

The Syllabus is approved by the Methodological
Council of the University

Record no. 5 dated 15.02.2024

SYLLABUS

for the Bachelor's degree programme

13.03.02

13.03.02 Power and Electrical Engineering

Course: Power Systems and Networks

Department: Power and Electrical Engineering

Faculty: Industrial Technologies, Power Engineering and Transport

Qualification: Bachelor

Mode of training: full-time

Period of training: 4 years

+	Main	Task Type of Professional Activity
+	+	Project
+	+	Operation

1st year of training (according to the Syllabus) 2024

Educational standard (FSSES) No. 144 dated 28.02.2018

Agreed with

Vice-Rector for Academic Affairs

Head of the Academic and Methodological Office

Director of the Polytechnic Institute

Dean

Head of the Department

Chairperson of the Methodological Council

APPROVED BY

Rector

Guliyakov A.D.

"16" 02 2024



/ Mekhanov V.B./

/ Soloviev V.A./

/ Kozlov G.V./

/ Kireev S.Yu./

/ Ashanin V. N./

/ Mekhanov V.B./

		Form of Assessment					ECTS	Total academic hours									Year 1		Year 2		Year 3		Year 4	
																	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Sem. 5	Sem. 6	Sem. 7	Sem. 8
Code	Name	Exam	Pass/fail exam	Grade d pass/fail exam	Team project	Review work	in fact	According to syllabus	Contact work	In-class work	Lec	Lab	Prac	Other cont work	Individual work	Assessment	ECTS	ECTS	ECTS	ECTS	ECTS	ECTS	ECTS	ECTS
B1. Discipline (module)							213	7668	3359.7	3177	1350	979	848	182.7	3408.3	900	29	28	29	28	29	28	29	13
Basic part							119	4284	1900.4	1800	768	578	454	100.4	1915.6	468	23	28	24	28	12			4
B1.O.01	History of Russia		1	2			4	144	119.5	119	68		51	0.5	24.5		2	2						
B1.O.02	Philosophy	4					4	144	54	51	17		34	3	54	36				4				
B1.O.03	Foreign Language	3	12				7	252	103.8	102		102		1.8	112.2	36	2	2	3					
B1.O.04	Life Safety		8				2	72	47.95	45	27		18	2.95	24.05									2
B1.O.05	Physical Education and Sport		1				2	72	34.25	34		34		0.25	37.75		2							
B1.O.06	Modern Information Technologies		1				2	72	35.95	34	17	17		1.95	36.05		2							
B1.O.07	Law		5				2	72	17.25	17			17	0.25	54.75						2			
B1.O.08	Higher Mathematics	12					12	432	182.8	170	102		68	12.8	177.2	72	5	7						
B1.O.09	Theory of Probability and Mathematical Statistics		3				2	72	35.95	34	17		17	1.95	36.05				2					
B1.O.10	Physics	12					13	468	199.8	187	102	51	34	12.8	196.2	72	5	8						
B1.O.11	Engineering and Computer Graphics	1					3	108	37	34	17	17		3	35	36	3							
B1.O.12	Information Retrieval Technology			4			4	144	69.95	68	17	17	34	1.95	74.05					4				
B1.O.13	Theoretical Basics of Electrical Engineering	34	3			4	15	540	233.85	221	85	68	68	12.85	234.15	72			7	8				
B1.O.14	Chemistry		2				2	72	35.95	34	17	17		1.95	36.05			2						
B1.O.15	Electrical Machines	4			4		6	216	92.2	85	34	34	17	7.2	87.8	36				6				
B1.O.16	Electrical and Non-Electrical Measurements		2				2	72	35.95	34	17	17		1.95	36.05			2						
B1.O.17	Electrical and Structural Materials Science		2				2	72	35.95	34	17	17		1.95	36.05			2						
B1.O.18	Mechanics	3					6	216	72.7	68	34	17	17	4.7	107.3	36			6					
B1.O.19	Computer Technologies in Electrical Power Engineering	2		3		3	6	216	91.45	85	34	51		6.45	88.55	36		3	3					
B1.O.20	Technical Design		3				3	108	52.95	51	17	34		1.95	55.05				3					
B1.O.21	Metrology, Standardization, Certification		8				2	72	19.15	18	9		9	1.15	52.85									2
B1.O.22	Electronics			4			6	216	88.65	85	34	34	17	3.65	127.35					6				
B1.O.23	Electromechanics			5		5	5	180	73.15	68	34	17	17	5.15	106.85						5			
B1.O.24	Mathematical Problems in Electrical Power Engineering	5				5	5	180	74.2	68	34	34		6.2	69.8	36					5			
B1.O.25	Principles of Russian Statehood			1			2	72	56.05	54	18		36	2.05	15.95		2							
Elective part							94	3384	1459.3	1377	582	401	394	82.3	1492.7	432	6		5		17	28	29	9

Б1.В.01	Russian Language and Business Communication		1			2	72	17.25	17			17	0.25	54.75		2							
Б1.В.02	Economics		5			2	72	35.95	34	17		17	1.95	36.05					2				
Б1.В.03	Basics of Project Work		8			2	72	38.05	36	18		18	2.05	33.95								2	
Б1.В.04	General and Social Psychology		8			2	72	38.05	36	18		18	2.05	33.95								2	
Б1.В.05	Reliability of Electrical Power Systems			8		3	108	47.05	45	18	9	18	2.05	60.95									3
Б1.В.06	Electrical Power Systems and Networks	56			6		10	360	147.9	136	68	51	17	11.9	140.1	72				4	6		
Б1.В.07	Electric Power Stations and Substations	5					5	180	72.7	68	34	17	17	4.7	71.3	36				5			
Б1.В.08	Electric Power Supply	6					5	180	89.7	85	34	17	34	4.7	54.3	36					5		
Б1.В.09	Optimisation Problems in the Electrical Power Engineering			7			4	144	71.65	68	34	34		3.65	72.35							4	
Б1.В.10	Electromechanical Transients in Electrical Power Systems	7				7	6	216	91.2	85	34	34	17	6.2	88.8	36						6	
Б1.В.11	Relay Protection and Automation of Electrical Power Systems	7					6	216	72.7	68	34	17	17	4.7	107.3	36						6	
Б1.В.12	Electrical Power Distribution and Transmission	5					3	108	37	34	17		17	3	35	36				3			
Б1.В.13	Modern Electrical Engineering and Electrical Power Engineering	1					4	144	37	34	17		17	3	71	36	4						
Б1.В.14	General Power Engineering	3					5	180	72.7	68	34	34		4.7	71.3	36			5				
Б1.В.15	High Voltage Technology			7			4	144	52.95	51	17	17	17	1.95	91.05							4	
Б1.В.16	Electromagnetic Transients in Electrical Power Systems	6					6	216	106.7	102	34	34	34	4.7	73.3	36					6		
Б1.В.17	Long-Distance Transmission of Ultra-High Voltage	7				7	5	180	89.5	85	17	34	34	4.5	54.5	36						5	
Б1.В.18	Dispatch Control			6			5	180	88.65	85	34	34	17	3.65	91.35						5		
Б1.В.ДВ.01	Elective disciplines (modules) 1 (ДВ.1)		8				2	72	38.05	36	18	18		2.05	33.95								2
Б1.В.ДВ.01.01	Electromagnetic Compatibility		8				2	72	38.05	36	18	18		2.05	33.95								2
Б1.В.ДВ.01.02	Electric Power Quality		8				2	72	38.05	36	18	18		2.05	33.95								2
Б1.В.ДВ.02	Elective disciplines (modules) 2 (ДВ.2)	7					4	144	54	51	17		34	3	54	36						4	
Б1.В.ДВ.02.01	Economics in Power Engineering	7					4	144	54	51	17		34	3	54	36						4	
Б1.В.ДВ.02.02	Economic Efficiency of Enterprise Electric Power Supply	7					4	144	54	51	17		34	3	54	36						4	
Б1.В.ДВ.03	Elective disciplines (modules) 3 (ДВ.3)		5				3	108	35.95	34	17	17		1.95	72.05					3			
Б1.В.ДВ.03.01	Elements of Electrical Power Systems		5				3	108	35.95	34	17	17		1.95	72.05					3			
Б1.В.ДВ.03.02	Modeling of Elements of Electrical Power Systems		5				3	108	35.95	34	17	17		1.95	72.05					3			
Б1.В.ДВ.04	Elective disciplines (modules) 4 (ДВ.4)			6			4	144	71.65	68	34	34		3.65	72.35						4		
Б1.В.ДВ.04.01	Operation of Electrical Networks			6			4	144	71.65	68	34	34		3.65	72.35						4		
Б1.В.ДВ.04.02	Installation and Adjustment of Electrical Systems			6			4	144	71.65	68	34	34		3.65	72.35						4		

Б1.Б.ДВ.05	Elective disciplines (modules) 5 (ДВ.5)		6				2	72	52.95	51	17		34	1.95	19.05							2		
Б1.Б.ДВ.05.01	Principles of Special Training		6				2	72	52.95	51	17		34	1.95	19.05							2		
Б1.Б.ДВ.05.02	First Aid		6				2	72	52.95	51	17		34	1.95	19.05							2		
Б 2.Practice							18	648	96					96	552			3		3		3		9
Basic part							18	648	96					96	552			3		3		3		9
Б2.О.01(У)	Academic (Introductory) Training			2			3	108	24					24	84			3						
Б2.О.02(У)	Academic Training (Training to Obtain Primary Skills in Working with Software)			4			3	108	24					24	84					3				
Б2.О.03(П)	On-the-Job Training (Project)			6			3	108	12					12	96							3		
Б2.О.04(П)	On-the-Job Training (Operation)			8			3	108	12					12	96									3
Б2.О.05(П)	On-the-Job Training (Pre-Graduation)			8			6	216	24					24	192									6
Б 3.State final certification							9	324	16					16	308									9
Basic part							9	324	16					16	308									9
Б3.О.01	Writing and Defending Graduation Thesis						9	324	16					16	308									9
ФТД. Optional course							4	144	71.9	68	34		34	3.9	72.1						2		2	
ФТД.01	Improvement of Sporting Excellence in Playing Sports		5				2	72	34.25	34			34	0.25	37.75						2			
ФТД.02	State Policy of Countering Terrorism and Extremism in the Russian Federation		7				2	72	37.65	34	34			3.65	34.35								2	
Э.																								
Basic part																								
Э.О.ДВ.01	Elective Disciplines in Physical Education and Sport																							
Э.О.ДВ.01.01	Artistic Gymnastics		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.02	Aerobic Dancing		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.03	Track-and-Field Athletics		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.04	Skiing		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.05	Swimming		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.06	General Physical Training		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.07	Basketball		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.08	Volleyball		234					328	238.75	238		238		0.75	89.25									
Э.О.ДВ.01.09	Football		234					328	238.75	238		238		0.75	89.25									
	Total ECTS/acad.hours (without electives)						240	8640	3471.7	3177	1350	979	848	294.7	4268.3	900	29	31	29	31	29	31	29	31
	Weekly workload in the study periods (acad.hour/week)																53	53	53	53	53	53	53	52
	Contact work (acad.hour/week)																28.6	26.4	25.4	25.4	24.7	28.6	25.5	25.4
	ECTS on courses (without electives)																60		60		60		60	