



Minimal Elements of Qualification Standards

1. BASIC CHARACTERISTICS

1.1 Name(s) of qualification (generic + subject specific part)

B.Sc. In Food Engineering

1.2 Minimal volume

180-240ECTS

1.3 Level

6

1.4 Entry conditions

Completed four-year secondary education

2. COMPETENCIES / LEARNING OUTCOMES

2.1 List of competencies at the level of qualification

- Plans, organises and supervises the work of food industry facilities
- Plans, organises and supervises the work in food analysis labs
- Works at scientific research institutes
- Plans and controls raw materials and finished products

2.1 Learning outcomes

(organised in Learning Outcome Units (LOU) and other groups/modules, where Units provide additional information, e.g. ECTS)

LOU 1. Fundamental Disciplines, *minimum 80 ECTS*

- Solve mathematical assignments and problems in calculus, algebra, differential equations, probability and statistics (this also includes the modelling and practical design of experiments)
- Know and interpret basic physical laws and phenomena in the field of mechanics, electricity and magnetism, atomic physics and the fundamentals of quantum mechanics
- Demonstrate knowledge in general, inorganic, organic, physical, and analytical chemistry
- Describe and explain the functioning of cells and their organelles, through a discussion on the laws of genetics and trends in genetic research
- Present and explain the biochemical processes through a practical implementation of basic biochemical lab tests

- Effectively utilise IT equipment, commercially available general purpose application software, as well as a limited number of specific software packages
- Be able to speak, read, and write in a foreign language at an *intermediate* level, at the very least
- Prepare and present written and oral-visual presentations

LOU 2. Chemistry and Food Analysis with the Fundamentals of Nutrition Science, *minimum 20 ECTS*

- Demonstrate in practice sample taking and the execution of basic lab and instrumental food analysis methods, in accordance with established protocols
- Explain the chemisms and mechanisms of chemical, biochemical and physical transformation of food ingredients during food production
- Describe and explain the functional and nutritional characteristics of the most relevant ingredients in food products
- Describe physical properties of food and elaborate on the causes and processes essentially present at different expression levels of such properties
- Classify and functionally characterise the most important groups of food additives

LOU 3. Microbiology and Food Safety, *minimum 20 ECTS*

- Demonstrate the knowledge of general and industrial microbiology, also administer in practice the isolation and identification of microbiological cultures relevant for food technology and microbiological disintegration of food
- Develop a programme on adequate hygiene maintenance in a model and actual production plant in food industry
- Be able to describe and differentiate functionally between the GMP and GHP elements
- Design elements of the HACCP plan for a model and actual production plant in food industry
- Explain the causes and effects of the most common food poisoning occurrences

LOU 4. Protection of the Environment, *minimum 5 ECTS*

- Categorise the pollution of air, water, and soil, as a result of the food industry
- Functionally identify and characterise the most common pollutants from the food industry
- Design elementary environmental protection systems and waste disposal systems on different models of food processing plants

LOU 5. Food Engineering and Food, *minimum 80 ECTS*

- List and assess the technological quality parameters of principal raw materials in food industry
- Explain and show—through the use of flowcharts—the most important transformation processes in food production
- Present the structure and basic elements of the processing equipment and control in different food industry facilities; demonstrate practically the process of measuring, documenting, processing and interpreting data acquired through measuring
- Classify, functionally differentiate and present the techniques and technologies of food preservation and protection processes, including refrigeration, freezing, thermal processing, dehydration, airing, and chemical protection
- Explain the purpose of food packaging, elements used to mark certain products, and the interaction between food and the packaging material
- Model the conditions of storing different groups of food products
- Calculate, solve problems, simulate and model in the domain of process engineering
- Conceptually design models of food industry facilities with the necessary power and installation

SIU 6. Economics and Management, *minimum 25 ECTS*

- Explain, calculate and interpret the microeconomic indicators in the food industry
- Calculate production expenses of the more important food products
- Using organisational schemes and flowcharts, model managing systems in the food industry

- Explain and demonstrate the knowledge of mechanisms and factors of the food market through practical implementation of small-scale market research

SIU 7. Student Project (Final Research Paper), *minimum 10 ECTS*

- Demonstrate the ability to define a research problem, to select and adequately use academic sources, to present research methods in a consistent manner, to adequately process and interpret research results, to derive conclusions consistently, and to develop written and oral-visual presentation of projects

3. RELEVANCE

3.1 Labour Market

- *Food industry*
- *Food and beverage quality control institutions*
- *Educational and health institutions*
- *Scientific research institutes*
- *Administrative agencies and inspection offices*

3.2 Further Education / Progression

- *Further education in food technology and similar studies in the next study cycle*

3.3 Other Needs

4. QUALITY ASSURANCE

4.1 Working group members responsible for the creation of the document:

Institution	Name of the group member
University of Bihać	Dr.Sc. Zemira Delalić, Full Professor
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Additional instructions:

- Learning outcomes listed in this document are founded on the recommendations of the International Union of Food Science and Technology (IUFoST) for the study programme in food technology.