15.04.02

Discipline cluster I	**Disciplines (modules)**	**Credits**
1.B	**Basic (mandatory) part**	**48**
1.B.01	Professionally-oriented foreign language	4
1.B.02	Methodology of scientific research in mechanical engineering	4
1.B.03	Computer-aided simulation and design tools	2
1.B.04	Protection of intellectual property	3
1.B.05	Computer technologies in mechanical engineering	5
1.B.06	Project management	3
1.B.07	Modern engineering materials	2
1.B.08	Microprocessor-based control systems	3
1.B.09	Design of power hydraulic drives of process machinery and equipment	4
1.B.10	Additive technologies in manufacture of process machinery and equipment	2
1.B.11	Pneumatic drive	3
1.B.12	Maintenance and lubrication of process machinery and equipment	4
1.B.13	Technologies for restoring parts of process machines and equipment	3
1.B.14	Diagnostics and reliability of process machinery and equipment drives	3
1.B.14	Special chapters in fluid dynamics	3
1.V	**Variation part established by the educational process participants, including elective disciplines**	**33**

1.V.M1	**Profile (32958/32960): Automated hydraulic and pneumatic systems and units**	**33**
1.V.M1.01	Scientific workshop on hydraulic, vacuum and compressor technology	4
1.V.M1.02	Automated hydraulic and pneumatic systems	9
1.V.M1.03	High-precision servo drives	3
1.V.M1.04	Hydraulic and pneumatic mechatronic systems	4
	Elective disciplines (modules)	**13**
1.V.M1.05.01	Theory of control of hydraulic and pneumatic systems	6
1.V.M1.06.01	Automated design systems	3
1.V.M1.07.01	Multidimensional flows and unsteady effects in hydraulic and pneumatic systems	4
Discipline cluster II	**Internship**	**30**
2.B	**Basic (mandatory) part**	**30**
2.V	**Variation part established by the educational process participants**	**30**
2.V.M1.01	Field internship, scientific research	18
2.V.M1.02	Training internship (introductory practical training)	3
2.V.M1.03	Field internship, technology (project-based) internship	3
2.V.M1.04	Field internship, pre-diploma internship, including scientific research	6
Discipline cluster III	**Final state academic assessment**	**9**
3.M1	**Profile (32958/32960): Automated hydraulic and pneumatic systems and units**	**9**

3.M1.01	Master’s graduation thesis	9
ED	**Elective disciplines**	**8**
ED.01	Design and maintenance of bearing units of technological equipment	2
ED.02	Modern ways of diagnosing the condition of process equipment	2
ED.03	Problems of computational fluid dynamics	2
ED.04	Problems of computational gas dynamics	2