

FACULTY OF CHEMICAL AND SYSTEM ENGINEERING

Specialty: **Biomedical Engineering**

Professional qualification: **Engineer**

| code of discipline | COURSES | FULL TIME EDUCATION | | | | | | | | | Total credits | Total |
|--------------------------------|--------------------------------------------------------------|---------------------|------------|----------------------|-----------------|----------|----------|------------------------|-----------|--------------------------|---------------|-----------|
| | | Semester | Assessment | Classroom employment | | | | Total of self-training | Credits | Credits of self-training | | |
| | | | | Teaching loads | | | | | | | | |
| | | | | Lectures | Laboratory work | Seminars | Total | | | | | |
| <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> | <i>10</i> | <i>11</i> | <i>21</i> | <i>22</i> |
| b052 | Mathematics – I part | I | E | 45 | 0 | 45 | 90 | 135 | 3.6 | 5.4 | 9 | 225 |
| b1001 | Fundamentals of Design and CAD | I | T | 15 | 30 | 0 | 45 | 68 | 1.6 | 2.4 | 4 | 113 |
| b676 | Informatics – I part | I | E | 30 | 30 | 0 | 60 | 90 | 2.4 | 3.6 | 6 | 150 |
| b190 | General Chemistry | I | E | 30 | 15 | 15 | 60 | 90 | 2.4 | 3.6 | 6 | 150 |
| b1198 | Introduction to the Specialty | I | T | 15 | 0 | 15 | 30 | 45 | 0.8 | 1.2 | 2 | 75 |
| | <i>Humanitarian elective courses – one of the following:</i> | | | | | | | | | | | |
| b056 | – Ecology and Technical Civilization | I | T | 30 | 0 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 |
| b066 | – Engineering Psychology and Ergonomics | I | T | 30 | 0 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 |
| b1150 | – Career Development and Entrepreneurship | I | T | 30 | 0 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 |
| b1000 | Sports | I | | | 60 | | | | | | | |
| Total for the semester: | | | | | | | 315 | 473 | | | 30 | 788 |
| b053 | Mathematics – II part | II | E | 45 | 0 | 45 | 90 | 135 | 3.6 | 5.4 | 9 | 225 |
| b937 | Biomedical Statistics | II | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b344 | Technical Mechanics | II | E | 30 | 0 | 30 | 60 | 90 | 2.4 | 3.6 | 6 | 150 |
| b849 | Physics | II | E | 30 | 30 | 0 | 60 | 90 | 2.4 | 3.6 | 6 | 150 |
| b980 | Informatics – II part | II | E | 15 | 30 | 0 | 45 | 68 | 1.6 | 2.4 | 4 | 113 |
| b1000 | Sports | II | | | 60 | | | | | | | |
| Total for the semester: | | | | | | | 315 | 473 | | | 30 | 788 |
| b089 | Analytical Chemistry | III | E | 25 | 25 | 0 | 50 | 75 | 1.6 | 2.4 | 4 | 125 |
| b236 | Organic Chemistry – I part | III | E | 45 | 45 | 0 | 90 | 135 | 3.6 | 5.4 | 9 | 225 |
| b313 | Physical Chemistry | III | E | 45 | 45 | 0 | 90 | 135 | 3.2 | 4.8 | 8 | 225 |
| b325 | Industrial Safety | III | T | 20 | 25 | 0 | 45 | 68 | 1.6 | 2.4 | 4 | 113 |

| | | | | | | | | | | | | | |
|--------------------------------|----------------------------------------------------------------------|-----|---|----|----|----|----|-----|-----|-----|---|-----------|------------|
| | <i>Humanitarian elective subjects – one of the following:</i> | | | | | | | | | | | | |
| b138 | – Communications in Social Systems | III | T | 30 | 0 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 | |
| b139 | – Organization Development and Staff Training | III | T | 30 | 0 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 | |
| | <i>Electives – one of the languages:</i> | | | | | | | | | | | | |
| b148 | – English | III | – | 0 | 30 | 0 | 30 | 45 | 0.8 | 1.2 | 2 | 75 | |
| b153 | – Russian | III | – | 0 | 30 | 0 | 30 | 45 | 0.8 | 1.2 | 2 | 75 | |
| b155 | – French | III | – | 0 | 30 | 0 | 30 | 45 | 0.8 | 1.2 | 2 | 75 | |
| b168 | – German | III | – | 0 | 30 | 0 | 30 | 45 | 0.8 | 1.2 | 2 | 75 | |
| b1000 | Sports | III | | | 30 | | | | | | | | |
| Total for the semester: | | | | | | | | | | | | 30 | 838 |
| b237 | Organic Chemistry – II part | IV | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 | |
| b922 | Instrumental Methods in Analytical Chemistry | IV | E | 20 | 20 | 0 | 40 | 60 | 1.6 | 2.4 | 4 | 100 | |
| b196 | Economics and Management | IV | E | 25 | 0 | 25 | 50 | 75 | 1.6 | 2.4 | 4 | 125 | |
| b309 | Colloid Chemistry | IV | T | 20 | 20 | 0 | 40 | 60 | 1.6 | 2.4 | 4 | 100 | |
| b725 | Biophysics | IV | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 | |
| b396 | Electrical Engineering and Electronics | IV | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 | |
| | <i>Electives – one of the languages:</i> | | | | | | | | | | | | |
| b148 | – English | IV | T | 0 | 30 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 | |
| b153 | – Russian | IV | T | 0 | 30 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 | |
| b155 | – French | IV | T | 0 | 30 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 | |
| b168 | – German | IV | T | 0 | 30 | 0 | 30 | 45 | 1.2 | 1.8 | 3 | 75 | |
| b1000 | Sports | IV | | | 30 | | | | | | | | |
| Total for the semester: | | | | | | | | | | | | 30 | 850 |
| b232 | Unit Operations | V | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 | |
| b432 | Biochemistry | V | E | 45 | 45 | 0 | 90 | 135 | 3.6 | 5.4 | 9 | 225 | |
| b1029 | Design and Analysis of Control Systems | V | E | 45 | 45 | 0 | 90 | 135 | 2.8 | 4.2 | 7 | 225 | |
| b173 | Microbiology – part I | V | E | 45 | 45 | 0 | 90 | 135 | 3.6 | 5.4 | 9 | 225 | |
| b1000 | Sports | V | | | 30 | | | | | | | | |
| Total for the semester: | | | | | | | | | | | | 30 | 825 |
| b980 | Biomedical Informatics | VI | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 | |
| b1208 | Unit Operations in Biotechnological Industry | VI | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 | |
| b260 | Digital and Microprocessor Technics | VI | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 | |
| b1141 | Microbiology – part II | VI | E | 30 | 30 | 0 | 60 | 90 | 2.4 | 3.6 | 6 | 150 | |
| b615 | Bioorganic Chemistry | VI | E | 30 | 30 | 0 | 60 | 90 | 2.4 | 3.6 | 6 | 150 | |
| b399 | Thermal Engineering | VI | E | 20 | 20 | 0 | 40 | 60 | 1.2 | 1.8 | 3 | 100 | |
| b1000 | Sports | VI | | | 30 | | | | | | | | |
| Total for the semester: | | | | | | | | | | | | 30 | 850 |

| | | | | | | | | | | | | |
|--------------------------------------------------|----------------------------------------------------------|------|---|----|----|----|-------------|------------|-----|-----|------------|------------|
| b708 | Pharmaceutical Biotechnology | VII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b784 | Molecular Biology and Genetics | VII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b600 | Biocatalysis | VII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1033 | Bionanotechnology | VII | E | 30 | 30 | 0 | 60 | 90 | 2.4 | 3.6 | 6 | 150 |
| b949 | Biomedical measurements, technical devices and apparatus | VII | T | 30 | 30 | 0 | 60 | 90 | 2.4 | 3.6 | 6 | 150 |
| | <i>Project – one of the following:</i> | | | | | | | | | | | |
| b1210 | Project on Molecular Biology and Genetics | VII | D | 0 | 0 | 30 | 30 | 45 | 1.2 | 1.8 | 3 | 75 |
| b1211 | Project on Bionanotechnology | VII | D | 0 | 0 | 30 | 30 | 45 | 1.2 | 1.8 | 3 | 75 |
| b1212 | Project on Biochemistry | VII | D | 0 | 0 | 30 | 30 | 45 | 1.2 | 1.8 | 3 | 75 |
| b1213 | Project on Microbiology | VII | D | 0 | 0 | 30 | 30 | 45 | 1.2 | 1.8 | 3 | 75 |
| Total for the semester: | | | | | | | 330 | 495 | | | 30 | 825 |
| b883 | Immunology | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1180 | Bioanalytical Techniques in Medicine | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1039 | Cell Biology | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| | <i>Elective courses – one of the following:</i> | | | | | | | | | | | |
| b1142 | – Biosensors and DNA Chips | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1039 | – Biotransport | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b480 | – Biomaterials and Biocompatibility | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b848 | – Tissue Engineering | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1286 | – Knowledge-based systems | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1294 | - Cyberphysical Systems | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1295 | – Modern Methods for Data Analysis | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b997 | – Medical Microbiology and Virology | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| b1030 | – Physiology | VIII | E | 30 | 30 | 0 | 60 | 90 | 2.0 | 3.0 | 5 | 150 |
| Total for the semester: | | | | | | | 240 | 360 | | | 20 | 600 |
| b1022 | Practice in Industry | | D | | | | 200 | | | | | |
| | BSc Thesis – 8 weeks | VIII | D | | | | | | | | 10 | |
| Total for the entire period of education: | | | | | | | 2545 | | | | 240 | |

| Electives disciplines | semester | assessment | Teaching loads | |
|--------------------------------------------------------------|----------|------------|----------------|----|
| | | | | |
| Foreign language (English, French, German, Russian) by level | II - VII | T | – | 30 |
| Computer data processing (3 levels) | II - VII | И | 15 | 30 |