Bachelor Program: Materials Science and Materials Technology

Field of Studies: Materials Science and Materials Technology

Years of Studies: 4

Language of Training: Russian

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| **No.** | **Subject** | **Semester** | **Hours** | **Credits** |
| B.1.1.1 | History | 1 | 108 | 3 |
| B.1.1.2 | Philosophy | 3 | 144 | 4 |
| B.1.1.3 | Foreign language | 1,2,3 | 288 | 8 |
| B.1.1.4 | Basics of economic theory | 3 | 144 | 4 |
| B.1.1.5 | Mathematics | 3 | 468 | 13 |
| B.1.1.6 | Physics | 2,3,4 | 468 | 13 |
| B.1.1.7 | Inorganic and organic chemistry | 1,2 | 288 | 8 |
| B.1.1.8 | Physical chemistry | 1,2 | 216 | 6 |
| B.1.1.9 | Ecology | 3 | 72 | 2 |
| B.1.1.10 | Engineering graphics (drafting) | 1 | 72 | 2 |
| B.1.1.11 | Descriptive geometry and computer graphics | 2 | 108 | 3 |
| B.1.1.12 | Information technology | 2 | 108 | 3 |
| B.1.1.13 | Mechanics of material and basics of design  | 5,6 | 252 | 7 |
| B.1.1.14 | Metrology, standardization, certification | 3 | 144 | 4 |
| B.1.1.15 | Electrical and electronics | 3,4 | 288 | 8 |
| B.1.1.16 | Safety of vital activity | 5 | 108 | 3 |
| B.1.1.17 | General materials science and materials technology | 3,4 | 360 | 10 |
| B.1.1.18 | Physical culture | 1 | 72 | 2 |
| B.1.2.1 | The rule of law: history and modernity | 2 | 108 | 3 |
| B.1.2.2 | Philosophy of science and technology | 6 | 72 | 2 |
| B.1.2.3 | The economy of the firm and industry markets  | 4 | 108 | 3 |
| B.1.2.4 | Physical and chemical fundamentals of materials science and materials technology | 5,6 | 288 | 8 |
| B.1.2.5 | Technical fundamentals of plasma processing of materials and products | 5,6 | 288 | 8 |
| B.1.2.6 | Physical and technical fundamentals of materials and products processing | 7,6 | 288 | 8 |
| B.1.2.7 | Physics of ion implantation of metals, semiconductors, dielectrics | 5,6 | 216 | 6 |
| B.1.2.8 | Dislocation physics of solids | 7 | 108 | 3 |
| B.1.2.9 | Fundamentals designing of technological equipment for processing materials and coating | 8 | 180 | 5 |
| B.1.2.10 | Promising materials and technologies | 7 | 144 | 4 |
| B.1.2.11 | Equipment, mechanization and automation in materials technology | 7,8 | 324 | 9 |
| B.1.2.12 | Intellectual property protection  | 4 | 108 | 3 |
| B.1.2.13 | Methods and quality control tool of materials and coatings | 8 | 108 | 3 |
| B.1.3.1.1 | Psychology | 4 | 108 | 3 |
| B.1.3.1.2 | Engineering psychology | 4 | 108 | 3 |
| B.1.3.2.1 | History of Russian culture  | 1 | 108 | 3 |
| B.1.3.2.2 | History of science and technology | 1 | 108 | 3 |
| B.1.3.3.1 | Mathematical and computer modeling techniques in engineering | 5 | 108 | 3 |
| B.1.3.3.2 | Mechanical properties of solids | 5 | 108 | 3 |
| B.1.3.4.1 | Electrical and magnetic properties of solids | 7 | 108 | 3 |
| B.1.3.4.2 | Physics and chemistry of ideal and real surfaces of materials. Atomic crystal structure | 7 | 108 | 3 |
| B.1.3.5.1 | Methods for producing single crystals and polycrystalline ingots | 1 | 108 | 3 |
| B.1.3.5.2 | Heat treatment of materials and alloys | 1 | 108 | 3 |
| B.1.3.6.1 | Physical foundations of measurement, control, testing, diagnostics | 6 | 108 | 3 |
| B.1.3.6.2 | Modern methods of formation of wear-resistant and corrosion-resistant coatings of metals and alloys | 6 | 108 | 3 |
| B.1.3.7.1 | Physics of intense electron and plasma beams | 7 | 108 | 3 |
| B.1.3.7.2 | Powerful lasers in engineering technology | 7 | 108 | 3 |
| B.1.3.8.1 | Modeling and optimization of materials and technological processes | 4 | 72 | 2 |
| B.1.3.8.2 | Application packages and databases in materials science and materials technology | 4 | 72 | 2 |
| B.1.3.9.1 | Design of workshops and sections for the manufacture of parts with sprayed and deposited surfaces | 5 | 72 | 2 |
| B.1.3.9.2 | Equipment and tooling in the electrical industry | 5 | 72 | 2 |
| B.1.3.10.1 | Foreign language for professional communication | 4,5 | 180 | 5 |
| B.1.3.10.2 | Technical translation | 4,5 | 180 | 5 |
| B.1.3.11.1 | Acoustic control methods in mechanical engineering | 6 | 144 | 4 |
| B.1.3.11.2 | [Techno-economic](https://www.multitran.com/m.exe?s=techno-economic&l1=1&l2=2) basis for the selection of technologies and equipment | 6 | 144 | 4 |
| B.1.3.12.1 | Metal Corrosion and Protection | 7 | 216 | 6 |
| B.1.3.12.2 | Theoretical foundations of the formation of coatings on metals and alloys | 7 | 216 | 6 |
| B.1.3.13.1 | Amorphous-crystalline materials and technologies for their preparation | 8 | 72 | 2 |
| B.1.3.13.2 | Amorphous metals and alloys | 8 | 72 | 2 |
| B.1.3.14.1 | Team sports | 2-6 | 328 | - |
| B.1.3.14.2 | Sport and health  | 2-6 | 328 | - |
| B.2.1 | 1st education practice training  | 2 | 144 | 4 |
| B.2.2 | 2nd  [education practice](https://www.multitran.com/m.exe?s=in-service+education+program&l1=1&l2=2) training  | 4 | 216 | 6 |
| B.2.3 | Industrial practice training  | 6 | 144 | 4 |
| B.2.4 | Industrial practice (R&D) | 8 | 144 | 4 |
| B.2.5 | Undergraduate practice training  | 8 | 216 | 6 |
| F.2  | Nanomaterials and technologies in industry | - | 108 | 3 |
| F.3 | Physical methods for the study of materials and coatings | - | 108 | 3 |
|  | **Total** |  | **8968** | **240** |