



**NOS.FS.01
FIRST EDITION**

**NATIONAL OCCUPATIONAL STANDARD FOR FOOD
SCIENTIST**

ZAMBIA QUALIFICATIONS AUTHORITY

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board on 15th February 2024.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide for the registration and accreditation of qualifications; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards (NOS) shall be revised every after **5 years**, or whenever necessary, by the issue of either amendments or of revised editions. It is important that users of NOS ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Manufacturing National Occupational Standards Development Team, upon which the following organisations were represented:

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2. Copperbelt University (CBU)
3. Engineering Institution of Zambia (EIZ)
4. Good Time Steel Company Zambia Limited (GTS)
5. Lusaka Vocational and Technical College (LVTC)
6. Makeni Ecumenical Centre (MEC)
7. Ministry of Commerce, Trade and Industry (MCTI)
8. Ministry of Health (MoH)
9. National Institute for Scientific and Industrial Research (NISIR)
10. Northern Technical College (NORTEC)
11. University of Lusaka (UNILUS)
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13. Zambia Association of Manufacturers (ZAM)
14. Zambia Forestry College (ZFC)
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ACKNOWLEDGEMENT

The Zambia Qualifications Authority would like to acknowledge the invaluable support of the following stakeholders that participated in the development of this National Occupational Standard:

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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Education established by the ZAQA Act No. 13 of 2011 to “**develop and implement a national qualifications framework; register and accredit qualifications; and ensure that standards and registered qualifications are internationally comparable**”.

Among other functions, ZAQA is responsible for “**determining national standards for any occupation**”, through various sector specific National Occupational Standards Development Teams (NOSDTs) of experts composed of representation from appropriate authorities, government departments, industry, academia, regulators, consumer associations and non-governmental organisations, etc.

This National Occupational Standard (NOS) has been developed by the Manufacturing National Occupational Standards Development Team in accordance with the procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as NOS are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula and learning programmes, in various sectors where the occupation exists. In the Manufacturing sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

A Food Scientist is critical in the promotion of food that is healthy, safe and of good quality. His/her role is to assess the nutritional content of food, discover new food sources, and research new ways to make raw and processed foods safe and healthy for the market.

This National Occupational Standard highlight core knowledge, skills, competences and personal attributes that Food Scientists must possess to be successful in their jobs.

ACRONYMS AND ABBREVIATIONS

CS	Core Skill
DNOS	Draft National Occupational Standard
FS	Food Scientist
FSSC 22000	Food Safety System Certification
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis Critical Points
ISO	International Standards Organization
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organizational Knowledge
PC	Performance Criteria
PS	Professional Skill
RK	Regulatory Knowledge
RPL	Recognition of Prior Learning
TK	Technical Knowledge
ZABS	Zambia Bureau of Standards
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Core Skills/Generic Skills: A group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

Function: An activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.

Job Title: A unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: Statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

National Occupational Standards (NOS): Statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: A unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): An established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: A set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: The manner in which the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: Statements that together specify the standard of performance required when carrying out a task.

Scope: A set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.

Sector: A conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub Sector: A further breakdown of a sector based on the characteristics and interests of its components.

Technical Knowledge: The specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: An overall statement about what the incumbent should be able to do.

1. OVERVIEW

This is an introductory section providing a brief summary and specific information or commentary about the content of the NOS and the targeted sector and occupation to help the user judge whether it is relevant to them.

NOS Code	NOS.FS.01
Occupation	Food Science
Job Title	Food Scientist or Food Technologist
Job Description	The individual is responsible for assessing the food's nutritional content, testing food quality, discovering new food sources, researching new ways to make raw and processed foods safe and healthy for the market. He/she also manages, operates and maintains laboratory equipment, trains staff in food production related aspects and document profiling. A Food Scientist is also responsible for ensuring adherence to the laws and regulations governing food processing, labelling, quality, safety, storage, and distribution of food products.
Job Purpose	To develop, produce, process, preserve, and promote food which is healthy, safe, good quality, adaptable, and innovative.
ZQF Level	7
Sector	Manufacturing
Sub sectors	Food Processing
Other Economic Sector(s) in which the Occupation is Practiced	Tourism and Education
Other Similar Jobs that can be performed by the Food Scientist	Research Manager, Tutor/Lecturer/Trainer of Trainers Quality Control Manager, Production Manager, Consultant, Food Analyst, Laboratory Scientist.
Minimum Educational Job Entry Qualification(s)	Bachelor's degree in Biology, Chemistry, Food Science or its equivalent
Practicing License Requirements (if any)	Advantageous to belong to the Zambia Association of Manufacturers, Food Science Association or other professional association related to food production
Training/RPL	<ol style="list-style-type: none"> 1. Awareness of the Food Industry standards and rules and regulations and their application. 2. Awareness about Food Industry Regulators such as Zambia Bureau of Standards (ZABS), Zambia Compulsory Agency (ZCSA), Ministry of Health, Zambia Metrology Agency, Ministry of Local Government through Councils. 3. Awareness about Food Industry statutory regulations such as Food Safety Act and the Public Health Act, and other statutory instruments that affect the Food Industry such as Environmental Management Act, Metrology Act, Standards Act, etc. 4. Food quality enhancement methods.

Minimum Job Entry Age	21 years
Prior Experience (Suggested)	Minimum of 1-year internship
Performance Criteria	As described in the Units under Section 4

2. SCOPE

This National Occupational Standard specifies the fundamental knowledge and understanding, skills and competences that the Food Scientists must possess to be successful in their jobs.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

This job requires an individual to possess ability to apply and interpret national and international food safety and quality standards such as standards set by the ZABS, Food safety regulations, Codex Alimentarius, FSSC 2200, ISO, GMP. The individual is expected to communicate clearly and effectively, use excellent reasoning as well as plan and prioritise their work. He/she must maintain personal hygiene, have good moral integrity, exceptional technical and problem-solving skills. He/she must also be creative, courteous, self-motivated, a great team worker quality consciousness, occupational health and safety orientated, physically fit and able to attend to work for long hours if required.

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into **6 Units** representing the tasks that a job holder should undertake in his/her day-to-day work. The unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

UNIT 1 This Unit is about providing leadership, direction, and execution of all plant food safety functions to support the company's food safety goals.

Unit No.	01
Unit Title	Leadership and execute food safety functions.
Description	This unit is about providing leadership, direction, and execution of all related food safety functions to support the organisation's product food safety goals.
Scope	This unit covers the following: <ul style="list-style-type: none"> • Planning and supervising food safety functions to support the organisation's food safety goals. • Assessing any non-conformities and follow-up on corrective actions.
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Planning and supervising food safety activities	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Assemble and supervise a representative Food Safety Team. PC2. Develop, implement, and review organisation Food Safety documents to identify gaps to national and international standards. PC3. Plan for internal and external quality controls PC4. Establish periodic internal and external audits. PC5. Initiate corrective actions to the identified gaps PC6. Set up a communication strategy for food safety related information
Assessing non-Conformities and follow-up on Corrective Action	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC7. Measure and interpret food safety parameters. PC8. Analyse/Assess the gaps to meeting national and international standards PC9. Evaluate key Performance Indicators in the Food safety systems PC10. Analyse/Assess the gaps to meeting national and international standards. PC11. Identify internal and external quality controls. PC12. Arrange internal and external audits PC13. Identify potential pests and log on an inventory. PC14. Plan food handlers to ensure that all staff are in good health. PC15. Create a pest control programme, (i.e. Include all elements that are involved in the implementation of full scale GMP Food Safety Management System). PC16. Plan and organize appropriate PPEs for all staff. PC17. Design a cleaning program for the facility. PC18. Design a product recall system

Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> OK1. Organisational food safety goals OK2. Organisational food quality goals OK3. Organisational food safety policies, rules and regulations OK4. Organisational standard operating procedures OK5. Organisational food product requirements and specifications
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> TK1. Food quality control techniques TK2. Food Safety Management Systems TK3. Food Processing Techniques and Product Development TK4. Packaging, storage and distribution chain requirements
C. Regulatory Context (knowledge of rules and regulations)	<p>The individual on the job must demonstrate knowledge and understanding of;</p> <ul style="list-style-type: none"> RK1. The Public Health Act RK2. Food Safety Act and regulations RK3. Zambia Bureau of Standards Act and Regulations RK4. Zambia Compulsory Standards Agency Act RK5. Environmental Management Act and regulations RK6. Occupational Health and Safety Act and regulations RK7. Workman's Compensation Act
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS1. Write in English and/ or have the means to give comprehensible instructions on food-related issues. CS2. Prepare and provide clear and simple instructions, or details to co-workers.
	Reading Skills
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS3. Read English and be able to or have the means to give instructions in the local language. CS4. Read and interpret, instrument analytical printouts or instructions provided for the required work
A. Core Skills/ Generic Skills	Oral Communication (Listening and Speaking skills)
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS5. Listen attentively and interpret communication/instructions from the supervisor and other co-workers CS6. Convey information clearly and concisely to co-workers and subordinates.

B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Determine and report to the superior whether the space and resources are adequate to produce a safe and good quality product. PS2. Recommend to superiors on best practices of food safety.
	Plan and Organise
	The individual on the job should be able to: PS3. Plan work and organise required resources in coordination with team members and superiors PS4. Plan and organise quality control audits and inspections with specific regulatory agencies PS5. Plan and organise efficient resources utilization.
	Customer Centricity
	The individual on the job should be able to: PS6. Manage relationships with customers with intent to satisfying their product requirements
	Problem Solving
	The individual on the job should be able to: PS7. Resolve any conflicts within the team PS8. Coordinate with different departments to achieve smooth workflow. PS 9. Share workload PS10. Contribute to quality customer satisfaction PS11. Comply with regulators on food product quality and safety PS12. Pay attention to detail
Analytical Thinking	
The individual on the job should be able to: PS13. Analyse ideas and use logic to formulate appropriate action PS14. Be flexible enough to apply new technologies.	
Critical Thinking	
The individual on the job should be able to: PS15. Identify and deal with emerging food safety non compliances	

UNIT 2 This Unit is about assessing the nutritional content of food and researching new ways to make raw and processed food nutritious.

Unit No.	02
Unit Title	Developing or formulating new food products for the organisation
Description	This unit is about assessing the nutritional content, safety of food and researching new ways to make raw and processed food nutritious.
Scope	This unit covers the following. <ul style="list-style-type: none"> • Optimising food ingredient formulation and product development • Assessing the nutritional content and determination of contaminants • Research product development
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Optimising food ingredient formulation and product development	To be competent, the individual must be able to: PC1. Identify the critical ingredients of the products. PC2. Enhance product nutritional content within the confines of quality specifications and regulations PC3. Coordinate with the marketing department to meet customer satisfaction in new products developed
Assessing nutritional content and determination of contaminants	To be competent, the individual must be able to: PC4. Measure and interpret nutritional parameters PC5. Interpret product specifications in relation to setting local and international standards PC6. Assess conformity of raw materials/ ingredients and packaging quality to acceptable standards PC7. Assess raw materials or ingredients for possible sources of contamination PC8. Identify internal and external standard controls for the new product PC9. Assess suitability and usability of testing kits relating to new product
Research product development	PC10. Develop new products
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Organisational food quality goals OK2. Organisational food nutritional profile goals OK3. Organisational food quality policies, rules and regulations OK4. Organisational standard operating procedures OK5. Organisational food product requirements and specifications
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of; TK1. Food quality control techniques TK2. Food nutritional profile techniques TK3. Food fortification techniques and product formulation

<p>C. Regulatory Context(knowledge of rules and regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of;</p> <ul style="list-style-type: none"> RK1. Foods and Drugs Regulations (eg SI 90 of 2001) RK2. Food Safety Act and regulations RK3. Zambia Bureau of Standards Act and Regulations RK4. Zambia Compulsory Standards Agency Act RK5. Public Health Act RK6. Codex Alimentarius
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS1. Write in English and/or have the means to give simple instructions in the local language. CS2. Prepare and provide clear and simple instructions, and details to co-workers
	<p>Reading Skills</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS3. Read English and be able to or have the means to give simple instructions in the local language used at the site CS4. Read and interpret sketches, drawings or instructions provided for the required work.
<p>B. Professional Skills</p>	<p>Oral Communication (Listening and Speaking skills)</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS5. Listen attentively and interpret communication/instructions from the supervisor and other co-workers CS6. Convey information clearly and concisely to co-workers
	<p>Decision Making</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> PS1. Determine and report to the superior whether the space and resources are adequate to produce a safe good quality product. PS2. Recommend to superiors on best practices on food formulations to ensure safe and nutritious food supply
	<p>Plan and Organise</p>
	<p>The individual on the job should be able to:</p> <ul style="list-style-type: none"> PS3. Plan work and organise required resources in coordination with team members and superiors. PS4. Plan and organise quality control audits and inspections with specific regulatory agencies PS5. Plan and schedule lab testing for compliance to regulatory standards. PS6. Plan and organise efficient resources utilization
	<p>Customer Centricity</p>
	<p>The individual on the job should be able to:</p> <ul style="list-style-type: none"> PS7. Manage relationships with the customers with intent to satisfy their product requirements

	Problem Solving
	The individual on the job should be able to: PS8. Resolve any conflicts within the team
	Analytical Thinking
	The individual on the job should be able to: PS9. Analyse and convey to the superior and carry out remedial action
	Critical Thinking
	The individual on the job should be able to: PS10. Identify and deal with or report violation of any safety norms which may lead to accidents.

UNIT 3 This Unit is about the skills needed by the Food Scientist to ensure that a specific food product meets existing food quality and safety specifications on the market

Unit No.	03
Unit Title	Product testing for required quality and safety specifications
Description	This Unit is about the skills needed to ensure that a specific food product meets existing food quality and safety specifications on the market.
Scope	This unit covers the following; <ul style="list-style-type: none"> • Food Sampling • Food Testing and Analysis • Food packaging and labelling
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Food Sampling	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Recognise the Hazard Critical Control Points of the specific product in the value chain from farm to fork PC2. Identify the possible hazards and spoilage organisms PC3. Categorise hazards into chemical, biological or toxicological PC4. Determine appropriate sampling points and size PC5. Determine sample size as it relates to existing food sampling protocols PC6. Design sampling plan PC7. Employ appropriate sampling kits for internal and external quality control testing PC8. Comply with appropriate transportation guidelines for external testing of products or raw materials
Food Testing and Analysis	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC9. Determine appropriate testing methods PC10. Analyse food products with appropriate controls PC11. Explain and interpret analytical results PC12. Determine appropriate corrective measures when unsatisfactory results occur PC13. Prepare an analytical report of the findings PC14. Identify which proficiency testing schemes (External Quality Assessment schemes) to utilise to maintain specific product safety and quality processes
Packaging and labelling product	To be competent, the individual must be able to; <ul style="list-style-type: none"> PC15. Identify the ideal (food grade) packaging for specific products PC16. Determine the shelf life of the product PC17. Apply 'Best before' and 'Sell By' dates appropriately

Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> OK1. Organisational food safety goals OK2. Organisational food quality goals OK3. Organisational food safety policies, rules and regulations OK4. Organisational standard operating procedures OK5. Organisational food product requirements and specifications
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of;</p> <ul style="list-style-type: none"> TK1. Food sampling techniques for biological or chemical analysis TK2. Biological and chemical food testing techniques TK3. Food processing techniques
C. Regulatory Context (knowledge of rules and regulations)	<p>The individual on the job must demonstrate knowledge and understanding of;</p> <ul style="list-style-type: none"> RK1. Food and Drugs Regulations (SI 90 of 2001) RK2. Food Safety Act and Regulations RK3. Zambia Standards Act and Regulations RK4. Zambia Compulsory Standards Agency Act RK5. Local Government Act and Regulations RK6. Codex Alimentarius
Skills (S)	
A. Core Skills/ Generic Skills	<p>Writing Skills</p> <p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS1. Write in English and/or have the means to give simple instructions in the local language. CS2. Prepare and provide clear and simple instructions details to co-workers CS3. Construct an Analytical report or Certificate of Analysis
	<p>Reading Skills</p> <p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS4. Read English and be able to give instructions to subordinates. CS5. Read, interpret results and convey information to superiors.
	<p>Oral Communication (Listening and Speaking skills)</p> <p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS6. Communicate effectively with supervisor and other co-workers on laboratory findings. CS7. Convey information clearly and concisely to co-workers and customers where applicable.
	<p>Decision Making</p> <p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> PS1. Determine which analytical parameters to sample for and test. PS2. Recommend to superiors on best practices in food sampling, analysis and packaging.
B. Professional Skills	

	Plan and organise
	The individual on the job should be able to: PS3. Plan and organise sampling plan including required resources PS4. Plan and organise a work schedule coordinating tasks for sampling and testing for compliance to regulations.
	Customer Centricity
	The individual on the job should be able to: PS5. Coordinate with other internal units that relate directly with customer care with intent to satisfy their product requirements
	Problem Solving
	The individual on the job should be able to: PS6. Resolve any conflicts within the team PS7. Resolve any conflicts with clients in relation to analytical report
Analytical Thinking	
The individual on the job should be able to: PS8. Analyse and convey to the superior any unsatisfactory results and non-conformities PS9. Discuss with superior any occurrence that may require change in type of sampling or analytical methods.	
Critical Thinking	
The individual on the job should be able to: PS10. Identify and deal with or report violation of guidelines or specifications that may require product recall as a remedial measure	

UNIT 4 This Unit is about the skills needed by the Food Scientist to profile documentation for certification to national and international food quality and safety bodies.

Unit No.	04
Unit Title	Certification to national and international food quality and safety standards
Description	This Unit is about the skills needed to ensure that a specific food product is certified to meet national and international food quality and safety bodies
Scope	This unit covers the following: <ul style="list-style-type: none"> • Identification of applicable standards and certification bodies. • Document profiling and document control
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Identification of standards and certification bodies	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Recognise the applicable food safety and quality local and international certification bodies. PC2. Identify standards and protocols required to meet certification agencies. PC3. Co-ordinate with certification bodies on requirements for inspection and audits.
Document profiling and document control	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC4. Develop data filling and storage methods PC5. Develop specific screening and data management systems PC6. Establish document review and control procedures. PC7. Establish and supervise staff team to record and profile document PC8. Establish an archiving or disposal of old documents procedure
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> OK1. Organisational food safety goals OK2. Organisational food quality goals OK3. Organisational food safety policies, rules and regulations OK4. Organisational standard operating procedures OK5. Organisational food product requirements and specifications
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> TK1. Record keeping techniques. TK2. Local and international certification bodies
C. Regulatory Context (knowledge of rules and regulations)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> RK1. Food and Drugs Regulations (eg SI 90 of 2001) RK2. Food Safety Act and Regulations RK3. Zambia Standards Act RK4. Zambia Compulsory Standards Agency Act RK5. Local Government Act and Regulations RK6. Codex Alimentarius RK7. ISO Standards

Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Write in English (at least working level) and/ or have the means to give simple instructions in the local language. CS2. Prepare and provide clear and simple instructions or details to co-workers CS3. Construct an Analytical report or Certificate of Analysis
	Reading Skills
	The individual on the job must be able to: CS4. Read English and be able to give instructions to subordinates. CS5. Read, interpret results, and convey information to superiors.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS6. Communicate effectively with supervisor and other co-workers on data management. CS7. Convey information clearly and concisely to co-workers and customers where applicable
B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Determine which type of data should be stored. PS2. Recommend to superiors on best practices recording and storing data
	Plan and organise
	The individual on the job should be able to: PS3. Plan and organise data management including required resources. PS4. Plan and organise a work schedule coordinating tasks for filing protocols
	Customer Centricity
	The individual on the job should be able to: PS5. Coordinate with other internal units that relate directly with customer care with intent to satisfy their product requirements
	Problem-Solving
	The individual on the job should be able to: PS6. Resolve any conflicts within the team PS7. Resolve any conflicts with clients in relation to analytical report
	Analytical Thinking
	The individual on the job should be able to: PS8. Analyse and convey to the superior any unsatisfactory data management issues. PS9. Discuss with superior any occurrence that may require change in type of data profiling methods.
Critical Thinking	
	The individual on the job should be able to: PS10. Identify and deal with or report violation of guidelines or specifications on data management

UNIT 5 This Unit is about the skills needed by the Food Scientist to supervise and train staff on food quality and safety aspects.

Unit No.	05
Unit Title	Training on food quality and safety
Description	This Unit is about the skills needed Food Scientist to train food quality and safety aspects
Scope	This unit covers the following; <ul style="list-style-type: none"> • Identifying training needs • Developing training materials • Coordinating all training programs
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Identifying training needs	To be competent, the individual must be able to: PC1. Conduct training needs assessment and identify staff skills gaps in food quality and safety aspects.
Developing training materials	To be competent, the individual must be able to: PC2. Design training materials on food quality and safety aspects PC3. Develop a training program
Coordinating all training programs	To be competent, the individual must be able to: PC4. Train and coordinate all food safety and quality training. PC5. Coordinate with relevant stakeholders on staff related training programs
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Organisational food safety policies, rules and regulations OK2. Organisational standard operating procedures OK3. Organisational food product requirements and specifications OK4. Organisational equipment calibration and maintenance policy OK5. Organisational hierarchy or Organogram.
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Training needs assessment skills TK2. Food safety and quality protocols rules and regulations TK3. Food production and processes skills TK4. Food deficiencies TK5. Food microbiology TK6. Hygiene and sanitation skills TK7. Food packaging skills TK8. Training skills TK9. Entrepreneurship TK10. Food Chemistry

<p>C. Regulatory Context (knowledge of rules and regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> RK1. Food and Drugs Regulations (SI 90 of 2001) RK2. Food Safety Act and Regulations RK3. Zambia Standards Act and Regulations RK4. Zambia Compulsory Standards Agency Act RK5. Local Government Act and Regulations RK6. Codex Alimentarius RK7. Occupational Health & Safety Act and Regulations RK8. Factories Act
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS1. Write in English CS2. Prepare operator's instructions for subordinates CS3. Construct a noncompliance report
	<p>Reading Skills</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS4. Read English CS5. Read and interpret results or instructions provided for the required work
<p>B. Professional Skills</p>	<p>Oral Communication (Listening and Speaking skills)</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS6. Listen attentively and interpret communication/instructions from the supervisor and other co-workers CS7. Convey information clearly and concisely to co-workers
	<p>Decision Making</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> PS1. Training skills
	<p>Plan and organise</p>
	<p>The individual on the job should be able to:</p> <ul style="list-style-type: none"> PS2. Plan and organise training schedules. PS3 Plan and organise the procurement of Training materials.
<p>Customer Centricity</p>	
<p>The individual on the job should be able to:</p> <ul style="list-style-type: none"> PS4. Coordinate with other internal units that relate directly with customer care with intent to satisfy their product requirements 	
<p>Problem Solving</p>	
<p>The individual on the job should be able to:</p> <ul style="list-style-type: none"> PS5. Resolve any conflicts within the team PS6. Upgrade training materials to latest available techniques and regulations. PS7. Resolve any conflicts with clients in relation to training 	

	Analytical Thinking
	The individual on the job should be able to: PS8. Analyse and solve training deficiencies. PS9. Convey to the superior any non-conformities and possible solutions PS10. Discuss with superior any occurrence that may require change training programs.
	Critical Thinking
	The individual on the job should be able to: PS11. Identify and deal with or report deviations in training programs

UNIT 6 [This Unit is about the knowledge and skills needed by a Food Scientist to explore the field of entrepreneurship]

Unit No.	06
Unit Title	Entrepreneurship for a Food Scientist
Description	This Unit is about the knowledge and skills needed by a Food Scientist to explore the field of entrepreneurship
Scope	This unit covers the following; <ul style="list-style-type: none"> • Consultation in setting up of Food laboratories • Setting up training centres in Food Science • Establishing a private Food Testing Laboratory • Marketing laboratory equipment and materials • Setting up a food or beverage product plant
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Consultation in setting up of Food laboratories	To be competent, the individual must be able to: PC1. Identify opportunities where specific expertise can be provided in the field of Food Science PC2. Determine relevant areas of economic importance in the field of food production.
Setting up training centres in Food Science	To be competent, the individual must be able to: PC3 Determine areas of significant relevance to the food industry projecting into future years PC4. Develop training materials for students at various tertiary levels PC5. Operate analytical equipment related to the training
Establishing a private Food Testing Laboratory	To be competent, the individual must be able to: PC6 Determine areas of Food science relevant to the immediate community and abroad PC7. Manage subordinate food scientists and support staff PC8. Acquire and maintain business acumen PC9 Acquire ISO 17025 or relevant accreditation of the laboratory
Marketing laboratory equipment and materials	To be competent, the individual must be able to; PC 10. Determine the current trends in food production and testing PC 11. Identify the relevant equipment in the industry PC 12 Acquire marketing skills
Setting up a food or water or beverage product plant	To be competent, the individual must be able to; PC13. Determine business viability in chosen location PC14 Identify the critical ingredients of the specific products. PC15. Enhance product nutritional content within confines of quality specifications and regulations PC17. Coordinate with Marketing department to meet customer satisfaction.

Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Organisational structures of food safety company/entity, policies, rules and regulations (locally and internationally) OK2. Relevant National standards, policies and procedures followed in the registration of the business company. OK 2. Business company roles, responsibilities, accountabilities, and authorities
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of; TK 1. Creating a business plan for a food safety company TK 2. Acquiring resources and financing for a new business TK 3. Hiring suitable labour for a food safety company TK4. Providing leadership and management for a food safety company
C. Regulatory Context(knowledge of rules and regulations)	The individual on the job must demonstrate knowledge and understanding of; RK1.HACCP RK2. GMP's RK3.FSSC,22000 RK4. Food and Drugs Regulations (eg SI 90 of 2001) RK5. Food Safety Act and Regulations RK6. Zambia Standards Act and Regulations RK7. Zambia Compulsory Standards Agency Act RK8. Local Government Act and Regulations RK9. Codex Alimentarius RK10. Patents and Companies Registration Agency (PACRA)
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Communicate in writing with various client types CS2. Construct and interpret noncompliance reports in laboratory setups or consultations.
	Reading Skills
	The individual on the job must be able to: CS3. Read and understand relevant documentation
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS4. Listen attentively and interpret communication from various clientele and subordinates
B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Decide on relevant business undertakings set in specific strategic plans

	Plan and organise
	The individual on the job should be able to: PS2. Plan and organise a business entity PS3. Coordinate marketing strategies related to the business entity
	Customer Centricity
	The individual on the job should be able to: PS4. Coordinate with key stakeholders that relate directly with the business entity with intent to satisfy their product/service requirements PS5. Apply business code of ethics, good manufacturing practices with emphasis on consumer protection
	Problem Solving
	The individual on the job should be able to: PS6. Resolve any conflicts with clients to provide excellent product service delivery
	Analytical Thinking
The individual on the job should be able to: PS5. Analyse and apply constructive business strategies	
Critical Thinking	
The individual on the job should be able to: PS6. Identify and deal with areas that tend to derail strategies laid down for business profit	

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

These include, but not limited to:

Equipment and Tools:

Design and Prototyping equipment and tools, computer software applications, food production equipment, Packaging equipment, Maintenance equipment and tools, Testing equipment and tools, Personal protective equipment, etc.

Raw Materials and Consumables:

Food ingredients etc.

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Food Scientists face challenges such as obsolete and/or inappropriate equipment and tools, budgetary constraints, inadequate product costing skills, poor technical skill base, bureaucracy in procurement procedures, lack of appreciation of preventive maintenance by non-engineering management staff, labour intensive nature of the work, rapid change of technology and materials, lack of personal protective equipment, climate change, cyber warfare, inconsistency in company and government policies and regulations, etc.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to challenges include: selecting and procuring appropriate equipment and tools for the job; supporting capacity building through training; identifying and utilising suitable adaptation and mitigation measure against the effect of climate change; utilising appropriate cyber security measures to protect against cyber warfare; include engineering professionals in management teams, deployment of automation where feasible, provision of personal protective equipment, participate in lobbying and formulation of policies, allocation of adequate financial resources, etc.

7. WORKING CONDITIONS/ENVIRONMENT

Food Scientists work with a variety of machinery, toxic substances and volatile materials, their work environment is susceptible to fires, explosions, structural failures and equipment malfunctions. Working conditions include cold, hot and wet conditions, climbing heights, stand/walk for long hours, lifting materials, working in day or night shifts, areas that are noisy and dusty, areas with limited lighting and ventilation, etc.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal/Within the Organisation

Management, supervisors, subordinates and other section members, etc.

8.2 External/Outside the Organisation

Government regulators, professional bodies, clients, suppliers, fellow food scientists from other companies, labour unions, clients, students/interns, etc.

9. PHYSICAL DEMANDS ON THE BODY

- Physique to sustain strenuous conditions;
- Be able to walk and stand for long periods of time;
- Bend, stretch, twist, or reach out;
- Be able to use fingers, hands and feet with ease to complete the assigned task (dexterity);

ANNEX A

Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programmes developers. Each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programmes developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated the 'Total Mark', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

A.1.2 Individual awarding/assessment bodies or institutions and other users of the NOS will create unique question papers for the theory part and evaluations for skill practical part for their respective candidates.

ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	DNOS.FS.01		
ZQF Level	7	Version Number	01
Sector	Manufacturing	Date of Approval	
Sub Sector		Date of Last Review	N/A
Occupation	Food Science	Date of Next Review	