Bachelor Program: Bioengineering Systems and Technologies

Field of Studies: Bioengineering and medical devices and systems

Years of Studies: 4

Language of Training: Russian

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Subject** | **Semester** | **Hours** | **Credits** |
| B.1.1.1 | History | 1, 2 | 144 | 4 |
| B.1.1.2 | Philosophy | 5 | 108 | 3 |
| B.1.1.3 | Foreign language | 1, 2, 3 | 288 | 8 |
| B.1.1.4 | Rule of Law state and contemporaneity | 3 | 72 | 2 |
| B.1.1.5 | Psychology | 4 | 108 | 3 |
| B.1.1.6 | Economy and  project management basics | 3 | 108 | 3 |
| B.1.1.7 | Mathematics | 1, 2, 3 | 504 | 14 |
| B.1.1.8 | Physics | 1, 2, 3 | 504 | 14 |
| B.1.1.9 | Chemistry | 1 | 72 | 2 |
| B.1.1.10 | Ecology | 2 | 72 | 2 |
| B.1.1.11 | Informatics | 1 | 108 | 3 |
| B.1.1.12 | Information technology | 2 | 72 | 2 |
| B.1.1.13 | Engineering Graphics (drafting) | 2 | 108 | 3 |
| B.1.1.14 | Descriptive Geometry and Computer Graphics | 2 | 108 | 3 |
| B.1.1.15 | Materials Science | 3 | 72 | 2 |
| B.1.1.16 | Metrology, standardization and technical measurements | 3 | 108 | 3 |
| B.1.1.17 | Control in biotechnological systems | 7 | 108 | 3 |
| B.1.1.18 | Fundamentals of design and construction | 5 | 144 | 4 |
| B.1.1.19 | Safety of vital activity | 5 | 108 | 3 |
| B.1.1.20 | Methods of processing and analysis of biomedical signals and data | 6 | 108 | 3 |
| B.1.1.21 | Medical devices, apparatus, systems and complexes | 6 | 144 | 4 |
| B.1.1.22 | Theoretical Foundations of Electrical Engineering | 4, 5 | 288 | 8 |
| B.1.1.23 | Physical training and sports | 1 | 27 | 2 |
| B.1.2.1 | Philosophy of Science and Technology | 6 | 72 | 2 |
| B.1.2.2 | Applied mechanics | 4 | 108 | 3 |
| B.1.2.3 | Biotechnical systems for medical use | 7 | 108 | 3 |
| B.1.2.4 | Construction unit and elements of biotechnological systems | 7, 8 | 180 | 5 |
| B.1.2.5 | Technical methods for  diagnostic testing  and therapeutic modality | 8 | 180 | 5 |
| B.1.2.6 | System analysis | 6 | 72 | 2 |
| B.1.2.7 | Biophysical foundations of living systems | 5 | 108 | 3 |
| B.1.2.8 | Anthropobiology  and animal biology | 2 | 108 | 3 |
| B.1.2.9 | Biochemistry | 1 | 72 | 2 |
| B.1.2.10 | Automation of biomedical information processing | 6 | 108 | 3 |
| B.1.2.11 | Construction materials and biomaterials | 4 | 108 | 3 |
| B.1.2.12 | State-of-the-art medical technologies and technique | 4 | 108 | 3 |
| B.1.2.13 | Microprocessor technology | 5 | 108 | 3 |
| B.1.2.14 | Mathematical methods for planning experiments and processing their results | 7 | 108 | 3 |
| B.1.2.15 | Mathematical modeling of biological processes and systems | 5 | 144 | 4 |
| B.1.2.16 | Fundamentals of Technical Design | 6 | 108 | 3 |
| B.1.2.17 | Actual problems of biomedical engineering | 3 | 108 | 3 |
| B.1.2.18 | Means for  diagnostic information retrieval  and conducting  therapeutic modality | 7 | 108 | 3 |
| B.1.2.19 | Fundamentals of electric-, hydraulic- and pneumatic drive | 7 | 72 | 2 |
| B.1.2.20 | Modern software | 4 | 72 | 2 |
| B.1.2.21 | Theory of Biotechnological Systems | 6 | 108 | 3 |
| B.1.2.22 | Certification and organization of production of medical devices | 7 | 108 | 3 |
| B.1.2.23 | Fundamentals of the assembly method and regulation of medical devices and apparatus | 8 | 144 | 4 |
| B.1.2.24 | Coating technology for medicine | 8 | 144 | 4 |
| B.1.3.1.1 | History of Russian Culture | 1 | 72 | 2 |
| B.1.3.1.2 | History of Science and Technology | 1 | 72 | 2 |
| B.1.3.2.1 | The use of physical fields in medicine | 3 | 144 | 4 |
| B.1.3.2.2 | Study of the influence of environmental factors on biological processes | 3 | 144 | 4 |
| B.1.3.3.1 | State-of-the-art technologies computer technology in medicine | 3 | 108 | 3 |
| B.1.3.3.2 | Computer simulation of biomedical processes | 3 | 108 | 3 |
| B.1.3.4.1 | Rehabilitation equipment | 4 | 108 | 3 |
| B.1.3.4.2 | Design and production technology of medical instruments | 4 | 108 | 3 |
| B.1.3.5.1 | Physicochemical and biomedical properties of biocompatible materials | 8 | 108 | 3 |
| B.1.3.5.2 | Maintenance of medical equipment | 8 | 108 | 3 |
| B.1.3.6.1 | Fundamentals of Biomechanics | 4 | 144 | 4 |
| B.1.3.6.2 | Fundamentals of Ergonomics | 4 | 144 | 4 |
| B.1.3.7.1 | Functional design and modeling in the study of biocompatible materials | 5 | 144 | 4 |
| B.1.3.7.2 | The use of computer methods for calculating and designing elements of medical equipment | 5 | 144 | 4 |
| B.1.3.8.1 | Fundamentals of organizing research | 6 | 180 | 5 |
| B.1.3.8.2 | Planning an experiment in biomedical practice | 6 | 180 | 5 |
| B.1.3.9.1 | Nanomaterials and nanotechnologies in biology and medicine | 7 | 180 | 5 |
| B.1.3.9.2 | Environmental biotechnology | 7 | 180 | 5 |
| B.1.3.10.1 | Biomechanics and design of endo- and exoprostheses | 8 | 108 | 3 |
| B.1.3.10.2 | Diagnostic medical systems | 8 | 108 | 3 |
| B.1.3.11.1 | Team sports | 2-6 | 328 | - |
| B.1.3.11.2 | Improving physical education | 2-6 | 328 | - |
| B.2.1.1 | Educational (fact-finding) practical training | 2 | 216 | 6 |
| B.2.1.2 | Undergraduate practical training | 8 | 216 | 6 |
| B.2.2.1 | Educational (research) practical training | 4 | 216 | 6 |
| B.2.2.2 | Industrial (production and technological)  practical training | 4 | 216 | 6 |
| B.2.2.3 | Production (R&D) practical training | 8 | 108 | 3 |
| B.3 | State Final Examination | 8 | 216 | 6 |
| F.2 | Methods of visualization of measurements in medicine | 7 | 108 | 3 |
| F.3 | The use of medical equipment in clinical practice | 8 | 108 | 3 |
| F.4 | Systems for computer-aided design and construction of medical equipment | 8 | 108 | 3 |
|  | **Total** |  | **8968** | **240** |