling of Dynamic Technological Unit Operations	VII	И	45	45	0	90	3.6	5.4	VIII	И	21	24	0	45	2.7	6.3	9
	Internet Technologies	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	Mobile Technologies	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
b791	Engineering Project	VI	защ.	0	0	30	30	1.2	1.8	VIII	защ.	0	0	15	15	0.9	2.1	3
	Elective subjects – one of:																	
	– Cloud Technologies	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	– Embedded Systems	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	– Knowledge Based Systems	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
b281	– Management of Projects	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	Elective subjects – one of:																	
b008	– Automation of Technological Processes – I part	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
	– Robotics	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5

	Total of the semester:						350								175			30
	Cyberphysical Systems	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	Modern Methods for Data Analysis	VIII	Т	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	Cybersecurity	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	<i>Elective subjects – one of:</i>																	
	– NoSQL Data Bases	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– Web Design	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– Industrial Internet of Things	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– Knowledge Based Systems	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	<i>Elective subjects – one of:</i>																	
	– Intelligent Production Systems	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
b048	– Automation of Technological Processes – II part	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
b028	– Industrial Control Systems	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	– Quality Control	VIII	И	24	24	0	48	1.6	2.4	IX	И	12	12	0	24	1.2	2.8	4
	Total of the semester:						240								120			20
b1022	Practice in Industry		защ.				200				защ.				100			

FACULTY OF CHEMICAL TECHNOLOGIES

Curriculum: PERFUMERY AND COSMETICS

Subject code	SUBJECTS	FULL-TIME STUDIES							PART-TIME STUDIES							Total credits		
		Semester	Course Loads					Credits of self-training	Semester	Course Loads					Credits of self-training			
			Assessment	Teaching Loads			Credits			Assessment	Teaching Loads			Credits				
				Lectures	Laboratory work	Seminars					Total	Lectures	Laboratory work				Seminars	Total

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b111	Inorganic Chemistry – I part	I	И	30	9	21	60	2.4	3.6	I	И	15	6	9	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b114	Inorganic Chemistry – II part	II	И	30	30	0	60	2.0	3.0	II	И	15	15	0	30	1.5	3.5	5
b412	Physics	II	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9
b1000	Sports	II			60													
	Total of the semester:						315								158			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b236	Organic Chemistry – I part	III	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						335								168			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7
b311	Physical Chemistry – I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b396	Electrical Engineering and Electronics	IV	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b237	Organic Chemistry – II part	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3

b1000	Sports	IV			30													
	Total of the semester:						315								158			30
	Humanitarian elective subjects – one of:																	
b138	– Communications in the Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b242	Unit Operations – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b029	Industrial Automation	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b837	Statistical Methods	V	T	15	15	0	30	1.2	1.8	V	И	7	8	0	15	0.9	2.1	3
b312	Physical Chemistry – II part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	Fine Organic Synthesis	V	И	45	45	0	90	3.6	5.4	VI	И	21	24	0	45	2.7	6.3	9
b1000	Sports	V			30													
	Total of the semester:						330								165			30
b243	Unit Operations – II part and a project	VI	И	30	15	30	75	2.8	4.2	VII	И	15	8	15	38	2.1	4.9	7
b399	Thermal Engineering	VI	И	20	20	0	40	1.2	1.8	V	И	9	11	0	20	0.9	2.1	3
b621	Fundamentals of Chemical and Metallurgical Technologies	VI	И	30	45	0	75	2.4	3.6	VI	И	15	23	0	38	1.8	4.2	6
	An elective subject																	
b.....	– proposed by Organic Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by General and Inorganic Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Analytical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Mathematics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Informatics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	Fragrant Compounds and Perfumery Products	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b.....	Raw Materials in Cosmetics Technology	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b1000	Sports	VI			30													
	Total of the semester:						355								179			30
b.....	Natural Cosmetics Products	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b.....	Cosmetics Raw Materials of Biological Origin	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b.....	UV-Absorbers and Antioxidants in Cosmetics	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b.....	Cosmetics Products Analysis	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b.....	Nanomaterials in Cosmetics	VII	И	20	20	0	40	1.6	2.4	VIII	И	9	11	0	20	1.2	2.8	4
b.....	Management of Perfumery and Cosmetics Manufacture Safety	VII	T	20	20	0	40	1.2	1.8	VIII	И	9	11	0	20	0.9	2.1	3
b.....	Management and Marketing of Perfumery and Cosmetics Products	VIII	T	15	15	0	30	0.8	1.2	VIII	И	7	8	0	15	0.6	1.4	2
	Projects – one of:																	
b.....	– A project on medical cosmetics	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– A project on fragrance compounds	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– A project on UV-absorbers and antioxidants	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– A project on cosmetic compositions	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1

b.....	– A project on natural cosmetics	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	Total of the semester:						360								180			30
b.....	Medical Cosmetics	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
b.....	Biocompatibility of Products of Cosmetic Application	VIII	И	25	25	0	50	1.6	2.4	IX	И	12	13	0	25	1.2	2.8	4
b.....	Cosmetic Products Technology	VIII	И	35	35	0	70	2.0	3.0	IX	И	17	18	0	35	1.5	3.5	5
b.....	Wrapping Materials in Cosmetics	VIII	И	25	25	0	50	1.2	1.8	IX	И	12	13	0	25	0.9	2.1	3
	A project – one of:																	
b.....	– A project on medical cosmetics	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– A project on fragrance compounds	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– A project on UV-absorbers and antioxidants	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– A project on cosmetic compositions	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– A project on natural cosmetics	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
	Total of the semester:						270								135			20
b1022	Practice in Industry		защ.				200				защ.				100			

Curriculum: POLYMERS ENGINEERING

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory work	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	И	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b111	Inorganic Chemistry – I part	I	И	30	9	21	60	2.4	3.6	I	И	15	6	9	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3

b1000	Sports	I			60													
	Total of the Semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part II	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b114	Inorganic Chemistry – II part	II	И	30	30	0	60	2.0	3.0	II	И	15	15	0	30	1.5	3.5	5
b412	Physics	II	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9
b1000	Sports	II			60													
	Total of the Semester:						315								158			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b236	Organic Chemistry – I part	III	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the Semester:						335								168			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7
b311	Physical Chemistry- I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b396	Electrical Engineering and Electronics	IV	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b237	Organic Chemistry- II part	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the Semester:						315								158			30
	Humanitarian elective subjects – one of:																	

[illegible]

	SPECIALYZING SUBJECTS Technology of Leather Products																	
	Biopolymers	VI	И	15	15	0	30	0.8	1.2	VII	И	7	8	0	15	0.6	1.4	2
b573	Technology of Plastics	VI	И	45	45	0	90	3.2	4.8	VII	И	21	24	0	45	2.4	5.6	8
	Total number for the entire period of education:						120								60			10
b575	Plastics Processing	VII	И	45	45	0	90	3.2	4.8	VIII	И	20	25	0	45	2.4	5.6	8
b431	Rubber Technology	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
b1191	Polymer Decorative and Protective Coatings and Adhesives	VII	И	30	30	0	60	1.6	2.4	VIII	И	15	15	0	30	1.2	2.8	4
b1192	Methods of Polymers Analysis and Testing	VII	–	15	15	0	30	0.8	1.2	VIII	–	7	8	0	15	0.6	1.4	2
b574	Polymer Composites	VII	И	45	45	0	90	3.2	4.8	VIII	И	21	24	0	45	2.4	5.6	8
	A project – one of:																	
b.....	–Elastomer Composites from Renewable Sources	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– Elastomer Composites Characterization	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– Synthesis of Polymers and Biopolymers	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– Design and Processing of Polymer Composites	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	Total of VII semester specializing subjects:						360								180			30
	Design of Plastic Products and Instruments	VIII	И	25	25	0	50	1.2	1.8	IX	И	10	15	0	25	0.9	2.1	3
b1193	Rubber Processing	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
b433	Synthetic Rubbers and Latexes	VIII	И	25	29	0	54	1.6	2.4	IX	И	12	15	0	27	1.2	2.8	4
b1192	Methods of Polymers Analysis and Testing	VIII	И	15	15	0	30	0.8	1.2	IX	И	7	8	0	15	0.6	1.4	2
b1194	Polymers Ageing and Ecological Problems	VIII	И	25	31	0	56	1.6	2.4	IX	И	12	16	0	28	1.2	2.8	4
	A project – one of:																	
b.....	– Elastomer Composites from Renewable Sources	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– Elastomer Composites Characterization	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– Synthesis of Polymers and Biopolymers	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– Design and Processing of Polymer Composites	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
	Total of VIII semester specializing subjects:						270								135			20
	SPECIALYZING SUBJECTS TEXTILE AND LEATHER TECHNOLOGICAL DESIGN																	
b.....	Modification Methods and Analysis of Polymers and Composites	VI	И	15	15	0	30	0.8	1.2	VII	И	7	8	0	15	0.6	1.4	2

b773	Polymers in Textile, Leather and Footwear Production	VI	И	45	45	0	90	3.2	4.8	VII	И	21	24	0	45	2.4	5.6	8
	Total of VI semester specializing subjects:						120								60			10
b774	Material Science in Textile, Leather and Footwear Production	VII	И	30	30	0	60	1.6	2.4	VIII	И	15	15	0	30	1.2	2.8	4
b775	Dyes and Auxiliary Materials in Textile and Leather Manufacturing	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b695	Textile Chemistry – I part	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
b564	Leather Technology	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
b1025	Technological Design of Textile and Leather	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
	A project – one of:																	
b.....	– Engineering Design of Footwear Chemical Technologies	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
b.....	– Engineering Design of Textile Chemical Technologies	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
	Total of VII semester specializing subjects:						360								180			30
b696	Textile Chemistry – II part	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
b215	Technology of Leather Products	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
b1023	Biotechnologies Application to Textile, Leather and Fur Production	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
b1195	Ecological Aspects of Textile, Leather and Fur Production	VIII	И	20	20	0	40	0.8	1.2	IX	И	10	10	0	20	0.6	1.4	2
	A project – one of:																	
b.....	Design of Footwear Chemical Technologies	VIII	защ	0	0	10	10	0.4	0.6	IX	защ	0	0	5	5	0.6	1.4	1
b.....	Design of Textile Chemical Technologies	VIII	защ	0	0	10	10	0.4	0.6	IX	защ	0	0	5	5	0.6	1.4	1

Curriculum: FINE ORGANIC SYNTHESIS

Subject code	SUBJECTS	FULL-TIME STUDIES					PART-TIME STUDIES					Total
		Semes	Course Loads			Credit	Semes	Course Loads			Credit	
			As	Teaching Loads	Cr			As	Teaching Loads	Cr		

			essment	Lectures	Laboratory work	Seminars	Total	redits			essment	Lectures	Laboratory work	Seminars	Total	redits		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b111	Inorganic Chemistry – I part	I	И	30	9	21	60	2.4	3.6	I	И	15	6	9	30	1.8	4.2	6
	Introduction to the specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b114	Inorganic Chemistry – II part	II	И	30	30	0	60	2.0	3.0	II	И	15	15	0	30	1.5	3.5	5
b412	Physics	II	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9
b1000	Sports	II			60													
	Total of the semester:						315								158			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b236	Organic Chemistry – I part	III	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2

b1000	Sports	III			30													
	Total of the semester:						335								168			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7
b311	Physical Chemistry – I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b396	Electrical Engineering and Electronics	IV	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b237	Organic Chemistry – II part	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						315								158			30
	Humanitarian elective subjects - one of:																	
b138	– Communications in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b242	Unit Operations – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b029	Industrial Automation	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b837	Statistical Methods	V	T	15	15	0	30	1.2	1.8	V	И	7	8	0	15	0.9	2.1	3
b312	Physical Chemistry – II Part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b507	Organic Synthesis Technology – I part	V	И	45	45	0	90	3.6	5.4	VI	И	21	24	0	45	2.7	6.3	9
b1000	Sports	V			30													
	Total of the semester:						330								165			30
b243	Unit Operations – II part and a project	VI	И	30	15	30	75	2.8	4.2	VII	И	15	8	15	38	2.1	4.9	7
b399	Thermal Engineering	VI	И	20	20	0	40	1.2	1.8	V	И	9	11	0	20	0.9	2.1	3
b621	Fundamentals of Chemical and Metallurgical Technologies	VI	И	30	45	0	75	2.4	3.6	VI	И	15	23	0	38	1.8	4.2	6
	An elective subject																	
b.....	– proposed by Organic Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by general and Inorganic Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Analytical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by mathematics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4

b.....	– proposed by Physical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Informatics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b508	Organic Synthesis Technology – II part	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b504	Synthetic Organic Products and Additives	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b1000	Sports	VI			30													
	Total of the semester:						355								179			30
b585	Biologically Active Substances	VII	И	45	45	0	90	2.8	4.2	VIII	И	21	24	0	45	2.1	4.9	7
b490	Applied Reactions in Organic Synthesis	VII	И	35	35	0	70	2.4	3.6	VIII	И	18	18	0	36	1.8	4.2	6
b660	Surface Active and Fragrance Compounds	VII	И	35	35	0	70	2.4	3.6	VIII	И	18	18	0	36	1.8	4.2	6
b710	Colour and Fluorescent Organic Products	VII	И	45	45	0	90	2.8	4.2	VIII	И	21	24	0	45	2.1	4.9	7
b506	Microsynthesis	VIII	И	0	30	0	30	1.2	1.8	VIII	И	0	15	0	15	0.9	2.1	3
	A project – one of:																	
b.....	– a project on Biologically Active Compounds	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– a project on Colour and Fluorescent Compounds	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– a project on Pharmaceutical Products	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	– a project on Perfumery and Cosmetics	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	Total of the semester:						360								182			30
b119	Synthetic and Semi-Synthetic Pharmaceutical Products	VIII	И	45	45	0	90	2.8	4.2	IX	И	21	24	0	45	2.1	4.9	7
b642	Analysis and Control of Organic Products	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
b324	Explosive Substances	VIII	И	20	20	0	40	1.2	1.8	IX	И	10	10	0	20	0.9	2.1	3
b116	Technology of Perfumery-Cosmetic Products	VIII	И	20	20	0	40	0.8	1.2	IX	И	10	10	0	20	0.6	1.4	2
	A project – one of:																	
b.....	– a project on Biologically Active Compounds	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– a project on Colour and Fluorescent Compounds	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– a project on Pharmaceutical Products	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
b.....	– a project on Perfumery and Cosmetics	VIII	защ	0	0	20	20	0.8	1.2	IX	защ	0	0	10	10	0.6	1.4	2
	Total of the semester:						270								135			20
b1022	Practice in Industry		защ				200				защ				100			

Curriculum: BIOPRODUCT ENGINEERING, PAPER AND PACKAGING

Subject	SUBJECTS	FULL-TIME STUDIES	PART-TIME STUDIES	Total
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ct code		Semester	Course Loads							Credits of self-training	Semester	Course Loads							Credits of self-training	tal credits
			Assessment	Teaching Loads				Credits	Assessment			Teaching Loads				Credits				
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory work	Seminars	Total					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9		
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4		
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6		
b111	Inorganic Chemistry – I part	I	И	30	9	21	60	2.4	3.6	I	И	15	6	9	30	1.8	4.2	6		
	Introduction to the specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2		
	Humanitarian elective subjects – one of:																			
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3		
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3		
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3		
b1000	Sports	I			60															
	Total of the semester:						315								158			30		
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9		
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3		
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4		
b114	Inorganic Chemistry – II part	II	И	30	30	0	60	2.0	3.0	II	И	15	15	0	30	1.5	3.5	5		
b412	Physics	II	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9		
b1000	Sports	II			60															
	Total of the semester:						315								158			30		
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5		
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5		
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5		
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4		
b236	Organic Chemistry – I part	III	И	45	45	0	90	3.6	5.4	III	И	21	24	0	45	2.7	6.3	9		
	Electives – one of the languages:																			
b148	- English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2		
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2		

b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						335								168			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7
b311	Physical Chemistry – I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b396	Electrical Engineering and Electronics	IV	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b237	Organic Chemistry– II part	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						315								158			30
	Humanitarian elective subjects – one of :																	
b138	– Communications in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b242	Unit Operations – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b029	Industrial Automation	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b837	Statistical Methods	V	T	15	15	0	30	1.2	1.8	V	И	7	8	0	15	0.9	2.1	3
b312	Physical Chemistry – II part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	Chemistry and Structure of Plant Raw Materials	V	И	45	45	0	90	3.6	5.4	VI	И	21	24	0	45	2.7	6.3	9
b1000	Sports	V			30													
	Total of the semester:						330								165			30
b243	Unit Operations – II part and a project	VI	И	30	15	30	75	2.8	4.2	VII	И	15	8	15	38	2.1	4.9	7
b399	Thermal Engineering	VI	И	20	20	0	40	1.2	1.8	V	И	9	11	0	20	0.9	2.1	3
b621	Fundamentals of Chemical and Metallurgical Technologies	VI	И	30	45	0	75	2.4	3.6	VI	И	15	23	0	38	1.8	4.2	6
	An elective subject																	
b.....	– proposed by Organic Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by General and Inorganic Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Analytical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4

b.....	– proposed by Mathematics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Informatics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	Bioenergy and Chemicals Exploitation	VI	И	25	25	0	50	1.6	2.4	VII	И	12	13	0	25	1.2	2.8	4
b.....	Technology of Pulp Production	VI	И	35	35	0	70	2.4	3.6	VII	И	17	18	0	35	1.8	4.2	6
b1000	Sports	VI			30													
	Total of the semester:						355								179			30
b.....	Pulp Bleaching and Refining	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b.....	High Yield Fibrous Materials and Plates from Ligneous Fibers	VII	И	35	35	0	70	2.4	3.6	VIII	И	15	20	0	35	1.8	4.2	6
	Refinement of Packaging Materials	VII	И	20	25	0	45	1.6	2.4	IX	И	9	14	0	23	1.2	2.8	4
b182	Chemistry and Technology of Paper	VII	И	45	45	0	90	3.2	4.8	VIII	И	21	24	0	45	2.4	5.6	8
b.....	Biorefining of Plant Raw Materials	VII	И	40	40	0	80	2.4	3.6	VIII	И	20	20	0	40	1.8	4.2	6
	A project – one of :							0.0	0.0									
b.....	– a project on Pulp Technology	VII	защ	0	0	15	15	0.4	0.6	VIII	защ	0	0	8	8	0.3	0.7	1
b.....	– a project on Bioenergy and Chemicals Balance	VII	защ	0	0	15	15	0.4	0.6	VIII	защ	0	0	8	8	0.3	0.7	1
	Total of the semester:						360								181			30
b.....	Technology of Secondary Fibrous Materials	VIII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b187	Properties of Paper	VIII	И	45	45	0	90	2.4	3.6	IX	И	21	24	0	45	1.8	4.2	6
b.....	Manufacture of Corrugated Board and Containers	VIII	И	35	40	0	75	2.4	3.6	IX	И	18	20	0	38	1.8	4.2	6
	Elective subjects - one of:							0.0	0.0									
b.....	– Extract Products from Raw Plant Materials	VIII	T	15	15	0	30	0.8	1.2	IX	И	9	6	0	15	0.6	1.4	2
b143	– Polygraphed Design of Wrapping Ware	VIII	T	15	15	0	30	0.8	1.2	IX	И	9	6	0	15	0.6	1.4	2
	A project – one of:							0.0	0.0									
b.....	– a project on Paper Production	VIII	защ	0	0	15	15	0.4	0.6	IX	защ	0	0	8	8	0.3	0.7	1
b.....	– a project on Wrapping Ware	VIII	защ	0	0	15	15	0.4	0.6	IX	защ	0	0	8	8	0.3	0.7	1
	Total of the semester:						270								136			20
b1022	Practice in Industry		защ				200				защ				100			

Curriculum: CLEAN ENERGY AND SUSTAINABLE DEVELOPMENT

Subject code	SUBJECTS	FULL-TIME STUDIES			PART-TIME STUDIES			Total
		Se	Course Loads	Cr	Se	Course Loads	Cr	

		mester	Assessment	Teaching Loads				Credits	edits of self-training	mester	Assessment	Teaching Loads				Credits	edits of self-training	
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory work	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	<i>Humanitarian elective subjects – one of:</i>																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	3.2	4.8	II	И	18	20	0	38	2.4	5.6	8
b412	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b1000	Sports	II			60													
	Total of the semester:						300								151			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b413	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	0.9	2.1	3
b087	Crystallography and Mineralogy	III	И	30	45	0	75	2.4	3.6	III	И	15	23	0	38	1.8	4.2	6

	<i>Electives – one of the languages:</i>																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						360								181			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7
b311	Physical Chemistry – I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b396	Electrical Engineering and Electronics	IV	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b238	Organic Chemistry	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
	<i>Electives – one of the languages:</i>																	
b148	- English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						315								158			30
	<i>Humanitarian elective subjects - one of:</i>																	
b138	– Communications in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b242	Unit Operations – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b029	Industrial Automation	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b814	Statistical Methods	V	T	15	15	0	30	1.2	1.8	V	И	7	8	0	15	0.9	2.1	3
b312	Physical Chemistry – II part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
	Fundamentals of Chemical Technologies in Energetics	V	И	45	45	0	90	3.6	5.4	VI	И	21	24	0	45	2.7	6.3	9
b1000	Sports	V			30													
	Total of the semester:						330								165			30
b243	Unit Operations – II part and a project	VI	И	30	15	30	75	2.8	4.2	VII	И	15	8	15	38	2.1	4.9	7
b399	Thermal Engineering	VI	И	20	20	0	40	1.2	1.8	V	И	10	10	0	20	0.9	2.1	3

b621	Fundamentals of Chemical and Metallurgical Technologies	VI	И	30	45	0	75	2.4	3.6	VII	И	15	23	0	38	1.8	4.2	6
	<i>An elective subject -</i>																	
b.....	– proposed by Organic Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by general and Inorganic Chemistry	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Analytical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Mathematics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physical Chemistry Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Informatics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
	Fundamentals of Green Chemistry and Technology	VI	И	60	60	0	120	4.0	6.0	VII	И	30	30	0	60	3	7	10
b1000	Sports	VI																
	Total of the semester:						355								179			30
	Renewable Energy Sources	VII	T	45	45	0	90	3.2	4.8	VIII	И	21	24	0	45	2.4	5.6	8
	Catalytic Processes for Clean Energy	VII	И	45	45	0	90	3.2	4.8	VIII	И	21	24	0	45	2.4	5.6	8
	Electrochemical Grounds of Energy Transformation	VII	И	45	45	0	90	2.8	4.2	VIII	И	21	24	0	45	2.1	4.9	7
	New Materials and Technologies for Clean Energy	VII	И	35	35	0	70	2.0	3.0	VIII	И	17	18	0	35	1.5	3.5	5
	<i>A project – one of:</i>																	
b.....	– a project on Catalytic Processes for Clean Energy	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
b.....	– a project on Electrochemical Energy Technologies	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
b.....	– a project on Electrocatalysis	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
b.....	– a project on Materials for Clean Energy	VII	–	0	0	20	20	0.8	1.2	VIII	–	0	0	10	10	0.3	0.7	2
	Total of the semester:						360								180			30
	Ecological Aspects of Energy Technologies and Systems	VIII	И	20	20	0	40	1.2	1.8	IX	И	10	10	0	20	0.9	2.1	3
	Technologies for Energy Production and Transformation	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
	Photo Processes for Energy Production and Transformation	VIII	И	35	35	0	70	2.0	3.0	IX	И	17	18	0	35	1.5	3.5	5
	Materials Degradation and Sustainable Development	VIII	И	45	45	0	90	2.4	3.6	IX	И	15	30	0	45	1.8	4.2	6
	<i>A project – one of:</i>																	
b.....	– a project on Catalytic Processes for Clean Energy	VIII	защ	0	0	10	10	0.4	0.6	IX	защ	0	0	5	5	0.3	0.7	1
b.....	– a project on Electrochemical Energy Technologies	VIII	защ	0	0	10	10	0.4	0.6	IX	защ	0	0	5	5	0.3	0.7	1
b.....	– a project on Electrocatalysis	VIII	защ	0	0	10	10	0.4	0.6	IX	защ	0	0	5	5	0.3	0.7	1
b.....	– a project on Materials for Clean Energy	VIII	защ	0	0	10	10	0.4	0.6	IX	защ	0	0	5	5	0.3	0.7	1

	semester:	Total of the							270								135			20
b1022	Practice in Industry		защ.						200				защ.				100			

Curriculum: INORGANIC AND ELECTROCHEMICAL TECHNOLOGIES AND CORROSION PROTECTION

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory work	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	3.2	4.8	II	И	18	20	0	38	2.4	5.6	8
b412	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6

b1000	Sports	II			60													
	Total of the semester:						300								151			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b413	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	0.9	2.1	3
b087	Crystallography and Mineralogy	III	И	30	45	0	75	2.4	3.6	III	И	15	23	0	38	1.8	4.2	6
	<i>Electives – one of the languages:</i>																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						360								181			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7
b311	Physical Chemistry – I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b396	Electrical Engineering and Electronics	IV	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b238	Organic Chemistry	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
	<i>Electives – one of the languages:</i>																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						315								158			30
	<i>Humanitarian elective subjects – one of:</i>																	
b138	– Communications in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b242	Unit Operations – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5

[illegible]

b815	Fundamentals of Inorganic Chemical Processes	VII	И	45	45	0	90	3.6	5.4	VIII	И	21	24	0	45	2.7	6.3	9
b463	Combined Nitrogen Technology	VII	И	40	40	0	80	2.4	3.6	VIII	И	20	20	0	40	1.8	4.2	6
b1200	Agrochemistry and Hydrochemistry	VII	И	45	45	0	90	2.8	4.2	VIII	И	21	24	0	45	2.1	4.9	7
b471	Mineral Fertilizers Technology	VII	И	45	45	0	90	2.8	4.2	VIII	И	21	24	0	45	2.1	4.9	7
	A project – one of:																	
	– a project on Combined Nitrogen Technology	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	– a project on Soda and Soda Products	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	– a project on Mineral Fertilizers	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	Total of the semester:						360											30
b812	Catalysis and Catalysts	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
b638	Soda and Soda Products Technology	VIII	И	30	30	0	60	1.6	2.4	IX	И	15	15	0	30	1.2	2.8	4
b1201	Mineral Acids and Salts	VIII	И	35	40	0	75	2.4	3.6	IX	И	18	20	0	38	1.8	4.2	6
	Utilization of Inorganic Chemical Wastes	VIII	И	15	20	0	35	0.8	1.2	IX	И	8	10	0	18	0.6	1.4	2
	A project – one of:																	
	– a project on Bonded Nitrogen Technology	VIII	защ.	0	0	20	20	0.8	1.2	IX	защ.	0	0	5	10	0.6	1.4	2
	– a project on Soda and Soda Products	VIII	защ.	0	0	20	20	0.8	1.2	IX	защ.	0	0	5	10	0.6	1.4	2
	– a project on Mineral Fertilizers	VIII	защ.	0	0	20	20	0.8	1.2	IX	защ.	0	0	5	10	0.6	1.4	2
	Total of the semester:						270											20
	SPECIALIZING SUBJECTS ELECTROCHEMICAL TECHNOLOGIES AND CORROSION PROTECTION																	
b443	Fundamentals of Electrochemical Systems	VII	И	40	45	0	85	2.8	4.2	VIII	И	20	23	0	43	2.1	4.9	7
b1199	Electrolysis Technologies	VII	И	40	40	0	80	2.4	3.6	VIII	И	20	20	0	40	1.8	4.2	6
b442	Electrochemical Power Sources	VII	И	40	40	0	80	2.4	3.6	VIII	И	20	20	0	40	1.8	4.2	6
	Construction, Electrode, Membrane Engineering Materials	VII	И	30	30	0	60	2.4	3.6	VIII	И	15	15	0	30	1.8	4.2	6
b331	Physical Metallurgy	VII	И	20	25	0	45	1.6	2.4	VIII	И	9	13	0	22	1.2	2.8	4

	A project – one of:																	
	– a project on Electrolysis Technologies	VII	защ.	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	– a project on Electroplating	VII	защ.	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	– a project on Corrosion and Materials Protection	VII	защ.	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	Total of the semester:						360								180			30
b103	Technologies of Surface Treatment	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
b074	Electroplating	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
b439	Corrosion and Materials Protection	VIII	И	45	45	0	90	2.4	3.6	IX	И	21	24	0	45	1.8	4.2	6
	A project – one of:																	
	– a project on Electrolysis Technologies	VIII	защ.	0	0	20	20	0.8	1.2	IX	защ.	0	0	10	10	0.6	1.4	2
	– a project on Electroplating	VIII	защ.	0	0	20	20	0.8	1.2	IX	защ.	0	0	10	10	0.6	1.4	2
	– a project on Corrosion and Materials Protection	VIII	защ.	0	0	20	20	0.8	1.2	IX	защ.	0	0	10	10	0.6	1.4	2
	Total of the semester:						270								135			20

Curriculum: TECHNOLOGY OF GLASS, CERAMICS AND BINDING AGENTS

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory work	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b341	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6

b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	0	8	15	0.6	1.4	2
	<i>Humanitarian elective subjects – one of:</i>																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.6	5.4	II	И	21	0	24	45	2.7	6.3	9
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	3.2	4.8	II	И	18	20	0	38	2.4	5.6	8
b412	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b1000	Sports	II			60													
	Total of the semester:						300								151			30
b118	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b115	Analytical Chemistry	III	И	30	30	0	60	2.0	3.0	III	И	15	15	0	30	1.5	3.5	5
b196	Economics and Management	III	И	25	0	25	50	2.0	3.0	IV	И	12	0	13	25	1.5	3.5	5
b325	Industrial Safety	III	T	20	25	0	45	1.6	2.4	IV	И	9	14	0	23	1.2	2.8	4
b413	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	0.9	2.1	3
b087	Crystallography and Mineralogy	III	И	30	45	0	75	2.4	3.6	III	И	15	23	0	38	1.8	4.2	6
	<i>Electives – one of the languages:</i>																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						360								181			30
b189	Instrumental Methods in Analytical Chemistry	IV	И	30	45	0	75	2.8	4.2	V	И	15	23	0	38	2.1	4.9	7

b311	Physical Chemistry – I part	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b396	Electrical Engineering and Electronics	IV	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	3.5	5
b238	Organic Chemistry	IV	И	45	45	0	90	3.6	5.4	IV	И	21	24	0	45	2.7	6.3	9
	<i>Electives – one of the languages:</i>																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						315								158			30
	<i>Humanitarian elective subjects – one of:</i>																	
b138	– Communications in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b242	Unit Operations – I part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b029	Industrial Automation	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b814	Statistical Methods	V	T	15	15	0	30	1.2	1.8	V	И	7	8	0	15	0.9	2.1	3
b312	Physical Chemistry – II part	V	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
нова	Optic Microscopy	V	И	10	15	0	25	1.2	1.8	VII	И	7	8	0	15	0.9	2.1	3
нова	Introduction to Nanotechnologies	V	И	30	30	0	60	2.4	3.6	VI	И	15	15	0	30	1.8	4.2	6
b1000	Sports	V			30													
	Total of the semester:						325								165			30
b243	Unit Operations – II part and a project	VI	И	30	15	30	75	2.8	4.2	VII	И	15	8	15	38	2.1	4.9	7
b399	Thermal Engineering	VI	И	20	20	0	40	1.2	1.8	V	И	9	11	0	20	0.9	2.1	3
b621	Fundamentals of Chemical and Metallurgical Technologies	VI	И	30	45	0	75	2.4	3.6	VI	И	15	23	0	38	1.8	4.2	6
	<i>Electives – one of the subjects:</i>																	
b.....	– Spectral Methods of Organic Chemistry (proposed by Organic Chemistry Department)	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Physics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– Coordination Chemistry (proposed by General and Inorganic Chemistry department)	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4

b.....	– Practical Aspects of Chemical Analysis (proposed by Analytical Chemistry Department)	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– предложение от катедра Математика	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– Applied Physical Chemistry (proposed by Physical Chemistry Department)	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b.....	– proposed by Informatics Department	VI	T	15	30	0	45	1.6	2.4	VII	И	9	14	0	23	1.2	2.8	4
b090	Physical Chemistry of Silicates	VI	И	35	40	0	75	2.4	3.6	VIII	И	20	20	0	40	1.8	4.2	6
нова	Silicate Technologies Equipment	VI	И	20	25	0	45	1.6	2.4	VII	И	9	0	14	23	1.2	2.8	4
b1000	Sports	VI			30													
	Total of the semester:						355								157			30
b658	Fundamentals of Silicate Production Processes	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
b091	Heat Processes and Equipment in Silicate Technologies	VII	И	30	35	0	65	2.4	3.6	VII	И	15	15	0	30	1.8	4.2	6
b097	Technical Petrography	VII	T	15	15	0	30	0.8	1.2	VII	И	7	8	0	15	0.6	1.4	2
b098	Technology of Glass	VII	И	45	45	0	90	3.2	4.8	VIII	–	9	9	0	18	2.4	5.6	8
b827	Instrumental Analysis of Raw Materials and Products of Silicate Production	VII	И	30	35	0	65	2.0	3.0	VIII	И	15	18	0	33	1.5	3.5	5
	Projects – two of:																	
b.....	- Phase-structural Characteristics of Silicate Materials	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	- Investigation of Silicate Systems Phase Diagrams	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	- Silicate Technologies	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	- Heat Equipment Silicate Industry	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
b.....	- Investment Design in Silicate Technologies	VII	–	0	0	10	10	0.4	0.6	VIII	–	0	0	5	5	0.3	0.7	1
	Electives – one of the subjects:																	
нова	– Functional Coverages	VII	T	15	15	0	30	0.8	1.2	IX	И	7	8	0	15	0.6	1.4	2
b102	– Structural Analysis	VII	T	15	15	0	30	0.8	1.2	IX	И	7	8	0	15	0.6	1.4	2
b100	– Composite Materials	VII	T	15	15	0	30	0.8	1.2	IX	И	7	8	0	15	0.6	1.4	2
	Total of the semester:						360								400			30
b095	Technology of Ceramics	VIII	И	45	45	0	90	2.8	4.2	IX	И	15	15	0	30	2.1	4.9	7
нова	Technology of Inorganic Biomaterials	VIII	И	25	25	0	50	1.6	2.4	VIII	И	9	16	0	25	1.2	2.8	4
b099	Technology of Binding Agents	VIII	И	45	45	0	90	2.8	4.2	IX	И	15	15	0	30	2.1	4.9	7

	Projects – two of :																	
b.....	- Phase-structural Characteristics of Silicate Materials	VIII	защ	0	0	20	20	0.4	0.6	IX	защ	0	0	10	10	0.6	1.4	1
b.....	- Investigation of Silicate Systems Phase Diagrams	VIII	защ	0	0	20	20	0.4	0.6	IX	защ	0	0	10	10	0.6	1.4	1
b.....	- Silicate Technologies	VIII	защ	0	0	20	20	0.4	0.6	IX	защ	0	0	10	10	0.6	1.4	1
b.....	- Heat Aggregates in Silicate Industry	VIII	защ	0	0	20	20	0.4	0.6	IX	защ	0	0	10	10	0.6	1.4	1
b.....	- Investment Design in Silicate Technologies	VIII	защ	0	0	20	20	0.4	0.6	IX	защ	0	0	10	10	0.6	1.4	1
	Total of the semester:						270								105			20
b1022	Practice in Industry		защ				200				защ				100			

FACULTY OF METALLURGY AND MATERIALS SCIENC

Curriculum: BIOMATERIALS FOR MEDICAL APPLICATIONS

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES							Total credits	
		Semester	Course Loads					Credits of self-training	Semester	Course Loads					Credits of self-training			
			Assessment	Teaching Loads			Credits			Assessment	Teaching Loads			Credits				
				Lectures	Laboratory work	Seminars					Total	Lectures	Laboratory work			Seminars		Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b1001	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	8	0	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3

	Total of the semester:						330								166			30
b196	Economics and Management	V	И	25	0	25	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
b227	Materials Science	V	И	45	45	0	90	3.6	5.4	V	И	21	24	0	45	2.7	6.3	9
b432	Biochemistry	V	И	45	45	0	90	3.2	4.8	VI	И	21	24	0	45	2.4	5.6	8
b731	Corrosion Resistance of Materials	V	T	20	25	0	45	1.6	2.4	VI	И	10	13	0	23	1.2	2.8	4
	Biomaterials	V	T	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
b1000	Sports	V			30													
	Total of the semester:						335								168			30
b029	Industrial Automation	VI	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b102	Structure Analysis	VI	И	30	30	0	60	2.0	3.0	VI	И	15	15	0	30	1.5	3.5	5
b1039	Cell Biology	VI	И	30	30	0	60	2.0	3.0	VII	И	15	15	0	30	1.5	3.5	5
	Natural Biomaterials	VI	T	20	20	0	40	1.6	2.4	VII	И	10	10	0	20	1.2	2.8	4
	Textile Materials for Medical Application	VI	T	20	20	0	40	1.2	1.8	VII	И	10	10	0	20	0.9	2.1	3
	Metal-based Biomaterials	VI	И	40	40	0	80	3.2	4.8	VII	И	20	20	0	40	2.4	5.6	8
b1000	Sports	VI			30													
	Total of the semester:						340								170			30
	Humanitarian elective subjects – one of:																	
b138	– Communications in Social Systems	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
	Bioglasses	VII	T	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
	Elastic Composites for Medical Application	VII	И	30	30	0	60	2.0	3.0	VIII	И	15	15	0	30	1.5	3.5	5
	Bioceramics	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
	Binding Materials for Medical Application	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
	Project – one of:																	
	– Design of Technologies	VII	защ	0	15	0	15	0.4	0.6	VIII	защ	0	8	0	8	0.3	0.7	1
	– Project on Phase-structure Analysis of Biomaterials	VII	защ	0	15	0	15	0.4	0.6	VIII	защ	0	8	0	8	0.3	0.7	1
	Total of the semester:						345								173			30
b200	Biomaterials and Biocompatibility	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
	Bioactive Polymer Composites	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
	Biomaterials for Pharmaceuticals Transport	VIII	И	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
	Elective subjects –one of:																	
	– Nanomaterials for Medical Application	VIII	T	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
	– Modelling and FEA	VIII	T	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5

	– Surface Treatment and Modification	VIII	T	30	30	0	60	2.0	3.0	IX	И	15	15	0	30	1.5	3.5	5
	Total of the semester:						240								120			20
	Practice in Industry		защ.				200				защ.				100			

Curriculum: DIGITAL TECHNOLOGIES IN METALLURGY

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Assessment	Course Loads				Credits of self-training	Semester	Assessment	Course Loads				Credits of self-training			
				Teaching Loads			Credits				Teaching Loads			Credits				
				Lectures	Laboratory work	Seminars					Total	Lectures	Laboratory work			Seminars	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b1001	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	8	0	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.2	4.8	II	И	21	0	24	45	2.4	5.6	8
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	2.8	4.2	II	И	18	20	0	38	2.1	4.9	7
b331	Physical Metallurgy	II	–	15	15	0	30	0.8	1.2	III	–	7	8	0	15	0.6	1.4	2
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b417	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4

b1000	Sports	II			60													
	Total of the semester:						330								166			30
b417	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	0.9	2.1	3
b313	Physical Chemistry	III	И	45	45	0	90	3.2	4.8	IV	И	21	24	0	45	2.4	5.6	8
b331	Physical Metallurgy	III	И	35	35	0	70	2.8	4.2	III	И	17	18	0	35	2.1	4.9	7
b344	Technical Mechanics	III	И	30	15	15	60	2	3	III	И	15	9	6	30	1.5	3.5	5
b396	Electrical Engineering and Electronics	III	T	30	30	0	60	2	3	IV	И	15	15	0	30	1.5	3.5	5
	<i>Electives – one of the languages:</i>																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						350								175			30
b029	Industrial Automation	IV	И	30	30	0	60	2	3	VI	И	15	15	0	30	1.5	3.5	5
b456	Metallurgical Thermal Engineering	IV	И	40	45	0	85	3.2	4.8	V	И	20	23	0	43	2.4	5.6	8
b361	Theory of Metallurgical Processes	IV	И	40	45	0	85	2.8	4.2	V	И	20	23	0	43	2.1	4.9	7
	3D Modelling	IV	И	25	45	0	70	2.8	4.2	IV	И	13	22	0	35	2.1	4.9	7
	<i>Electives – one of the languages:</i>																	
b148	– English	IV	–	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	–	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	–	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	–	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						330								166			30
b172	Machine Design (with project)	V	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b325	Industrial Safety	V	T	20	25	0	45	1.6	2.4	VI	И	9	14	0	23	1.2	2.8	4
b334	Heat Treatment of Metals and Alloys	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b196	Economics and Management	V	T	25	0	25	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
b469	Metal Casting	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b1000	Sports	V			30													
	Total of the semester:						335								168			30
b460	Metallurgy of Ferrous Metals	VI	И	45	45	0	90	3.2	4.8	VII	И	22	23	0	45	2.4	5.6	8
	Metal Forming - Physical Fundamentals and Technologies	VI	И	45	45	0	90	3.2	4.8	VII	И	22	23	0	45	2.4	5.6	8

b468	Metallurgy of Non-Ferrous Metals	VI	И	45	45	0	90	3.2	4.8	VII	И	22	23	0	45	2.4	5.6	8
b998	Best Available Technics in Metallurgy	VI	T	30	30	0	60	2.4	3.6	VII	И	15	15	0	30	1.8	4.2	6
b1000	Sports	VI			30													
	Total of the semester:						330								165			30
	Humanitarian elective subjects – one of:																	
b138	– Communications in Social Systems	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
	Data Processing with Python	VII	И	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	Furnaces in Metallurgy	VII	И	45	45	0	90	3.2	4.8	VIII	И	22	23	0	45	2.4	5.6	8
	Computer Methods in Engineering Sciences	VII	И	20	25	0	45	1.6	2.4	VIII	И	10	13	0	23	1.2	2.8	4
m097	Cloud Technologies	VII	И	20	20	0	40	1.6	2.4	VIII	И	10	10	0	20	1.2	2.8	4
	Simulation Modelling of Technological Processes in Metallurgy	VII	И	45	45	0	90	3.2	4.8	VIII	И	22	23	0	45	2.4	5.6	8
	Total of the semester:						335								168			30
b039	Control Information Technologies	VIII	И	20	25	0	45	1.6	2.4	IX	И	10	13	0	23	1.2	2.8	4
	Digital Technologies for Predictive Maintenance of Metallurgical Equipment	VIII	И	35	40	0	75	2.4	3.6	IX	И	18	20	0	38	1.8	4.2	6
	Elective subjects – one of:																	
	– Computer Architectures and Networks	VIII	И	20	25	0	45	1.2	1.8	IX	И	10	13	0	23	0.9	2.1	3
	– Data Base Control Systems	VIII	И	20	25	0	45	1.2	1.8	IX	И	10	13	0	23	0.9	2.1	3
	Electives - one of subjects with project																	
	– Design of Technologies in Metal Forming	VIII	И	45	30	15	90	2.8	4.2	IX	И	22	15	8	45	2.1	4.9	7
	– Design of Metallurgical Furnaces	VIII	И	45	30	15	90	2.8	4.2	IX	И	22	15	8	45	2.1	4.9	7
	– Digital Metallography	VIII	И	45	30	15	90	2.8	4.2	IX	И	22	15	8	45	2.1	4.9	7
	– Design and Modelling in Metal Casting	VIII	И	45	30	15	90	2.8	4.2	IX	И	22	15	8	45	2.1	4.9	7
	– Design of Technologies in Non-Ferrous Metallurgy	VIII	И	45	30	15	90	2.8	4.2	IX	И	22	15	8	45	2.1	4.9	7
	– Modelling of Technological Processes in Ferrous Metallurgy	VIII	И	45	30	15	90	2.8	4.2	IX	И	22	15	8	45	2.1	4.9	7
	Total of the semester:						255								129			20
b1022	Industrial Practice		защ.				200				защ.				100			

Curriculum: ENERGY AND ECOLOGICAL EFFICIENCY IN METALLURGY

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory work	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b1001	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	8	0	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sport	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.2	4.8	II	И	21	0	24	45	2.4	5.6	8
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	2.8	4.2	II	И	18	20	0	38	2.1	4.9	7
b331	Physical Metallurgy	II	–	15	15	0	30	0.8	1.2	III	–	7	8	0	15	0.6	1.4	2
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b417	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b1000	Sports	II			60													
	Total of the semester:						330								166			30
b417	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	0.9	2.1	3
b313	Physical Chemistry	III	И	45	45	0	90	3.2	4.8	IV	И	21	24	0	45	2.4	5.6	8
b331	Physical Metallurgy	III	И	35	35	0	70	2.8	4.2	III	И	17	18	0	35	2.1	4.9	7
b344	Technical Mechanics	III	И	30	15	15	60	2	3	III	И	15	9	6	30	1.5	3.5	5

b396	Electrical Engineering and Electronics	III	T	30	30	0	60	2	3	IV	И	15	15	0	30	1.5	3.5	5
	<i>Electives – one of languages</i>																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						350								175			30
b029	Industrial Automation	IV	И	30	30	0	60	2	3	VI	И	15	15	0	30	1.5	3.5	5
b089	Analytical Chemistry and Instrumental Methods	IV	И	35	40	0	75	2.8	4.2	IV	И	17	21	0	38	2.1	4.9	7
b456	Metallurgical Thermal Engineering	IV	И	40	45	0	85	3.2	4.8	V	И	20	23	0	43	2.4	5.6	8
b361	Theory of Metallurgical Processes	IV	И	40	45	0	85	2.8	4.2	V	И	20	23	0	43	2.1	4.9	7
	<i>Electives – one of the languages:</i>																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						335								169			30
b172	Machine Design (with project)	V	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b196	Economics and Management	V	T	25	0	25	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
b325	Industrial Safety	V	T	20	25	0	45	1.6	2.4	VI	И	9	14	0	23	1.2	2.8	4
b334	Heat Treatment of Metals and Alloys	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b469	Metal Casting	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b1000	Sports	V			30													
	Total of the semester:						335								168			30
b460	Metallurgy of Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b300	Metal Forming	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b468	Metallurgy of Non-Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b998	Ecology and Metallurgy	VI	T	25	25	0	50	2.4	3.6	VII	И	12	13	0	25	1.8	4.2	6
b1000	Sports	VI			30													
	Total of the semester:						305								154			30
	<i>Humanitarian elective subjects – one of:</i>																	
b138	– Communications in Social Systems	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3

b139	– Organization Development and Staff Training	VII	Т	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b393	Heat Engineering of Furnaces	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
b392	Electrical Furnaces	VII	И	30	30	0	60	2.4	3.6	VIII	И	15	15	0	30	1.8	4.2	6
b394	Furnace Elements and Equipment	VII	–	20	20	0	40	1.2	1.8	VIII	–	10	10	0	20	0.9	2.1	3
b974	Furnaces and Equipment in Metallurgy	VII	–	25	25	0	50	1.6	2.4	VIII	–	12	13	0	25	1.2	2.8	4
b610	Heat-Power Engineering of Metallurgical Plants	VII	И	32	33	0	65	2.4	3.6	VIII	И	16	17	0	33	1.8	4.2	6
b1040	Project on Metallurgical Equipment I	VII	защ.	0	15	0	15	0.4	0.6	VIII	защ.	0	8	0	8	0.3	0.7	1
	Total of the semester:						340								171			30
b394	Furnace Elements and Equipment	VIII	И	37	38	0	75	2.4	3.6	IX	И	18	20	0	38	1.8	4.2	6
b982	Design of Metallurgical Equipment	VIII	И	37	38	0	75	2.4	3.6	IX	И	18	20	0	38	1.8	4.2	6
b974	Furnaces and Equipment in Metallurgy	VIII	И	45	45	0	90	2.8	4.2	IX	И	22	23	0	45	2.1	4.9	7
b1043	Project on Metallurgical Equipment II	VIII	защ.	0	15	0	15	0.4	0.6	IX	И	0	8	0	8	0.3	0.7	1
	Total of the semester:						255								129			20
b1022	Practice in Industry		защ.				200				защ.				100			

[illegible]

b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.2	4.8	II	И	21	0	24	45	2.4	5.6	8
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	2.8	4.2	II	И	18	20	0	38	2.1	4.9	7
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b417	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b252	Transport Phenomena	II	–	15	15	0	30	0.8	1.2	III	–	7	8	0	15	0.6	1.4	2
b1000	Sports	II			60													
	Total of the semester:						330								166			30
b344	Technical Mechanics	III	И	30	15	15	60	2.0	3.0	III	И	15	9	6	30	1.5	3.5	5
b313	Physical Chemistry	III	И	45	45	0	90	3.2	4.8	IV	И	21	24	0	45	2.4	5.6	8
b252	Transport Phenomena	III	И	35	35	0	70	2.8	4.2	III	И	17	18	0	35	2.1	4.9	7
b396	Electrical Engineering and Electronics	III	И	30	30	0	60	2.0	3.0	IV	И	15	15	0	30	1.5	4.5	5
b417	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	1.5	3.5	3
	Electives – one of the languages:																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						350								175			30
b089	Analytical Chemistry and Instrumental Methods	IV	И	35	40	0	75	2.8	4.2	IV	И	17	21	0	38	1.2	3.8	7
b238	Organic Chemistry	IV	И	45	45	0	90	3.6	5.4	VI	И	21	24	0	45	1.5	4.5	9
b085	Crystallography	IV	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b029	Industrial Automation	IV	И	30	30	0	60	2	3	VI	И	15	15	0	30	1.5	3.5	5
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.5	1.5	3

b1000	Sports	IV			30													
	Total of the semester:						315								158			30
	<i>Humanitarian elective subjects – one of:</i>																	
b138	– Communications in Social Systems	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	V	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b325	Industrial Safety	V	T	20	25	0	45	1.6	2.4	VI	И	9	14	0	23	1.2	2.8	4
b196	Economics and Management	V	И	25	0	25	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
b227	Materials Science	V	И	45	45	0	90	3.6	5.4	V	И	22	23	0	45	2.7	6.3	9
b172	Machine Design (with project)	V	T	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.5	3.5	6
b731	Corrosion Resistance of Materials	V	T	20	25	0	45	1.6	2.4	VI	И	10	13	0	23	1.2	2.8	4
b1000	Sports	V			30													
	Total of the semester:						320								161			30
b102	Structure Analysis	VI	И	30	30	0	60	2.4	3.6	VI	И	15	15	0	30	1.8	4.2	6
	<i>SUBJECTS OF OPTIONAL MODULES</i>																	
	METALLIC MATERIALS	VI					280			VII					140			24
	SILICATE MATERIALS	VI					280			VII					140			24
	SEMICONDUCTOR MATERIALS AND TECHNOLOGIES	VI					280			VII					140			24
	POLYMER MATERIALS	VI					280			VII					140			24
	Total of the semester:						340								170			30
	<i>SUBJECTS OF OPTIONAL MODULES</i>																	
	METALLIC MATERIALS	VII					335			VIII					170			30
	SILICATE MATERIALS	VII					335			VIII					170			30
	SEMICONDUCTOR MATERIALS AND TECHNOLOGIES	VII					335			VIII					170			30
	POLYMER MATERIALS	VII					335			VIII					170			30
	Total of the semester:						335								170			30
	<i>SUBJECTS OF OPTIONAL MODULES</i>																	
	METALLIC MATERIALS	VIII					255			IX					129			20
	SILICATE MATERIALS	VIII					255			IX					129			20
	SEMICONDUCTOR MATERIALS AND	VIII					255			IX					129			20

	TECHNOLOGIES																	
	POLYMER MATERIALS	VIII					255				IX					129		20
	Total of the semester:						255				IX					129		20
b1022	Practice in Industry		защ.				200					защ.				100		
	BSc Thesis – 8 weeks	VIII	ДЗ								IX	ДЗ						10
	Total for the entire period of education:						2560									1287		240

**OPTIONAL MODUL
METALLIC MATERIALS**

b886	Silicate Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
b653	Polymer materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
b887	Semiconductor Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
b639	Metallic Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
	Total of the semester:						280								140			24
b495	Powder Metallurgy Materials and Products	VII	И	35	40	0	75	2.8	4.2	VIII	И	18	20	0	38	2.1	4.9	7
b381	Cast Alloys	VII	И	35	35	0	70	2.4	3.6	VIII	И	15	20	0	35	1.8	4.2	6
	Subjects of option - Technology of Extractive Metallurgy																	
b358	Fundamentals of Metallurgical Processes	VII	Т	25	30	0	55	2	3	VIII	И	13	15	0	28	1.5	3.5	5
b516	Ferrous Metals	VII	И	25	30	0	55	2	3	VIII	И	13	15	0	28	1.5	3.5	5
	Non-Ferrous Metals	VII	И	25	30	0	55	2	3	VIII	И	13	15	0	28	1.5	3.5	5
b517	Project	VII	защ.	0	25	0	25	0.8	1.2	VIII	защ.	0	13	0	13	0.6	1.4	2
	Total of the semester:						335								170			30
b141	Quality Control (with project)	VIII	защ.	15	20	0	35	0.8	1.2	IX	защ.	8	10	0	18	0.6	1.4	2
b759	Synthesis and Application of Alloys and Composites	VIII	И	25	25	0	50	1.6	2.4	IX	И	12	13	0	25	1.2	2.8	4
b135	High-temperature Equipment	VIII	Т	15	20	0	35	1.2	1.8	IX	И	8	10	0	18	0.9	2.1	3
	Subjects of option - Metal Processing																	
b332	Physics of Metals and Phase Transformations	VIII	Т	17	18	0	35	1.2	1.8	IX	И	9	9	0	18	0.9	2.1	3

b362	Metal Forming	VIII	И	25	25	0	50	1.6	2.4	IX	И	12	13	0	25	1.2	2.8	4
b366	HeatTreatment	VIII	И	25	25	0	50	1.6	2.4	IX	И	12	13	0	25	1.2	2.8	4
	Total of the semester:						255								129			20
	OPTIONAL MODUL SILICATE MATERIALS																	
b886	Low-temperature Synthesis Methods	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
b653	Polymer Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
b887	Semiconductor Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
b639	Metallic Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6
	Total of the semester:						280								140			24
b026	Thermal Equipment for Silicate Materials Production	VII	И	30	35	0	65	2.4	3.6	VIII	И	15	18	0	33	1.8	4.2	6
b446	Mineral Raw Materials for Silicate Materials Synthesis	VII	И	20	25	0	45	2	3	VIII	И	9	14	0	23	1.5	3.5	5
b447	Phase Equilibrium in Silicate Systems	VII	И	35	40	0	75	2.8	4.2	VIII	И	18	20	0	38	2.1	4.9	7
b677	Solid Phase Reactions	VII	T	30	30	0	60	2	3	VIII	И	15	15	0	30	1.5	3.5	5
b136	Optical Microscopy	VII	T	20	20	0	40	1.2	1.8	VIII	И	10	10	0	20	0.9	2.1	3
	Elective subjects –two of:																	
	– Project on Phase-structure Characteristics of Silicate Materials	VII	защ.	0	25	0	25	0.8	1.2	VIII	защ.	0	13	0	13	0.6	1.4	2
	– Project on Phase Diagrammes Study of Silicate Systems	VII	защ.	0	25	0	25	0.8	1.2	VIII	защ.	0	13	0	13	0.6	1.4	2
	– Project on Silicate Materials	VII	защ.	0	25	0	25	0.8	1.2	VIII	защ.	0	13	0	13	0.6	1.4	2
	– Design of Thermal Equipment for Silicate Materials Production	VII	защ.	0	25	0	25	0.8	1.2	VIII	защ.	0	13	0	13	0.6	1.4	2
	– Design of Enterprises in Silicate Industry	VII	защ.	0	25	0	25	0.8	1.2	VIII	защ.	0	13	0	13	0.6	1.4	2
	Total of the semester:						335								170			30
b134	Ceramic Materials	VIII	И	40	45	0	85	2.8	4.2	IX	И	20	22	0	43	2.1	4.9	7
b100	Composite Materials	VIII	И	40	45	0	85	2.8	4.2	IX	И	20	22	0	43	2.1	4.9	7
b137	Glass Materials	VIII	И	40	45	0	85	2.4	3.6	IX	И	20	22	0	43	1.8	4.2	6
	Total of the semester:						255								129			20
	OPTIONAL MODULE																	

	SEMICONDUCTOR MATERIALS AND TECHNOLOGIES																		
b886	Silicate Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
b653	Polymer Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
b329	Materials Science in Electronics	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
b639	Metallic Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
	Total of the semester:						280								140			24	
b031	Chemistry and Physical Chemistry of Semiconductor Materials	VII	И	30	30	0	60	2	3	VIII	И	15	16	0	31	1.5	3.5	5	
b760	Deep Purification of Substances	VII	И	30	30	0	60	2	3	VIII	И	15	15	0	30	1.5	3.5	5	
b317	Technology of Semiconductor Devices and Circuits	VII	–	25	30	0	55	2	3	VIII	–	13	15	0	28	1.5	3.5	5	
b318	Materials and Technologies of Passive Electronic Elements	VII	–	20	20	0	40	1.6	2.4	VIII	–	10	10	0	20	1.2	2.8	4	
b411	Semiconductors Physics	VII	И	20	20	0	40	1.6	2.4	VIII	И	10	10	0	20	1.2	2.8	4	
b645	Solid State Chemistry	VII	И	30	30	0	60	2	3	VIII	И	15	16	0	31	1.5	3.5	5	
	Elective subjects –one of:																		
	– Project on Resistors	VII	защ.	0	20	0	20	0.8	1.2	VIII	защ.	0	10	0	10	0.6	1.4	2	
	– Project on Magnet Materials	VII	защ.	0	20	0	20	0.8	1.2	VIII	защ.	0	10	0	10	0.6	1.4	2	
	– Project on Condensors	VII	защ.	0	20	0	20	0.8	1.2	VIII	защ.	0	10	0	10	0.6	1.4	2	
	Total of the semester:						335								170			30	
b317	Technology of Semiconductor Devices and Circuits	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6	
b318	Materials and Technologies of Passive Electronic Elements	VIII	И	30	30	0	60	2	3	IX	И	15	15	0	30	1.5	3.5	5	
b319	Technology of the Semiconductor Materials	VIII	И	30	30	0	60	2	3	IX	И	15	15	0	30	1.5	3.5	5	
	Project on Technology of Semiconductor Devices and Circuits	VIII	защ.	0	30	0	30	0.8	1.2	IX	защ.	0	15	0	15	0.6	1.4	2	
	Project on Plates and Hybrid Circuits	VIII	защ.	0	25	0	25	0.8	1.2	IX	защ.	0	14	0	14	0.6	1.4	2	
	Total of the semester:						255								129			20	

	OPTIONAL MODUL POLYMER MATERIALS																		
b886	Silicate Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
b653	Chemistry and Physics of Polymers	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
b887	Semiconductor Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
b639	Metallic Materials	VI	И	35	35	0	70	2.4	3.6	VII	И	15	20	0	35	1.8	4.2	6	
	Total of the semester:						280								140			24	
b981	Elastic Cross-linked Polymers	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	21	0	41	2.1	4.9	7	
b364	Natural Polymers from Plant Origin	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	21	0	41	2.1	4.9	7	
b405	Polymer Processing	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7	
b1202	Polymer Composites	VII	И	40	40	0	80	3.2	4.8	VIII	И	20	20	0	40	2.4	5.6	8	
	Elective subjects –one of:															0	0		
	– Project on Natural Polymer Materials	VII	защ.	0	0	15	15	0.4	0.6	VIII	защ	0	0	8	8	0.3	0.7	1	
	– Project on Polymer Engineering	VII	защ.	0	0	15	15	0.4	0.6	VIII	защ	0	0	8	8	0.3	0.7	1	
	Total of the semester:						335								170			30	
b972	Oriented Polymers	VIII	И	25	25	0	50	1.6	2.4	IX	И	12	13	0	25	1.2	2.8	4	
b582	Film-Forming Polymers	VIII	И	35	35	0	70	2	3	IX	И	15	20	0	35	1.5	3.5	5	
b174	Natural Polymers from Animal Origin	VIII	И	25	25	0	50	1.6	2.4	IX	И	12	13	0	25	1.2	2.8	4	
b129	Analysis and Testing of Polymers	VIII	И	35	35	0	70	2	3	IX	И	15	20	0	35	1.5	3.5	5	
	Elective subjects – one of:																		
	– Project on Natural Polymer Materials	VIII	защ.	0	0	15	15	0.8	1.2	IX	–	0	0	9	9	0.6	1.4	2	
	– Project on Polymer Engineering	VIII	защ.	0	0	15	15	0.8	1.2	IX	–	0	0	9	9	0.6	1.4	2	
	Total of the semester:						255								129			20	

Curriculum: METALLURGY

Subject code	SUBJECTS	FULL-TIME STUDIES					PART-TIME STUDIES					Total
		Seme	Course Loads			Credit	Seme	Course Loads			Credit	
			As	Teaching Loads	Cr			As	Teaching Loads	Cr		

			essment	Lectures	Laboratory work	Seminars	Total	redits	hours of self-training		essment	Lectures	Laboratory work	Seminars	Total	redits	hours of self-training	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b1001	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	8	0	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.2	4.8	II	И	21	0	24	45	2.4	5.6	8
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	2.8	4.2	II	И	18	20	0	38	2.1	4.9	7
b331	Physical Metallurgy	II	–	15	15	0	30	0.8	1.2	III	–	7	8	0	15	0.6	1.4	2
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b417	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b1000	Sports	II			60													
	Total of the semester:						330								166			30
b417	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	0.9	2.1	3
b313	Physical Chemistry	III	И	45	45	0	90	3.2	4.8	IV	И	21	24	0	45	2.4	5.6	8
b331	Physical Metallurgy	III	И	35	35	0	70	2.8	4.2	III	И	17	18	0	35	2.1	4.9	7
b344	Technical Mechanics	III	И	30	15	15	60	2	3	III	И	15	9	6	30	1.5	3.5	5
b396	Electrical Engineering and Electronics	III	T	30	30	0	60	2	3	IV	И	15	15	0	30	1.5	3.5	5
	Electives – one of the languages:																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2

b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						350								175			30
b029	Industrial Automation	IV	И	30	30	0	60	2	3	VI	И	15	15	0	30	1.5	3.5	5
b089	Analytical Chemistry and Instrumental Methods	IV	И	35	40	0	75	2.8	4.2	IV	И	17	21	0	38	2.1	4.9	7
b456	Metallurgical Thermal Engineering	IV	И	40	45	0	85	3.2	4.8	V	И	20	23	0	43	2.4	5.6	8
b361	Theory of Metallurgical Processes	IV	И	40	45	0	85	2.8	4.2	V	И	20	23	0	43	2.1	4.9	7
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						335								169			30
b172	Machine Design (with project)	V	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b196	Economics and Management	V	T	25	0	25	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
b325	Industrial Safety	V	T	20	25	0	45	1.6	2.4	VI	И	9	14	0	23	1.2	2.8	4
b334	Heat Treatment of Metals and Alloys	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b469	Metal Casting	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b1000	Sports	V			30													
	Total of the semester:						335								168			30
b1000	Sports	VI			30													
	Subjects of optional modules																	
	MATALLURGY OF FERROUS METALS	VI					305			VII					154			30
	MATALLURGY OF NON-FERROUS METALS AND ALLOYS	VI					305			VII					154			30
	METAL FORMING AND HEAT TREATMENT	VI					305			VII					154			30
	METAL CASTING	VI					305			VII					154			30
	Total of the semester:						305								154			30
	Subjects of optional modules	VII								VIII								
	Humanitarian elective subjects – one of:																	
b138	– Communications in Social Systems	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
	MATALLURGY OF FERROUS METALS						310			VIII					156			27

	MATALLURGY OF NON-FERROUS METALS AND ALLOYS						310			VIII					156			27
	METAL FORMING AND HEAT TREATMENT						310			VIII					156			27
	METAL CASTING						310			VIII					156			27
	Total of the semester:						340								171			30
	Subjects of optional modules																	
	MATALLURGY OF FERROUS METALS	VIII					255			IX					129			20
	MATALLURGY OF NON-FERROUS METALS AND ALLOYS	VIII					255			IX					129			20
	METAL FORMING AND HEAT TREATMENT	VIII					255			IX					129			20
	METAL CASTING	VIII					255			IX					129			20
	Total of the semester:						255								129			20
b1022	Practice in Industry		защ.				200				защ.				100			
	BSc Thesis – 8 weeks	VIII	ДЗ							IX	ДЗ							10
	Total for the entire period of education:						2565								1290			240

**OPTIONAL MODUL
MATALLURGY OF FERROUS METALS**

b944	Alternative Ferrous Metallurgy	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b300	Metal Forming	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b468	Metallurgy of Non-Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b302	Metallurgy and Environment	VI	Т	25	25	0	50	2.4	3.6	VII	И	12	13	0	25	1.8	4.2	6
	Total of the semester:						305								154			30
b664	Metallurgical Furnaces and Equipment	VII	И	40	45	0	85	3.2	4.8	VIII	И	20	23	0	43	2.4	5.6	8
b464	Steelmaking	VII	И	45	45	0	90	3.2	4.8	VIII	И	22	23	0	45	2.4	5.6	8
	Ferrous Alloys Metallurgy	VII	И	45	45	0	90	3.2	4.8	VIII	И	22	23	0	45	2.4	5.6	8
b903	Project	VII	защ.	0	45	0	45	1.2	1.8	VIII	защ.	0	23	0	23	0.9	2.1	3
	Total of the semester:						310								156			27
b481	Ladle Metallurgy and Continuous Casting	VIII	И	45	45	0	90	2.8	4.2	IX	И	22	24	0	46	2.1	4.9	7
b518	Design of Metallurgical Foundries and Enterprises	VIII	И	42	43	0	85	2.8	4.2	IX	И	21	22	0	43	2.1	4.9	7
b383	Powder Metallurgy	VIII	И	40	40	0	80	2.4	3.6	IX	И	20	20	0	40	1.8	4.2	6
	Total of the semester:						255								129			20

**OPTIONAL MODUL
MATALLURGY OF NON-FERROUS METALS**

AND ALLOYS

b460	Metallurgy of Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b300	Metal Forming	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b792	Fundamentals of Pyro- and Hydrometallurgical Processes	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b998	Ecology and Metallurgy	VI	Т	25	25	0	50	2.4	3.6	VII	И	12	13	0	25	1.8	4.2	6
Total of the semester:							305								154			30
b664	Metallurgical Furnaces and Equipment	VII	И	40	45	0	85	3.6	5.4	VIII	И	20	23	0	43	2.7	6.3	9
b893	Lead and Zinc Metallurgy	VII	И	45	45	0	90	3.6	5.4	VIII	И	22	23	0	45	2.7	6.3	9
b900	Copper and Rare Metals Metallurgy	VII	И	45	45	0	90	3.6	5.4	VIII	И	22	23	0	45	2.7	6.3	9
b1042	Project on Heavy Non-Ferrous Metals – I part	VII	защ.	0	45	0	45	1.2	1.8	VIII	защ.	0	23	0	23	0.9	2.1	3
Total of the semester:							310								156			30
	Engineering Calculations in Metallurgy	VIII	Т	5	25	0	30	0.8	1.2	IX	И	2	13	0	15	0.6	1.4	2
b546	Secondary Metallurgy of Non-Ferrous Metals	VIII	И	45	45	0	90	3.2	4.8	IX	И	22	23	0	45	2.4	5.6	8
	Metallurgy of Nobel Metals	VIII	И	30	30	0	60	2	3	IX	И	15	15	0	30	1.5	3.5	5
b982	Design of Metallurgical Equipment	VIII	И	30	30	0	60	1.6	2.4	IX	И	15	15	0	30	1.2	2.8	4
b1044	Project on Heavy Non-Ferrous Metals – II part	VIII	защ.	0	15	0	15	0.4	0.6	IX	защ.	0	9	0	9	0.3	0.7	1
Total of the semester:							255								129			20

OPTIONAL MODUL METAL FORMING AND HEAT TREATMENT

b460	Metallurgy of Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b498	Metal Forming and Fracture	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b468	Metallurgy of Non-Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b998	Ecology and Metallurgy	VI	Т	25	25	0	50	2.4	3.6	VII	И	12	13	0	25	1.8	4.2	6
Total of the semester:							305								154			30
b664	Metallurgical Furnaces and Equipment	VII	И	40	45	0	85	3.6	5.4	VIII	И	20	23	0	43	2.7	6.3	9
b76	Corrosion and Protection of Metals	VII	И	20	20	0	40	1.6	2.4	VIII	И	10	10	0	20	1.2	2.8	4
b493	Powder Metallurgy Materials and Composites	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
b750	Methods of Metal Structure Characterization and Properties	VII	И	45	45	0	90	3.6	5.4	VIII	И	22	23	0	45	2.7	6.3	9
b1041	Project on Metal Forming	VII	защ.	0	15	0	15	0.4	0.6	VIII	защ.	0	8	0	8	0.3	0.7	1
Total of the semester:							310								156			30
b496	Heat Treatment Technologies	VIII	И	45	45	0	90	2.8	4.2	IX	И	22	23	0	45	2.1	4.9	7

b499	Technologies of Metal Forming	VIII	И	45	45	0	90	2.8	4.2	IX	И	22	23	0	45	2.1	4.9	7
b173	Technology Design and Quality Management	VIII	И	30	30	0	60	2	3	IX	И	15	15	0	30	1.5	3.5	5
b1045	Project on Heat Treatment of Metals	VIII	защ.	0	15	0	15	0.4	0.6	IX	защ.	0	9	0	9	0.3	0.7	1
Total of the semester:							255								129			20
OPTIONAL MODUL METAL CASTING																		
b460	Metallurgy of Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b300	Metal Forming	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b468	Metallurgy of Non-Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
	Metal Casting and Environment	VI	Т	25	25	0	50	2.4	3.6	VII	И	12	13	0	25	1.8	4.2	6
Total of the semester:							305								154			30
b664	Metallurgical Furnaces and Equipment	VII	И	40	45	0	85	3.6	5.4	VIII	И	20	23	0	43	2.7	6.3	9
b604	Technology of Molding Process	VII	И	40	40	0	80	3.2	4.8	VIII	И	20	20	0	40	2.4	5.6	8
b938	Casting Alloys Technology	VII	И	40	45	0	85	3.2	4.8	VIII	И	20	23	0	43	2.4	5.6	8
b917	Inoculating Production	VII	И	30	30	0	60	2	3	VIII	И	15	15	0	30	1.5	3.5	5
Total of the semester:							310								156			30
b383	Powder Technology	VIII	И	40	45	0	85	2.8	4.2	IX	И	20	23	0	43	2.1	4.9	7
b606	Special Casting Methods	VIII	И	45	45	0	90	2.8	4.2	IX	И	22	23	0	45	2.1	4.9	7
b607	Foundry Plants and Equipment Design	VIII	И	30	35	0	65	2.0	3.0	IX	И	15	18	0	33	1.5	3.5	5
	Project	VIII	защ.	0	15	0	15	0.4	0.6	IX	защ.	0	8	0	8	0.3	0.7	1
Total of the semester:							255								129			20

Curriculum: RECYCLING OF METALS

Subject code	SUBJECTS	FULL-TIME STUDIES								PART-TIME STUDIES								Total credits
		Semester	Course Loads						Credits of self-training	Semester	Course Loads						Credits of self-training	
			Assessment	Teaching Loads				Credits			Assessment	Teaching Loads				Credits		
				Lectures	Laboratory work	Seminars	Total					Lectures	Laboratory work	Seminars	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

b052	Mathematics – I part	I	И	45	0	45	90	3.6	5.4	I	И	21	0	24	45	2.7	6.3	9
b1001	Fundamentals of Design and CAD	I	T	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b111	Inorganic Chemistry – I part	I	И	27	9	24	60	2.4	3.6	I	И	12	6	12	30	1.8	4.2	6
b676	Informatics – I part	I	И	30	30	0	60	2.4	3.6	I	И	15	15	0	30	1.8	4.2	6
	Introduction to the Specialty	I	T	15	0	15	30	0.8	1.2	I	И	7	8	0	15	0.6	1.4	2
	Humanitarian elective subjects – one of:																	
b056	– Ecology and Technical Civilization	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b066	– Engineering Psychology and Ergonomics	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b177	– Career Development and Entrepreneurship	I	T	30	0	0	30	1.2	1.8	I	И	15	0	0	15	0.9	2.1	3
b1000	Sports	I			60													
	Total of the semester:						315								158			30
b053	Mathematics – II part	II	И	45	0	45	90	3.2	4.8	II	И	21	0	24	45	2.4	5.6	8
b114	Inorganic Chemistry – II part	II	И	36	39	0	75	2.8	4.2	II	И	18	20	0	38	2.1	4.9	7
b331	Physical Metallurgy	II	–	15	15	0	30	0.8	1.2	III	–	7	8	0	15	0.6	1.4	2
b344	Technical Mechanics	II	–	15	0	15	30	1.2	1.8	II	–	7	0	8	15	0.9	2.1	3
b417	Physics	II	И	30	30	0	60	2.4	3.6	III	И	15	15	0	30	1.8	4.2	6
b824	Informatics – II part	II	И	15	30	0	45	1.6	2.4	II	И	9	14	0	23	1.2	2.8	4
b1000	Sports	II			60													
	Total of the semester:						330								166			30
b417	Solid State Physics	III	И	20	20	0	40	1.2	1.8	IV	И	9	11	0	20	0.9	2.1	3
b313	Physical Chemistry	III	И	45	45	0	90	3.2	4.8	IV	И	21	24	0	45	2.4	5.6	8
b331	Physical Metallurgy	III	И	35	35	0	70	2.8	4.2	III	И	17	18	0	35	2.1	4.9	7
b344	Technical Mechanics	III	И	30	15	15	60	2	3	III	И	15	9	6	30	1.5	3.5	5
b396	Electrical Engineering and Electronics	III	T	30	30	0	60	2	3	IV	И	15	15	0	30	1.5	3.5	5
	Electives – one of the languages:																	
b148	– English	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b153	– Russian	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b155	– French	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b168	– German	III	–	0	30	0	30	0.8	1.2	IV	–	0	15	0	15	0.6	1.4	2
b1000	Sports	III			30													
	Total of the semester:						350								175			30
b029	Industrial Automation	IV	И	30	30	0	60	2	3	VI	И	15	15	0	30	1.5	3.5	5
b089	Analytical Chemistry and Instrumental Methods	IV	И	35	40	0	75	2.8	4.2	IV	И	17	21	0	38	2.1	4.9	7
b456	Metallurgical Thermal Engineering	IV	И	40	45	0	85	3.2	4.8	V	И	20	23	0	43	2.4	5.6	8

b361	Theory of Metallurgical Processes	IV	И	40	45	0	85	2.8	4.2	V	И	20	23	0	43	2.1	4.9	7
	Electives – one of the languages:																	
b148	– English	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b153	– Russian	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b155	– French	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b168	– German	IV	T	0	30	0	30	1.2	1.8	V	И	0	15	0	15	0.9	2.1	3
b1000	Sports	IV			30													
	Total of the semester:						335								169			30
b172	Machine Design (with project)	V	И	30	30	0	60	2.4	3.6	V	И	15	15	0	30	1.8	4.2	6
b196	Economics and Management	V	T	25	0	25	50	1.6	2.4	III	И	12	0	13	25	1.2	2.8	4
b325	Industrial Safety	V	T	20	25	0	45	1.6	2.4	VI	И	9	14	0	23	1.2	2.8	4
b334	Heat Treatment of Metals and Alloys	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b469	Metal Casting	V	И	45	45	0	90	3.2	4.8	VI	И	22	23	0	45	2.4	5.6	8
b1000	Sports	V			30													
	Total of the semester:						335								168			30
b460	Metallurgy of Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b300	Metal Forming	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b468	Metallurgy of Non-Ferrous Metals	VI	И	40	45	0	85	3.2	4.8	VII	И	20	23	0	43	2.4	5.6	8
b998	Ecology and Metallurgy	VI	T	25	25	0	50	2.4	3.6	VII	И	12	13	0	25	1.8	4.2	6
b1000	Sports	VI			30													
	Total of the semester:						305								154			30
	Humanitarian elective subjects – one of:																	
b138	– Communications in Social Systems	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b139	– Organization Development and Staff Training	VII	T	30	0	0	30	1.2	1.8	V	И	15	0	0	15	0.9	2.1	3
b664	Furnaces and Equipment for Recycling and Treatment of Metal Materials	VII	И	35	40	0	75	2.4	3.6	VIII	И	18	20	0	38	1.8	4.2	6
	Recycling of Ferrous Metal Secondary Raw Materials	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
	Recycling of Non-Ferrous Metal Secondary Raw Materials	VII	И	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
	Methods for Metals Characterization	VII	T	40	40	0	80	2.8	4.2	VIII	И	20	20	0	40	2.1	4.9	7
	Total of the semester:						345								173			30
	Recycling of Light Non-Ferrous and Noble Metal Secondary Raw Materials	VIII	И	35	40	0	75	2.4	3.6	IX	И	18	20	0	38	1.8	4.2	6

	Recycling of Electronic Scrap	VIII	И	30	30	0	60	2	3		IX	И	15	15	0	30	1.5	3.5	5
	Design of Equipment for Secondary Metallurgy	VIII	И	35	40	0	75	2.8	4.2		IX	И	18	20	0	38	2.1	4.9	7
	Project	VIII	защ.	0	35	0	35	0.8	1.2		IX	защ.	0	18	0	18	0.6	1.4	2
	Total of the semester:						245									124			20