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**Curriculum**

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| --- | --- | --- | --- |
| **Program** | | Bachelor program – **Food Industry Engineering, Management of Production Processes and Machinery** | |
| **Degree awarded** | | **Bachelor of Science in Industrial Engineering and Technology** | |
| **Faculty** | | **Faculty of Technical Engineering** | |
| **Program coordinator/coordinators** | | Otar Sesikashvili, Associate Professor | |
| **Length of the program (semester, ECTS)** | | **Length of the program is 240 credits,** 8 semesters, one semester – 15 weeks, one credit point – 25 hours, 6000 hours in all   * General university courses - 15 credits * General faculty courses – 83 credits * General faculty elective courses - 18 credits * Program’s compulsory courses – 70 credits * Elective modules courses – 54 credits | |
| **Language of the Program** | | | **Georgian** |
| **Program development and renewal date of issue** | | | 01.07.2014  01. 11. 2017 |
| **Program prerequisites** | | | |
| Certificate of general education or the equivalent document. For citizens of Georgia – certificate of confirmation of passing the unified national exams (three compulsory exams – Georgian language, Foreign language and General skills, and one elective from the following subjects: Mathematics, Physics, Chemistry, Biology, History, Geography), which grants them student status, or the equivalent document for foreign citizens, in the case of the appropriate inter-state agreement. | | | |
| **Aim of the Program** | | | |
| The program is aimed at: training of Bachelor in the field Engineering specialized in Industrial Engineering and Technology, who, with the achieved level of knowledge, skills and values based on acquired knowledge, is consistent with the framework of qualifications of the first level of higher education; developing students’ competences required for solving technical. technological and organizational problems, and on the basis of these competences, at allowing them for personal development; providing them with citizenship and patriotism training. | | | |
| **Learning outcomes (General and branch competences)** | | | |
| **Knowledge and understanding** | **General competences**: Graduates are expected to have a broad knowledge of field, which involves critical understanding of theories and principles.  **Branch competences:**  Graduates are expected to know:   * basic concepts, laws and theoretical foundations of natural science and basic technical disciplines; * basics of economic disciplines; * technological processes and their automated control; * principles the functioning, maintenance, installation and operation of technological equipment; * understanding of field-related complex issues. | | |
| **Applying knowledge** | **General competences**: Graduates are expected to use the field-characteristic and some distinguishing methods to address problems, as well as to implement the practical-nature project in accordance with pre-defined guidelines.  **Branch competences:**  Graduates are expected to be able:   * to draft and read out drawings of technological machinery, units and components; * to participate in solving the issues of enterprise design, management, marketing and logistics; * to understand and realize technological processing of technological machinery, units and components; * to maintain technological machinery, produce repair works and operate automated control systems; * to design technological. principle, design and kinematic diagrams, select methods of selecting and controlling modern equipment taking into account the specificity of manufacturing process. | | |
| **Making judgement** | **General competences**: Graduates are expected to collect and interpret field-related data, as well as to analyze the abstract data and/or situations by using standard and some particular methods, and to draw up justified conclusion.  **Branch competences:**  Graduates, based on the analysis of the information received, are expected to be able:   * to assess condition of technological equipment; * to analyze the emergency situations created during the operation of this equipment; * to critically assess the learned theories and principles; * to identify the optimal option and develop ways to avoid problem. | | |
| **Communication skills** | **General competences**: Graduates are expected to prepare the detailed written report on ways to address and resolve the existing problems, and to transfer information to specialists and non-specialists in Georgian and foreign languages by using creatively modern information and communication technology.  **Branch competences:**  Graduates, are expected to be able:   * to search and process required data using modern information and communication technology; * to communicate orally and in writing in Georgian and foreign languages | | |
| **Learning skills** | **General competences**: Graduates are expected to assess their own studying process consistently and comprehensively.  **Branch competences:**  Graduates, are expected to be able:   * to study the structure and operating principles of technological equipment; * to study processes occurring in technological equipment; * to identify the need for further enhancing and continuation of educational level; * to determine the possibility and necessity of continuation of education at the next educational level. | | |
| **Values** | **General competences**: Graduates are expected to participate in value formation process and seek to entrench them.  **Branch competences:**  Graduates, are expected to be able:   * to be knowledgeable of the basics of humanitarian knowledge; * to understand ethical and legal standards, on the basis of which, they have to act in society; * to be guided by standards of professional and human ethics in activities; * to be aware of environmental problems of production; * to follow the labor and life safety standards; * to understand those threats, which can be caused by failure of technological machinery and equipment. | | |
| **Teaching methods** | | | |
| **Teaching forms:** lecture, laboratory and practical exercises, teamwork, practical training, work experience internship.  **Teaching methods:** transfer of theoretical material, question-answer sessions, discussion, debates practical case studies. | | | |
| **Structure of the Program** | | | |
| The Program involves:  General university courses - 15 credits  General faculty courses – 83 credits  General faculty elective courses - 18 credits  Program’s compulsory courses – 70 credits.  Elective modules:   1. Foond industry emnterprises equipment and services – 54 credits; 2. Foond industry emnterprises process management – 54 credits; 3. Refrigerating engineering and technology – 54 credits. | | | |
| **Assessment System** | | | |
| The assessment system of the academic performance of students in higher education programs is in compliance with the Order of the Minister of Education and Science of Georgia of 5 January 2007 No 3 “On approving the calculation rules of credits for higher education programs” (as at 1 September 2016).  The students grading scheme includes,  a) five types of positive assessment:  (A) Excellent – 91-100 points.  (B) Very good – 81-90 points.  (C) Good – 71-80 points.  (D) Satisfactory – 61-70 points.  (E) Acceptable – 51-60 points.  b) two types of negative assessment:  (FX) Student could not pass examination – 41-50 point that means that she/he is required to work more for passing the exam, and that s/he is entitled to retake exam only once after individual work;  (F) failed to pass –40 points and lower that means that the work done by student is not sufficient and she/he has to redo the course.  Within the training component of educational program, in case of FX assessment, a makeup exam is appointed no later than 5 days since the announcement of the examination results.  Maximum course assessment score is 100 points.  The assessment of the academic performance of student in each course consists of the interim and final assessments, of which the conclusive one is a Final Examination.  The maximum score for final examination is 40 points. Student has the right to take the final exam, if his/her minimum assessment score at mid-term examination is 18 points.  The number of points received in a makeup examination is a final assessment score and is not added to the final assessment received by student, and it will be reflected in final assessment of the training component. With account for the assessment received in the educational component, in case of final assessment score 0-50 points, student is assessed at F-0 point. The assessment schemes for each particular course are given in syllabuses presented in annexes to this Program. | | | |
| **Employment opportunities** | | | |
| 1. **Food industry emnterprises equipment and services** – a graduate can be employed in food industry enterprises, such as: bread, macaroni, tea, confectionery, milk, wine, beer, non-alcoholic beverages, meat, fish and other foods manufacturing small and large enterprises, with a focus on the operation, maintenance, installation and repair of equipment. 2. **Food industry emnterprises process management -** a graduate can be employed in food industry enterprises, such as: bread, macaroni, tea, confectionery, milk, wine, beer, non-alcoholic beverages, meat, fish and other foods manufacturing small and large enterprises, with a focus on the control and management of manufacturing process. 3. **Refrigerating engineering and technology -**  a graduate can be employed in the refrigerating enterprises, such as: refrigeration plants, fridge and conditioner manufacturing enterprises, public catering services, care-care centers, customs institutions (refrigeration terminals), distribution companies, and they also can establish their own small enterprises focused on food storage or installation and repair of refrigerating equipment. | | | |
| **Supportive resources** | | | |
| For the program implementation purpose, there will be used the University’s classrooms, located in the VII, VIII and IX Buildings, computer classes, classroom equipped with multimedia means located in the IX Building of University, which is provided with computer, printing machine, projector, slide projector; incomplete laboratory of food industry enterprises processes and technological equipment, laboratory of refrigerating equipment and engineering, specialist literature book collection.  **see attached document 3** | | | |
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**Attachment 1**

**Akaki Tsereteli State University**

**Faculty of Technical Engineering**

**Bachelor Program**

**Food Industry Engineering, Management of Production Processes and Machinery**

**Study Schedule 2017-2021**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| № | Course title | Hours per week | Number of credits | Number of hours | | | | Lect./practic./group/lab | Semesters | | | | | | | | Precondition |
| Total | Contact hours | | Independent | I | II | III | IV | V | VI | VII | VIII |
| Class hours | Mid-term and final exams |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 1 | **University compulsory courses (15 credits)** | | | | | | | | | | | | | | | | |
| 1.1. | Foreign Language 1 (Russian) |  | 5 | 125 | 60 | 2 | 63 | 0.60.0.0 |  | 5 |  |  |  |  |  |  |  |
|  | Foreign Language 1 (English) |  | 5 |  |  |  |  |  |  | 5 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Foreign Language 1 (French) |  | 5 |  |  |  |  |  |  | 5 |  |  |  |  |  |  |  |
|  | Foreign Language 1 (German) |  | 5 |  |  |  |  |  |  | 5 |  |  |  |  |  |  |  |
| 1.2 | Foreign Language 2 (Russian) |  | 5 | 125 | 60 | 2 | 63 | 0.60.0.0 |  |  | 5 |  |  |  |  |  | 1.1. |
|  | Foreign Language 2 (English) |  | 5 |  |  |  |  |  |  |  | 5 |  |  |  |  |  |  |
|  | Foreign Language 2 (French) |  | 5 |  |  |  |  |  |  |  | 5 |  |  |  |  |  |  |
|  | Foreign Language 2 (German) |  | 5 |  |  |  |  |  |  |  | 5 |  |  |  |  |  |  |
| 1.3 | Foreign Language 3 (Russian) |  | 5 | 125 | 60 | 2 | 63 | 0.60.0.0 |  |  |  | 5 |  |  |  |  | 1.2. |
|  | Foreign Language 3 (English) |  | 5 |  |  |  |  |  |  |  |  | 5 |  |  |  |  |  |
|  | Foreign Language 3 (French) |  | 5 |  |  |  |  |  |  |  |  | 5 |  |  |  |  |  |
|  | Foreign Language 3 (German) |  | 5 |  |  |  |  |  |  |  |  | 5 |  |  |  |  |  |
| **Total** | |  | **15** | **375** | **180** | **6** | **189** | **-** | **15** | | | | | | | |  |
| 2 | **Faculty compulsory courses (83 credits)** | | | | | | | | | | | | | | | | |
| 2 | Mathematics |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.1. | Linear Algebra and Analytic Geometry |  | 5 | 125 | **45** | **2** | **78** | **15.30.0.** | **5** |  |  |  |  |  |  |  |  |
| 2.2. | Mathematical Analysis - 1 |  | 5 | 125 | **45** | **2** | **78** | **15.30.0** | **5** |  |  |  |  |  |  |  |  |
| 2.3. | Mathematical Analysis - 2 |  | 5 | 125 | **45** | **2** | **78** | **15.30.0** |  | **5** |  |  |  |  |  |  | 2.2. |
| 2.4. | Probability Theory and Statistics |  | 5 | 125 | **45** | **2** | **78** | **15.30.0** |  | **5** |  |  |  |  |  |  |  |
| 2.5 | Fundamentals of Mechanics |  | 5 | 125 | **45** | **2** | **78** | **15.30.0** | **5** |  |  |  |  |  |  |  |  |
| 2.6 | Physics - 1 |  | 4 | 100 | **45** | **2** | **78** | **15.15.15** |  | 4 |  |  |  |  |  |  |  |
| 2.7 | Physics -2 |  | 4 | 100 | **45** | **2** | **78** | **15.15.15** |  |  | 4 |  |  |  |  |  |  |
| 2.8 | Chemistry |  | 5 | 125 | **45** | **2** | **78** | **15.15.15** | **5** |  |  |  |  |  |  |  |  |
| 2.9 | Engineering Graphics |  | 5 | 125 | **45** | **2** | **78** | **15.0.30.** | **5** |  |  |  |  |  |  |  |  |
|  | Computing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.10 | Computer Skills - 1 |  | 5 | **125** | **45** | **2** | **78** | **15.0.30.** | **3** |  |  |  |  |  |  |  |  |
| 2.11 | Computer Skills - 2 |  | 3 | **75** | **30** | **2** | **43** | **0.0.30.** |  | 3 |  |  |  |  |  |  |  |
| 2.12 | Engineering Computer Graphics |  | 5 | **125** | **45** | **2** | **78** | **0.0.45.** |  | **4** |  |  |  |  |  |  |  |
| 2.13 | MathCAD |  | 3 | **75** | **45** | **2** | **28** | **15.0.30.** |  | 3 |  |  |  |  |  |  |  |
|  | Total |  | 56 | **1400** | **570** | **26** | **804** | **570** | 56 | | | | | | | |  |
|  | **Economic and managerial disciplines** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.14 | Micro & Macro Economics |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  | 3 |  |  |  |  |  |  |
| 2.15 | Fundamentals of Business Activities |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  | 3 |  |  |  |  |
|  | Total |  | **6** | **150** | **60** | **4** | **86** | **60** | 6 | | | | | | | |  |
|  | Mechanics |  |  |  |  |  |  |  |  | | | | | | | |  |
| 2.16 | Dynamics |  | 5 | **125** | **45** | **2** | **78** | **15.30.0** |  |  | 5 |  |  |  |  |  |  |
| 2.17 | Strength of Materials |  | 5 | **125** | **45** | **2** | **78** | **15.15.15** |  |  |  | 5 |  |  |  |  |  |
| 2.18 | Machine Elements |  | **6** | **150** | **60** | **2** | **88** | **30.15.15** |  |  |  | 6 |  |  |  |  |  |
| 2.19 | Fluid Mechanics, Hydraulic and Pneumatic Engines |  | 5 | **125** | **45** | **2** | **78** | **15.15.15** |  |  |  |  | 5 |  |  |  |  |
| **Total** | |  | 21 | 525 | 195 | 8 | 322 | **195** | **21** | | | | | | | |  |
|  | **Elective courses 18 credits (6 credits per semester)** | | | | | | | | | | | | | | | | |
| 3.1 | Marketing Foundations |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  | 6 | 6 | 6 |  |  |
| 3.2 | Project Management |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.3.1 | Logistics Foundations |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  | 8.4 |
| 3.3.2 | Entrepreneurship and Problem Solving |  | **3** | **75** | **30** | **2** | **43** | **15.15.0.** |  |  |  |  |  |  |
| 3.3.3 | Mathematical Methods and Models in Management |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.3.4 | Special-purpose materials and alloys |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.3.5 | Certification |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.4.1 | History of Georgia |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.4.2 | Philosophy |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.4.3 | Emergency Situations and Civil Defence |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.4.4 | Political Science |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.4.5 | Ethics |  | **3** | **75** | **30** | **2** | **43** | **15.15.0** |  |  |  |  |  |  |
| 3.5.1 | Ecology and life safety |  | **6** | **150** | **45** | **2** | **103** | **15.0.30** |  |  |  |  |  |  |
| 3.5.2 | Foreign Language (Branch-wise English) |  | **6** | **150** | **45** | **2** | **103** | **0.45.0** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Total** | |  | **18** | **450** | **180** | **12** | **258** | **60** | 18 | | | | | | | | |
| 4 | **General engineering compulsory courses (70 credits)** | | | | | | | | | | | | | | | | |
| 4.1 | Material science |  | 6 | 150 | **60** | **2** | 88 | 30.0.30 |  |  | 6 |  |  |  |  |  |  |
| 4.2 | Construction materials engineering |  | 6 | 150 | **60** | **2** | 88 | 30.0.30 |  |  |  | **6** |  |  |  |  |  |
| 4.3 | Replaceability and technical measurements |  | 4 | 100 | 45 | 2 | 53 | 15.15.15 |  |  |  |  | 4 |  |  |  |  |
| 4.4 | Thermodynamics and heat transfer |  | 4 | 100 | 45 | 2 | 53 | 15.15.15 |  |  | 4 |  |  |  |  |  |  |
| 4.5 | Electrical Engineering and Foundations of Electronics |  | 5 | 125 | 45 | 2 | 78 | 15.15.15 |  |  |  | **5** |  |  |  |  |  |
| 4.6 | Converters |  | 4 | 100 | 45 | 2 | 53 | 30.15.0 |  |  |  |  | **4** |  |  |  |  |
| 4.7 | Technological machinery |  | 5 | 125 | 45 | 2 | 78 | 30.15.0 |  |  |  |  | 5 |  |  |  |  |
| 4.8 | Production mechanical processes |  | 4 | 100 | 45 | 2 | 53 | 15.30.0 |  |  |  |  |  | 4 |  |  |  |
| 4.9 | Technological processes and apparatus -1 |  | 6 | 150 | 60 | 2 | 88 | 30.30.0 |  |  |  |  |  | 6 |  |  |  |
| 4.10 | Technological processes and apparatus -2 |  | 4 | 100 | 45 | 2 | 53 | 30.15.0 |  |  |  |  |  |  | 4 |  |  |
| 4.11 | Refrigerating engineering -1 |  | 3 | 75 | 30 | 2 | 43 | 15.15.0 |  |  |  |  | 3 |  |  |  |  |
| 4.12 | Refrigerating engineering -2 |  | 4 | 100 | 45 | 2 | 53 | 30.15.0 |  |  |  |  |  | 4 |  |  |  |
| 4.13 | Introduction to specialty |  | 3 | 75 | 30 | 2 | 43 | 30.0.0 | **3** |  |  |  |  |  |  |  |  |
| 4.14 | Standardization and metrology |  | 3 | 75 | 30 | 2 | 43 | 15.0.15 |  |  | **3** |  |  |  |  |  |  |
| 4.15 | Industrial products expert examination |  | 3 | 75 | 30 | 2 | 43 | 15.15.0 |  |  |  |  |  | 3 |  |  |  |
|  | **Practice** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 38 | Practical Training |  | 3 | 100 |  |  |  |  |  |  |  | 3 |  |  |  |  |  |
| 39 | Work Experience Internship |  | 3 | 50 |  |  |  |  |  |  |  |  |  | 3 |  |  |  |
| **Total** | |  | 70 | 1775 |  |  |  | **740** | **70** | | | | | | | |  |
| **Elective module -1**  **Food industry emnterprises equipment and services** | | | | | | | | | | | | | | | | | |
| 5.1.1 | Food industry machine designs and calculation -1 |  | 4 | 100 | 30 | 2 | 68 | 15.15.0 |  |  |  |  |  |  | 4 |  |  |
| 5.1.2 | Food industry machine designs and calculation -2 |  | 6 | 150 | 60 | 2 | 88 | 30.30.0 |  |  |  |  |  |  |  | 6 |  |
| 5.1.3 | Food industry machine operation and repair -1 |  | 5 | 125 | 45 | 2 | 78 | 30.15.0 |  |  |  |  |  |  | 5 |  |  |
| 5.1.4 | Food industry machine operation and repair -2 |  | 5 | 125 | 45 | 2 | 78 | 15.15.15 |  |  |  |  |  |  |  | 5 |  |
| 5.1.5 | Food enterprise automation -1 |  | 4 | 100 | 45 | 2 | 53 | 15.30.0 |  |  |  |  |  |  | 4 |  |  |
| 5.1.6 | Food enterprise automation -2 |  | 5 | 125 | 45 | 2 | 78 | 15.15.15 |  |  |  |  |  |  |  | 5 |  |
| 5.1.7 | General food technologies |  | 4 | 100 | 45 | 2 | 53 | 15.15.15 |  |  |  |  |  | 4 |  |  |  |
| 5.1.8 | Food enterprise technological equipment -1 |  | 4 | 100 | 45 | 2 | 53 | 15.15.15 |  |  |  |  |  |  | 4 |  |  |
| 5.1.9 | Food enterprise technological equipment -2 |  | 8 | 200 | 75 | 2 | 128 | 30.30.15 |  |  |  |  |  |  |  | 8 |  |
| 5.1.10 | Mechanization of loading, unloading, transport and warehousing operations -1 |  | 3 | 75 | 30 | 2 | 43 | 15.15.0 |  |  |  |  |  |  | 3 |  |  |
| 5.1.11 | Mechanization of loading, unloading, transport and warehousing operations -2 |  | 6 | 150 | 60 | 2 | 88 | 30.30.0 |  |  |  |  |  |  |  | 6 |  |
| **Total** | |  | **54** | **1350** | **525** | **22** | **803** | **525** | **54** | | | | | | | |  |
| **Electiva module -2**  **Food industry emnterprises process management** | | | | | | | | | | | | | | | | | |
| 5.2.1 | Control of food production processes -1 |  | 4 | 100 | 45 | 2 | 53 | 15.30.0 |  |  |  |  |  |  | 4 |  |  |
| 5.2.2 | Control of food production processes -2 |  | 6 | 150 | 60 | 2 | 88 | 30.15.15 |  |  |  |  |  |  |  | 6 |  |
| 5.2.3 | Automated control of food production processes -1 |  | 4 | 100 | 45 | 2 | 53 | 15.30.0 |  |  |  |  |  |  | 4 |  |  |
| 5.2.4 | Automated control of food production processes -2 |  | 8 | 200 | 75 | 2 | 128 | 30.30.15 |  |  |  |  |  |  |  | 8 |  |
| 5.2.5 | Operation and maintenance of food industry machines -1 |  | 4 | 100 | 45 | 2 | 53 | 15.30.0 |  |  |  |  |  |  | 4 |  |  |
| 5.2.6 | Operation and maintenance of food industry machines -2 |  | 5 | 125 | 45 | 2 | 78 | 15.15.15 |  |  |  |  |  |  |  | 5 |  |
| 5.2.7 | General food technologies |  | 4 | 100 | 45 | 2 | 53 | 15.15.15 |  |  |  |  |  | 4 |  |  |  |
| 5.2.8 | Mechanization of loading, unloading, transport and warehousing operations -1 |  | 3 | 75 | 30 | 2 | 43 | 15.15.0 |  |  |  |  |  |  | 3 |  |  |
| 5.2.9 | Mechanization of loading, unloading, transport and warehousing operations -2 |  | 5 | 125 | 45 | 2 | 78 | 15.30.0 |  |  |  |  |  |  |  | 5 |  |
| 5.2.10 | Food enterprise technological equipment -1 |  | 5 | 125 | 45 | 2 | 78 | 30.15.0 |  |  |  |  |  |  | 5 |  |  |
| 5.2.11 | Food enterprise technological equipment -2 |  | 6 | 150 | 60 | 2 | 88 | 30.15.15 |  |  |  |  |  |  |  | 6 |  |
| **Total** | |  | **54** | **1350** | **540** | **22** | **788** | **540** | **54** | | | | | | | |  |
| **Elective module – 3**  **Refrigerating engineering and technology** | | | | | | | | | | | | | | | | | |
| 5.3.1 | Thermodynamic foundations of refrigeration machines and conditioning -1 |  | 6 | 150 | 60 | 2 | 88 | 30.30.0 |  |  |  |  |  |  | 6 |  |  |
| 5.3.2 | Thermodynamic foundations of refrigeration machines and conditioning -2 |  | 6 | 150 | 60 | 2 | 88 | 30.15.15 |  |  |  |  |  |  |  | 6 |  |
| 5.3.3 | Food storage |  | 4 | 100 | 45 | 2 | 53 | 15.15.15 |  |  |  |  |  | 4 |  |  |  |
| 5.3.4 | Refrigerating enterprise machinery -1 |  | 4 | 100 | 45 | 2 | 53 | 15.15.15 |  |  |  |  |  |  | 4 |  |  |
| 5.3.5 | Refrigerating enterprise machinery -2 |  | 7 | 175 | 60 | 2 | 113 | 30.15.15 |  |  |  |  |  |  |  | 7 |  |
| 5.3.6 | Conditioning equipment and devices |  | 5 | 125 | 45 | 2 | 78 | 15.15.15 |  |  |  |  |  |  | 5 |  |  |
| 5.3.7 | Automation of refrigerating processes |  | 6 | 150 | 60 | 2 | 88 | 30.15.15 |  |  |  |  |  |  |  | 6 |  |
| 5.3.8 | Installation, operation and repair refrigerating and conditioning equipment -1 |  | 5 | 125 | 45 | 2 | 78 | 30.0.15 |  |  |  |  |  |  | 5 |  |  |
| 5.3.9 | Installation, operation and repair refrigerating and conditioning equipment -2 |  | 6 | 150 | 60 | 2 | 88 | 30.15.15 |  |  |  |  |  |  |  | 6 |  |
| 5.3.10 | Refrigerating materials, refrigerants and cool carriers |  | 5 | 125 | 45 | 2 | 78 | 30.15.0 |  |  |  |  |  |  |  | 5 |  |
| **Total** | |  | **54** | **1350** | **525** | **20** | **805** | **525** | **54** | | | | | | | |  |
| **Total** | |  | **240** |  |  |  |  |  | **240** | | | | | | | |  |