

Joint EU/CoE Project
Strategic Development of Higher Education and Qualification Standards



3rd Workshop on Qualifications and Occupational Standards

15-16 May 2014, Konjic

Working Group Task

In accordance with the designated role, choose the necessary components of occupational standards for this project using the list below:

- **Code of the occupation**
2145.005 (Federal Institute for Statistics)
- **Name of the occupation**
Food Engineer (Federal Institute for Statistics)
- **Link to international classification**
International standard classification as recommended by the ILO (International Labour Organization) (Decision on the Classification of Occupations “Official Gazette of the Federation of Bosnia-Herzegovina” number 60, 2014)
- **Level of necessary qualifications**
240 ECTS
- **Description of the occupation**
 - Working in all food industry facilities (for the processing of crops, meat, fish, fruit, vegetables, oil, fat, milk, etc.), waste water treatment
 - Working at food analysis labs and scientific research institutes
 - Designing, leading, managing, and controlling the production process
 - Controlling raw materials and finished products
- **Key Tasks and Necessary Competencies**

WORKING TASKS / ACTIVITIES	COMPETENCIES (SKILLS AND KNOWLEDGE)
Controlling the input raw materials	Taking samples as per the work order; Determining physical (temperature, pH levels, density, etc.), chemical (relative acidity, ingredients) and microbiological (overall number of microorganisms, pathogenic microorganisms and somatic cells) characteristics
Managing the technological production process	Monitoring parameters during the process of pasteurisation, separation, homogenisation, sterilisation, and fermentation.
Standardisation of products	Applying stoichiometric calculation of the quantitative composition of a standardised product
Controlling the packaging process and finished products	Controlling the quality of packaging (to estimate the safety of welding joints, and the asepticity of packaging) Internal quality control of the finished product (sample taking; analysis of physical, chemical, and microbiological parameters; assessment of organoleptic characteristics).
Controlling the storage conditions of finished products	Controlling hygiene and sanitation conditions in compliance with legal regulations and production standards
Quality assurance	Applying ISO and HACCP quality systems.
Protection of health and environment	Applying legal regulations on health and safety, as well as environmental protection

Components for the Quality Assurance of Occupational Standards

- **Justifying the introduction of occupational standards**
- **Developers of occupational standards and development date**
- **Deadline for occupational standards used to develop qualifications**
- **Competent institution, the link on the decision of entry into the Registry, as well as the sector council's expert opinion on such entry**
- **Date of entry in the Registry**

ADDITIONAL

- **Occupational perspectives – further education and career**
Second and third study cycles, specialisation, and the acquisition of new technologies
- **Specific components (conditions) for persons with disabilities**

In your opinion, which additional components should be included in the occupational standard?

- .
- .

Example of the Occupational Standard

1. Occupational standard: **SOIL CONSERVATION TECHNICIAN**

2. Level of complexity: **IV₁**

Vocational competencies:

- Plans, prepares and executes tasks within his/her own field
- Inspects the quality of completed work
- Uses energy, work material and time in a rational manner
- Possesses basic IT skills
- Monitors the sources of soil contamination
- Obtains soil samples from contaminated areas for lab analysis
- Takes part in the process of preparing soil samples and solutions for analysis
- Takes part in physical, chemical and microbiological inspection of the soil
- Monitors and implements preventive and protective measures for environmental protection
- Monitors and controls the emission of harmful substances from technological processes
- Monitors and implements methods of adequate disposal, storage and recycling of waste materials
- Controls the use of pesticides and artificial fertilisers
- Determines the fertility of the soil and the composition of pollutants
- Applies quality standards during work
- Keeps record on his/her own work
- Knows at least one foreign language
- Applies regulations on health and safety and environmental protection

3. Typical Tasks within the Specified Occupation

Group of tasks	Key Tasks	Skills and Knowledge
Analysis, planning and organisation of work	Reviewing work documentation and determining work procedures	<ul style="list-style-type: none"> - Analyses daily tasks and assignments, and prepares for their execution - Takes up work orders and based on them, plans the time needed for the execution of tasks - Is familiar with the workplace organization - Is familiar with measures for environmental protection, legal regulations and standards for the assigned field
Preparation of work/workplace	Preparing the workplace	<ul style="list-style-type: none"> - Requisitions and prepares solutions, reagents, equipment and samples based on the work order - Uses scientific literature and manuals - Checks the functioning of equipment - Undertakes safety measures as defined by provisions on hygiene and technical protection - Prepares, cleans, and maintains laboratory dishes, appliances, instruments, equipment and workspace - Assembles lab appliances as outlined in the guidelines - Is familiar with the properties of chemicals and reagents - Knows how to handle lab equipment, appliances and instruments - Is familiar with the general rules of conduct, caution and protection measures in a chemical lab
Operational tasks	Obtaining soil samples for analysis	<ul style="list-style-type: none"> - Obtains soil samples for analysis, in accordance with applicable standards - Transports soil samples to the lab - Stores and conserves the samples obtained - Is familiar with the standard-regulated methods for obtaining and conserving soil samples
	Preparing soil samples for analysis	<ul style="list-style-type: none"> - Prepares soil samples for the physical-chemical and microbiological analysis - Preserves the remainder of the samples in accordance with regulations - Is familiar with the procedures for preparation and conservation

Group of tasks	Key Tasks	Skills and Knowledge
		of soil samples
	Preparing solutions	<ul style="list-style-type: none"> - Prepares solutions of different concentrations - Measures reagents using the work guidelines - Calculates the quantitative composition of the solution - Knows the solution's composition and properties - Knows the stoichiometric coefficient
	Analysing soil samples	<ul style="list-style-type: none"> - Performs the analysis of soil samples according to the work order - Under expert supervision, determines physical, chemical and microbiological parameters in the soil sample: pH value, dampness, specific mass, porosity, mechanical composition, electrical conductivity, water capacity, capillary action, the overall number and the type of microorganisms in the soil sample, etc. - Under expert supervision, assesses the composition of dangerous and harmful materials and determines whether they comply with the MAV (maximum allowed values) - Inspects samples with a microscope at different levels of magnification - Examines the soil's biological activity - Documents the analysis in accordance with the work order - Is familiar with the characteristics of the soil - Is familiar with work methods on the equipment for biological, chemical, and microbiological analysis - Is familiar with classical and contemporary methods of chemical analysis - Is familiar with the role of microorganisms in the biological processes inside the soil
	Monitoring and implementing the industrial process	<ul style="list-style-type: none"> - Monitors the industrial process through characteristic physical quantities of the process - Observes and monitors the type of accumulated waste during the industrial process - Monitors the use of chemicals that may affect the soil and public health by their hazardous and harmful properties - Takes part in the writing of the reports on the treatment and emission of hazardous matter - Is familiar with the treatment of pollutants - Is familiar with the phases of technological process, technological operations and appliances - Is familiar with potential pollutants and their effect on the quality of the soil

EXAMPLE OF THE OCCUPATIONAL STANDARD: AGRICULTURAL TECHNICIAN

1. Level, Key Purpose and Description of the Occupation

Level:	
Key purpose:	Production, refinement, processing and marketing of agricultural products and animal products
Description of the occupation: Organises work and deals with matters in agricultural economy (family farming, crafts, trading companies, co-operatives) and at institutions (schools, institutes, agencies) in the area of production, refinement, processing and marketing of plant and animal products (animal husbandry, fishing, bee-keeping). Agricultural technician can perform his/her tasks and duties independently or as an employee. Working hours are adjusted according to the technological processes and weather conditions. The use of special protective gear at work is mandatory.	

2. Group of Job Duties, Key Duties, and Activities

Group of Job Duties	Key Duties	Activities
Analysis, planning and organisation of work	- Analysis of production resources (material and human), labour market needs and possible funding sources	<ul style="list-style-type: none"> • Analyse documents and databases, and apply them in technological processes • Analyse documentation on the needs and methods of procurement of production materials and sales of finished products • Monitor information on the availability of funding sources
Analysis, planning and organisation of work	- Short-term and long-term production planning in accordance with the legal framework	<ul style="list-style-type: none"> • Develop a long-term work plan, in compliance with applicable laws in this field • Develop a short-term work plan, in compliance with applicable laws in this field (annual, quarterly, monthly, weekly, and daily plans)
Analysis, planning and organisation of work	- Organisation of work	<ul style="list-style-type: none"> • Analyse tasks that should be completed • Establish resources for the execution of tasks • Supervise the execution of tasks
Preparation of the workplace	- Preparation for the execution of work	<ul style="list-style-type: none"> • Apply rules of personal hygiene, spatial and workplace hygiene • Use prescribed protective gear

Group of Job Duties	Key Duties	Activities
Preparation of the workplace	- Establishing the current state of production and workplace specifications	<ul style="list-style-type: none"> • Establish the state of production • Check critical production points • Lay out priorities in the production process
Operational duties	- Preparing for cultivation and production	<ul style="list-style-type: none"> • Take samples of the soil and send them for lab analysis, as prescribed in the established protocol • Obtain samples of other products (raw materials and production materials)
Operational duties	- Preparing and inspecting machines, equipment and tools for the execution of production process	<ul style="list-style-type: none"> • Select the machinery, equipment and tools, and check that they are in good working order • Adjust the machinery, equipment and tools for the production process
Operational duties	- Implementing technological processes in crop production	<ul style="list-style-type: none"> • Implement basic soil tillage • Implement supplementary soil tillage • Carry out sowing and/or planting • Implement crop maintenance measures • Observe and recognise changes on plants • Implement necessary measures • Choose a time period and organise product harvest • Carry out product harvest

Group of Job Duties	Key Duties	Activities
	<p>- Implementation of technological processes in animal production</p>	<ul style="list-style-type: none"> • Prepare food for animals • Distribute food on the farm • Feed the animals • Maintain hygiene of the environment and animals • Monitor all the changes and deviations in the appearance and behaviour of the animals • Implement the necessary measures • Implement technological processes in animal breeding and fish farming • Implement technological processes in the production of animal products • Carry out sampling of semi-finished and finished products • Implement technological processes in the disposal of animal waste

Group of Job Duties	Key Duties	Activities
	- Completion of work in plant and animal production	<ul style="list-style-type: none"> • Prepare space for storage • Implement product refinement and place products in the storage • Perform inspection of stored products • Handle and transport products • Implement primary product processing (grinding, vinification, caseiculture, fishing, and similar)
Administrative work	- Documenting business activities	<ul style="list-style-type: none"> • Keep records of employees' arrival and departure from the workplace, as prescribed by regulations • Prepare an activities report • Regularly update the record of production and the necessary record files and registries, using information technology
Administrative work	- Inventories and basic bookkeeping	<ul style="list-style-type: none"> • Monitor the status of supplies and the needs for production materials and finished products • Document business activities in the purchase and sales invoice daybooks

Group of Job Duties	Key Duties	Activities
Commercial tasks	- Participation in and implementation of marketing activities	<ul style="list-style-type: none"> • Examine the supply, demand, and prices of production materials, products and services • Compare and determine specific features of the sales of plant and animal products • Prepare an advertising campaign for products • Carry out the sale of products and services through different sales channels and techniques
Communication and cooperation with others	- Developing communication with co-workers and/or clients, as well as with other parties in the business process	<ul style="list-style-type: none"> • Take part in team meetings in order to plan for further activities • Maintain basic communication in one foreign language • Adjust the communication style to that of the conversational partner during problem-solving or the implementation of particular orders • Communicate with the co-workers, and with representatives of other institutions in a spoken or written form through the use of available technologies

Group of Job Duties	Key Duties	Activities
Quality assurance	- Performing duties in accordance with applicable standards	<ul style="list-style-type: none"> • Inspect the quality of goods and/or services according to applicable regulations and standards • Check whether the product was made according to the specifications • Apply quality systems (ISO, HACCP, GLOBALGAP) • Undertake specific measures if the quality standards have not been met
Health and environmental protection	- Implementing health and safety measures in accordance with applicable regulations	<ul style="list-style-type: none"> • Use equipment in an adequate way • Train co-workers in the proper use of the equipment and materials • Apply health protection procedures against hazardous substances
Health and environmental protection	- Taking care of the environment	<ul style="list-style-type: none"> • Apply legal regulations on health and safety, environmental protection, as well as protection from fire, and other standards • Respect the principles of good agricultural practices

3. Common / Desired Attitudes and Behavioural Patterns

An agricultural technician should have well-developed psychomotor skills, but also deft hands, good eyesight and sense of touch, hearing and taste. He/she should possess well-developed hygienic habits, ecological awareness, sense for aesthetics, and presentation and communication skills for presenting products and services. He/she should also show initiative and independence in decision-making, responsibility in organisation, affinity for team-work, excellence in the preparation and implementation of technological processes/tasks, entrepreneurial skills, willingness for life-long learning, and interest in new technologies.

4. Other Information

4.1. List of regulations related to the occupation

- Agriculture Act (OG 152/08, 25/09, 149/09 153/09, 21/10, 39/11, 63/11, and 120/12)
- Ecological Production and Ecological Product Labelling Act (OG 139/10)
- Plant Protection Act (OG 10/94 and 117/03)
- Plant Protection Products Act (OG 70/05 and 124/10)
- Act on State Support to Agriculture and Rural Development (OG 92/10)
- Animal Husbandry Act (OG 70/97, 36/98, 151/03, and 132/06)
- Food Act (OG 46/07 and 55/11)
- Wine Act (OG 96/03, 25/09 and 55/11)
- Marine Fisheries Act (OG 56/10 and 55/11)
- Freshwater Fisheries Act (OG 106/01, 174/04 and 10/05)
- Nature Conservation Act (OG 139/08 and 70/05)
- Environment Protection Act (OG 110/07)
- Agricultural Soil Act (OG 152/08)
- Veterinary Act (OG 41/07 and 55/11)
- Trade Act (OG 87/08, 96/08, 116/08, 76/09, and 114/11)
- Crafts Act (OG 73/93, 90/96, 102/98, 64/01, 71/01, 68/07, 79/07, and 40/10)
- Waste Management Act (OG 178/04)
- Payment Operations Act (OG 133/09 and 136/12)
- Act on the Value Added Tax (OG 47/95 and 76/07)
- Specific Taxes Act (OG 137/97, 105/99, 55/00, 127/00, 107/01, 136/02, 44/03, 95/04, 94/09, 21/10, and 78/12)
- Other applicable legislation.

4.2. Occupational Perspectives – Further Education and Career

An agricultural technician can advance to specific titles/positions and work at the following places:

- Public institutions: technical associate at a specific department, technical associate – supervisor, technical associate driver-supervisor, technical associate-animal records manager, technical associate for the preparation of packaging, technical associate for the receipt and identification of samples, lab tester for the inspection of livestock food and animal products
- Self-employment as part of family farms, companies, crafts, and co-operatives that deal with agricultural production and the production of processed farm food products and supplements
- Supermarkets, stores, and specialised stores for agricultural products and food
- Agricultural pharmacies
- Chemical industry for fertilisers and protective agents
- Farms: cattle farms, pig farms, poultry farms, sheep farms, goat farms, fish farms, hatcheries, and stud farms
- Large agricultural, fruit, and vine growing and wine making farms: production technicians (tractor driver, driver of combine harvester, working in food driers and refrigerators, and in internal labs)
- Working on the processing of agricultural products
- Working on the refinement of agricultural products (at warehouses, silos, vineyards and orchards, working with medicinal, aromatic and spice herbs, as well as animal products)
- Apiaries, wine cellars, plant nurseries, garden centres, wine bars, and greenhouses
- Working on agritourist farms as an employee or manager
- Working in schools as teaching associates; or as technicians in university experiment stations
- Endowed with a business spirit, creativity, and willingness to take risks, an agricultural technician can set up and run his/her own company, manage the work of a family farm, etc.
- The possibility of acquiring a higher title/qualification at higher education institutions.

4.3. List of Occupations Agricultural Technicians Work with on a Frequent and Close Basis

- Agronomist
- Veterinary physician
- Local government employee
- Agricultural Advisor
- Market Agent
- Inspection offices
- Advisory offices
- Mechanical technician for agricultural machinery
- Agricultural technician: phyto pharmacist
- Agricultural technician: gardener
- Agritourist technician
- Florist
- Fruit grower, vine grower and wine-maker
- Baker
- Butcher
- Miller
- Merchant
- Nutritionist
- Botanist
- Food technician
- Veterinary technician

4.4. Health Risks in the Occupation

- Working in open and closed spaces (barns, greenhouses, cellars, food refrigerators and driers, silos, mariculture, aquaculture, and pastures)
- Exposure to extreme and specific weather conditions
- Exposure to engine noise and dust
- Improper operation of machines can result in physical injuries
- Inadequate application of plant protection products poses a health risk
- Inadequate use of protective equipment
- Non-compliance with the Health and Safety Act
- Inappropriate handling and treatment of animals, and the risk of zoonoses and allergic reactions

4.5. Typical Work Environment and Working Conditions

An agricultural technician works either outside in noisy, damp and dusty surroundings, where he/she is often exposed to extreme temperatures, or in a closed environment with specific and changeable micro-climate. During the season, he/she works every day of the week, including at night. In animal husbandry, an agricultural technician works in different shifts, depending on the requirements of the position. He/she is in direct contact with animals. He/she handles machines and equipment with moving parts, which requires vocational training and computer skills. An agricultural technician is exposed to hazardous and poisonous substances (pesticides and fertilizers). It is mandatory to wear special protective gear and other means of personal protection.