THE NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

OCCUPATIONAL STANDARDS

OCCUPATION: ANIMAL BREEDING TECHNICIAN

LEVEL: NTA LEVEL 5

FEBRUARY 2024

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ABBREVIATIONS

CBET	Competency Based Education and Training
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OSHA	Occupational Safety and Health Administration
OS	Occupational Standards
OXT	Oxytocin
PG	Prostaglandin
PMSG	Pregnant Mare Serotonin (Gonadotropin)
SOP	Standard Operating Procedures
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks - essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Examples: livestock breeding services).
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.
Standards:	A set of statements, which, if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.

Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status, with a high level of human development. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical and Vocational Education and Training (NACTVET) has begun the job of drafting Occupational Standards (OS) that will eventually be adopted as National Occupational Standards (NOS) for use in the delivery of TET that meets the needs of the labour market and the country's economic agenda.

Occupational Standards (OS) are performance criteria that are matched with labour market demands. Each of them describes the functions, performance standards, and understanding or knowledge underpinning a given occupation. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruitment, supervision, and appraisal, as well as TET Standards. They are also helpful for benchmarking and harmonizing job qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in application across all public and private institutions.

However, it must be noted that Occupational Standards are different from Training /Education Standards. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical circuits, performs troubleshooting in electrical circuits, etc.), and are usually defined by Employers following procedures as agreed upon by all the stakeholders. On the other hand, Training and Education Standards are developed from the activities defined in the occupational standards, and they specify learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him/her to function at an agreed level in an occupation. Training and Education Standards are used to define curricula in training institutions. It is critical, however, to establish a direct link between the occupational standards and the training standards for both of them to respond collaboratively to the demands of the labour market.

For the purpose of TET delivery, Tanzania has adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. Therefore, it is quite pertinent for TET institutions to use the relevant occupational standards as a benchmark for formulating their

curricula.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training.

The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The process of developing these Occupational Standards involved both local and international expertise. The process began with an examination of major documents that guide Tanzanian skills development including the *10-year National Skills Development Strategy (2016-2026)*. NACTVET labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a team of experts in consultation with practitioners developed draft occupational standards. The draft document was used to develop an occupational profile for each occupation (DACUM Chart), which is attached as an **Appendix** to every Occupational Standard.

The occupational standards were validated during the stakeholders' forum held on 22nd and 23rd February 2024 at Morogoro. The information from the stakeholders' forum provides insight from the workplace, professional bodies, regulatory bodies and sector ministries regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR ANIMAL BREEDING TECHNICIANS

These standards cover a broad range of duties and tasks that can be performed by an Animal Breeding Technician. However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Animal Breeding Technician may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The Animal Breeding Technician plays an important role in the feeding, management, reproduction, epidemic prevention, feed and utilization during the breeding of livestock and poultry. They will provide the society with excellent meat, egg and milk products to meet people's food and nutritional needs. The Animal Breeding Technician is responsible for various tasks in delivery, obstetrics, nursing of new-born and lactating young animals, animal breeding control, breeding management, feeding, and epidemic prevention of livestock and poultry. Generally, the Animal Breeding

Technician performs the following responsibilities:

a) Estrus identification of female livestock

b) Collection of the semen of male livestock and poultry

c) Treatment of the semen of livestock and poultry

d) Breeding technology of livestock and poultry through artificial insemination

e) Animal breeding control

f) Knowing and identification of feed ingredients

g) Identification of feed additives

h) Mastering the underpinning knowledge of animal nutrition

i) Animal nutritional requirements and feeding standards

j) Livestock obstetrics

k) Livestock pregnancy diagnosis

l) Livestock obstetrics

m) Egg hatching

n) Collection of farm data

o) Common equipment applications in farms

p) Basic management of livestock and poultry breeding

q) Feeding basic management of commercial livestock and poultry farms

r) Disinfection of livestock and poultry farms

s) Treatment of manure of livestock and poultry

t) Livestock and poultry immunisation

u) Disease prevention and control

v) Basic management of farms

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA level 4, 5 and 6.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards

being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR ANIMAL BREEDING TECHNICIAN - NTA LEVEL 5

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PRESERVE THE SEMEN OF LIVESTOCK AND POULTRY	**DUTY NO.**	501
TASK TITLE	CONDUCT SEMEN QUALITY ASSESSMENT	**TASK NO.**	5011
PERFORMANCE CRITERIA	The person performing this task must be able to conduct the semen quality assessment according to the standard processing requirements of different livestock and poultry semen.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians. The tools and equipment to be used include: 1. Protective equipment: medical rubber gloves, protective suit, mask, hat; 2. Semen appearance assessment tool: electronic balance, measuring cylinder, graduated straw, semen collection cup; 3. Semen motility assessment tool: water bath kettle, pipette, microscope, constant temperature stage, glass slide, cover glass, centrifuge tube; 4. Sperm density assessment tool: haemocytometer, coverslip, glass slide, counter, pipette, microscope, sperm density meter, centrifuge tube; 5. Sperm abnormal rate assessment tool: microscopes, glass slide, coverslip, counter, blood cell differential counting board; 6. Reagents: distilled or deionized water, 0.9% sodium chloride solution, 3.0% sodium chloride solution, absolute ethanol (fix), Giemsa stain (stain), formalin fixative (fix); 7. Safety gear.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		**UNDERPINNING KNOWLEDGE**	
The person performing this task must be able to do the following: 1. Select the correct equipment, instruments and reagents for task execution; 2. Clean the work area to ensure a hygienic and sterile environment; 3. Visually assess the colour of the semen; 4. Smell to assess the smell of semen;		**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Assess the colour of the semen; 1.2 Assess the smell of the semen; 1.3 Assess the sperm motility by the microscope; 1.4 Calculate the sperm density by the haemocytometer;	

5. Prepare semen tablets; 6. Observe using the microscope 3-5 fields of view of the sample; 7. Count the cells using the haemocytometers; 8. Calculate the sperm density according to the formula; 9. Standardize the operations of smearing, staining, and fixing, and make glass slides with abnormal rate; 10. Calculate the abnormal sperm rate according to the formula; 11. Determine the results of semen quality; 12. Correctly fill in the semen quality assessment scale; 13. Observe health, occupational and environmental safety rules and regulations.	1.5 Assess the abnormal sperm rate by the microscope. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Hygiene and disinfection principles; 2.2 Aseptic operation principles; 2.3 Safety principles; 2.4 Principles of precision and accuracy; 2.5 Requirement standards for different livestock and poultry semen products; 2.6 Assessment standards of the quality of semen quality. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Composition of semen; 3.2 Physicochemical properties of semen; 3.3 Structure and metabolism of semen; 3.4 Concept of indicators related to semen quality; 3.5 Influence of the external environment on sperm; 3.6 Significance of semen quality assessment. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Time management skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The semen quality assessment is conducted according to the standard preservation requirements of different livestock and poultry semen.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Laboratory safety rules; 2. Epidemic prevention and occupational health; 3. Professional ethics and conduct codes; 4. Laws, regulations and policies applicable to the agribusiness sector; 5. National, industry, and local standards; 6. File management system.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PRESERVE THE SEMEN OF LIVESTOCK AND POULTRY	**DUTY NO.**	501
TASK TITLE	CARRY OUT SEMEN DILUTION	**TASK NO.**	5012
PERFORMANCE CRITERIA	The person performing this task must be able to conduct the semen dilution according to the standard processing requirements of different livestock and poultry semen.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians. The tools and equipment to be used include: 1. Protective equipment: medical rubber gloves, protective suit, mask, hat; 2. Tools and instruments: glass rod, label paper, thermometer, electronic scale, PH meter, drying oven, water bath kettle, measuring cylinder, triangular flask, water storage bottle, beaker, constant temperature magnetic stirrer; 3. Reagents: distilled water, secondary water or tertiary water, analytically pure, commercial diluent; 4. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools, equipment and reagents for the task; 2. Clean and disinfect equipment of diluent; 3. Prepare the semen sample; 4. Determine the amount of diluent according to the properties of the semen and the insemination dose of the female livestock; 5. Weigh chemical reagents accurately; 6. Adjust the volume, dissolve and sterilize distilled water or ultrapure water; 7. Prepare the diluent, and set the temperature of the diluent to be equivalent to that of the semen; 8. Pour the diluent into the semen, drain it with a glass rod, and mix the two thoroughly; 9. Record the source of sample semen, dilution ratio, operation date and other information;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Prepare the diluent according to the formula; 1.2 Dilute semen; 1.3 Control the semen dilution ratio. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Hygiene and disinfection principles; 2.2 Aseptic operation principles; 2.3 Safety principles; 2.4 Principles of precision and accuracy. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The purpose and method of semen dilution; 3.2 The relationship between dilution factor and semen quality; 3.3 The relationship between the dilution factor and the type of diluent and storage method;

10. Observe health, occupational and environmental safety rules and regulations.	3.4 Common semen diluent formulations. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Time management skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Semen dilution is carried out according to the standard production and processing requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Laboratory safety rules; 2. Epidemic prevention and occupational health; 3. Professional ethics and conduct codes; 4. Laws, regulations and policies applicable to the agribusiness sector; 5. National, industry, and local standards; 6. Cost accounting.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PRESERVE THE SEMEN OF LIVESTOCK AND POULTRY	**DUTY NO.**	501
TASK TITLE	PRODUCE FROZEN SEMEN	**TASK NO.**	5013
PERFORMANCE CRITERIA	The person performing this task must be able to produce frozen semen according to the processing requirements of livestock and poultry semen.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians. The tools and equipment to be used include: 1. Protective equipment: medical rubber gloves, protective suit, mask, hat; 2. Tools and instruments: liquid nitrogen, low temperature balance cabinet, frozen semen tubule, semen filling machine, program-controlled freezer, connecting line, magnetic stirrer, centrifuge; 3. Reagents: diluent, antifreeze, nutrient, glycerine, egg yolk liquid, distilled/deionized water, liquid nitrogen, thawing solution; 4. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools, equipment and reagents for the task; 2. Collect semen; 3. Clean and disinfect equipment of diluent; 4. Weigh chemical reagents accurately; 5. Adjust the volume, dissolve and sterilize distilled water or ultrapure water; 6. Determine the amount of diluent based on the properties of the semen; 7. Prepare the frozen semen diluent; 8. Mix and dilute semen; 9. Cool balance; 10. Perform the Canning, seal and label tubule semen; 11. Identify with distinguishing sticks; 12. Set the semen freezing program and freeze semen; 13. Collect and put the prepared frozen semen into liquid nitrogen; 14. Make frozen semen labels; 15. Select samples for future reference; 16. Correctly fill out the frozen semen production record form;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Configure diluent; 1.2 Dilute semen; 1.3 Can, seal and label tubule semen; 1.4 Freeze semen with the program-controlled freezer; 1.5 Store semen in liquid nitrogen. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of semen freezing; 2.2 The action principle of egg yolk liquid; 2.3 The action principle of antifreeze; 2.4 The technical index standards of different livestock and poultry frozen semen; 2.5 The industry standards of packaging, labelling, and storage of frozen semen. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The significance of frozen semen;

17. Observe health, occupational and environmental safety rules and regulations.	3.2 The type of frozen semen; 3.3 Freezing procedure of semen freezing; 3.4 Labelling requirements and methods of tubule frozen semen; 3.5 Storage requirements of frozen semen containers; 3.6 Common freeze diluent formulations. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Time management skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The frozen semen is produced according to the standard preservation specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Laboratory safety rules; 2. Epidemic prevention and occupational health; 3. Professional ethics and conduct codes; 4. Related policies and regulations; 5. Guidelines for the use of compound antibiotics; 6. The structure and use precautions of the liquid nitrogen container; 7. Emergency treatment for liquid nitrogen frostbite.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PRESERVE THE SEMEN OF LIVESTOCK AND POULTRY	**DUTY NO.**	501
TASK TITLE	CARRY OUT SEMEN STORAGE AND TRANSPORTATION	**TASK NO.**	5014
PERFORMANCE CRITERIA	The person performing this task must be able to store and transport the semen according to the standard processing and preservation requirements of different livestock and poultry semen.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians. The tools and equipment to be used include: 1. Protective equipment: medical rubber gloves, protective suit, mask, hat; 2. Tools and instruments: liquid nitrogen, thermostat, refrigerator, semen bag (bottle), semen storage tube (storage of tubule frozen semen), gauze packaging bag; 3. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for the task; 2. Check the integrity and cleanliness of storage containers, transportation containers and other equipment; 3. Use the thermostat correctly; 4. Use the liquid nitrogen carefully 5. Carry out relevant operations according to the requirements of semen transportation; 6. Fill out the semen preservation and transportation registration form; 7. Select samples for future reference; 8. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Use liquid nitrogen, thermostat, refrigerator, etc. to preserve semen; 1.2 Transport semen. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of aseptic manipulation; 2.2 Principles of cold storage of semen; 2.3 Principles of freezing storage of semen. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The purpose of semen preservation; 3.2 The shelf life of different livestock and poultry semen storage methods; 3.3 Suitable storage temperature for different semen; 3.4 The type of frozen semen; 3.5 Semen transportation requirements.

	4.0 Essential Skills 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Time management skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The storage and transportation of semen is carried out according to the needs of production and operation, and the requirements of livestock and poultry semen treatment.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Laboratory safety rules; 2. Epidemic prevention and quarantine system; 3. Legal system for semen transportation; 4. Transportation safety and emergency response.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY BREEDING THROUGH ARTIFICIAL INSEMINATION TECHNOLOGY	**DUTY NO.**	502
TASK TITLE	CONDUCT CATTLE ARTIFICIAL INSEMINATION BREEDING TECHNOLOGY	**TASK NO.**	5021
PERFORMANCE CRITERIA	The person performing this task must be able to conduct artificial insemination technology for cattle according to the standard artificial insemination breeding technologies		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians. The tools and equipment to be used include: 1. Insemination gun for cattle; 2. Insemination gun casing; 3. Liquid nitrogen container; 4. Granular frozen semen; 5. Thawing cup of granule frozen semen; 6. Special scissors for granule frozen semen; 7. Microscope; 8. Glass slide, cover slip; 9. Restraint frame or neck clamp for cattle; 10. Autoclave; 11. Petrolatum; 12. Crayons for cattle; 13. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Assess the cattle's estrus status and suitable insemination time according to the cattle's behavioural characteristics, wax traces on the back, or pedometer data; 2. Collect the frozen semen according to the breeding plan and thaw at the optimal temperature; 3. Extract individual frozen semen for semen motility test; 4. Prepare the insemination gun correctly; 5. Correctly load the frozen semen into the insemination gun;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Judge the estrus of cattle; 1.2 Select and thaw frozen semen; 1.3 Test semen motility; 1.4 Prepare insemination gun and load frozen semen into the gun; 1.5 Conduct insemination on cows by rectal grasping method. **2.0 Principles** The person performing this task must be able to explain the following principles:

6. Conduct accurate insemination with rectal grasping method; 7. Record inseminated cow data and files; 8. Observe health, occupational and environmental safety rules and regulations.	2.1 Ovulation cycle of cows; 2.2 Requirements and standards for the extraction of granular frozen semen; 2.3 Semen motility and quality identification requirements; 2.4 Evaluation criteria for sperm motility; 2.5 Principles of artificial insemination technology. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Structure and morphology of the genitourinary system of cows; 3.2 Precautions for loading frozen semen into the gun; 3.3 Precautions for insemination with rectal grasping method; 3.4 Operating procedure and operation method of insemination through rectal grasping method. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Planning skills; 4.6 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Cattle artificial insemination breeding technology conducted according to the standard artificial insemination breeding technologies.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Reproductive physiology; 2. Safety operation and animal welfare; 3. Management and analysis of data specification; 4. Aseptic operation and hygienic standards.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY BREEDING THROUGH ARTIFICIAL INSEMINATION TECHNOLOGY	**DUTY NO.**	502
TASK TITLE	CONDUCT ARTIFICIAL INSEMINATION OF SHEEP AND GOAT	**TASK NO.**	5022
PERFORMANCE CRITERIA	The person performing this task must be able to conduct artificial insemination of sheep according to the approved standards and specifications		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians. The tools and equipment to be used include: 1. Insemination gun for sheep; 2. Sheep speculum; 3. Head-mounted searchlight; 4. Insemination Restraint frame; 5. Autoclave; 6. Glassware; 7. Microscope; 8. Glass slide, cover slip; 9. Instrument disinfection cotton ball; 10. Marker crayon or paint; 11. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Assess the estrus status of ewes according to their behavioural characteristics; 2. Conduct estrus test of rams according to the estrus situation of ewes; 3. Collect ram semen correctly; 4. Detect the motility and quality of fresh ram semen; 5. Dilute and store semen; 6. Prepare the insemination equipment; 7. Restrain ewes; 8. Properly clean the vulva of ewes; 9. Carry out the speculum insemination; 10. Record inseminated ewe data and files; 11. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Identification of estrus ewes; 1.2 Determine the sheep breeding time; 1.3 Collect ram semen; 1.4 Detect the motility of fresh sheep semen; 1.5 Dilute ram semen; 1.6 Prepare and disinfect insemination guns and speculum; 1.7 Restrain ewes; 1.8 Conduct insemination through speculum method. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Ewe ovulation rules and best breeding time;

	2.2 Requirements and standards for the extraction of granular frozen semen; 2.3 Semen motility and quality identification requirements; 2.4 Evaluation criteria for sperm motility; 2.5 Principles of artificial insemination technology; 2.6 Standard for restraining ewes. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Identification method of ewe's estrus behaviour; 3.2 Structure and morphology of the genitourinary system of ewes; 3.3 Evaluation methods for sperm motility; 3.4 Operating procedures and precautions for ram semen collection; 3.5 Precautions for disinfection and preparation of insemination instruments; 3.6 Operating procedures and precautions for insemination through speculum. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Planning skills; 4.6 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Artificial insemination of sheep is conducted according to the standard artificial insemination breeding technologies
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Prevention of zoonotic diseases; 2. Reproductive physiology; 3. Relevant laws and regulations and ethical guidelines; 4. Risk factors and emergency measures.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY BREEDING THROUGH ARTIFICIAL INSEMINATION TECHNOLOGY	**DUTY NO.**	502
TASK TITLE	CONDUCT ARTIFICIAL INSEMINATION OF PIGS	**TASK NO.**	5023
PERFORMANCE CRITERIA	The person performing this task must be able to conduct artificial insemination of pigs according to approved standards and specifications		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Conventional sperm duct; 2. Deep sperm duct; 3. Microscope; 4. Glass slide, cover slip; 5. Semen bag or bottle; 6. Potassium permanganate; 7. Lubricant; 8. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the estrus performance of sows; 2. Judge the estrus status according to the sow's behaviour and genital characteristics and pressing and standing reflex; 3. Determine the insemination time according to the estrus status of the sow; 4. Extract a small amount of fresh semen to detect motility; 5. Prepare the sperm duct; 6. Clean the vulva of sows; 7. Conduct smooth routine insemination and deep insemination of sows; 8. Record inseminated sow data and files; 9. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Identify changes in behavioural characteristics of estrus sows; 1.2 Determine the best insemination time for sows; 1.3 Detect the motility and quality of boar semen; 1.4 Distinguish between conventional insemination and deep insemination. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of artificial insemination technology; 2.2 Ovulation cycle of sows; 2.3 Indicators of semen quality. **3.0 Theories**

	The person performing this task must be able to explain the following: 3.1 Structure and morphology of the genitourinary system of sows; 3.2 Evaluation for sperm motility; 3.3 Difference between conventional insemination and deep insemination; 3.4. Operation procedures and precautions of conventional insemination; 3.5 Operation procedures and precautions of deep insemination; **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Planning skills; 4.6 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Artificial insemination of pigs in accordance with approved standards .
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Batch production management in sow farms; 2. Breeding technology; 3. Staff assessment indicators; 4. Establishment of breeding files.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY BREEDING THROUGH ARTIFICIAL INSEMINATION TECHNOLOGY	**DUTY NO.**	502
TASK TITLE	CONDUCT ARTIFICIAL INSEMINATION OF CHICKEN	**TASK NO.**	5024
PERFORMANCE CRITERIA	The person performing this task must be able to conduct artificial insemination of chicken according to the standard artificial insemination specifications.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Insemination gun and gun tip; 2. Insemination glue head dropper; 3. Microscope; 4. Glass slide, cover slip; 5. Semen bottle; 6. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Coordinate and arrange the time of insemination according to the incubation requirements and plans of the hatchery; 2. Prepare semen collection and insemination equipment; 3. Collect rooster semen; 4. Dilute rooster semen; 5. Conduct double cooperation and distribute insemination tasks; 6. Restrain hens; 7. Accurately absorb the demanded amount of inseminated semen; 8. Identify the insemination site; 9. Conduct correct and smooth insemination; 10. Accurately record insemination files; 11. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop a hatchery incubation plan; 1.2 Prepare insemination collection equipment; 1.3 Conduct semen collection and insemination by two persons. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of egg insemination; 2.2 Quality standards for qualified rooster semen; 2.3 Hen ovulation and incubation cycle; 2.4 Principles of artificial insemination technology. **3.0 Theories** The person performing this task must be able to explain the following:

	3.1 Structure, morphology and function of the reproductive system of the hen; 3.2 Evaluation methods for sperm motility; 3.3 Insemination procedure. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Planning skills; 4.6 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Chicken artificial insemination breeding technology conducted according to the standard artificial insemination breeding technologies
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Breeding plan and management; 2. Reproductive tract hygiene and disinfection; 3. Chicken behaviour and welfare; 4. Emerging technologies and research advances.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY BREEDING THROUGH ARTIFICIAL INSEMINATION TECHNOLOGY	**DUTY NO.**	502
TASK TITLE	CARRY OUT SELECTIVE PAIRING TECHNOLOGY OF LIVESTOCK AND POULTRY	**TASK NO.**	5025
PERFORMANCE CRITERIA	The person performing this task must be able to formulate reasonable plans for adaptive age, breeding methods, and breeding techniques in pig farms, beef cattle farms, sheep farms, and chicken farms according to the requirements for standard pairing technologies.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Insemination guns for cattle and insemination guns for sheep; 2. Insemination gun casing; 3. Liquid nitrogen container; 4. Granular frozen semen; 5. Thawing cup of granule frozen semen; 6. Special scissors for granule frozen semen; 7. Microscope; 8. Glass slide, cover slip; 9. Restraint frame or neck clamp for cattle; 10. Autoclave; 11. Petrolatum; 12. Crayons for cattle; 13. Sheep speculum; 14. Head-mounted searchlight; 15. Sheep insemination restraint frame; 16. Instrument disinfection cotton ball; 17. Conventional sperm duct; 18. Deep sperm duct; 19. Semen bag or bottle; 20. Potassium permanganate; 21. Lubricant; 22. Insemination gun and gun tip; 23. Insemination glue head dropper; 24. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following:	**Detailed knowledge about:** **1.0 Methods**

1. Select and retain high-quality livestock and poultry breeds according to the principles and requirements of animal production and economic indicators; 2. Select the suitable breeding method for different livestock and poultry varieties; 3. Manage specific procedures for the breeding of breeding animals; 4. Calculate the animal's duration of pregnancy and expected date of delivery; 5. Accurately record animal breeding data and sort out breeding files; 6. Observe health, occupational and environmental safety rules and regulations.	The person performing this task must be able to explain how to: 1.1 Formulate breeding methods for breeding animals according to production methods and production objectives; 1.2 Determine the best breeding age of animals according to the animal breeding methods; 1.3 Determine the proportion of male and female animals to be bred according to the animal breeding method; 1.4 Determine the animal feeding method according to the age of animal breeding; 1.5 Formulate animal selective pairing plans and programs; 1.6 Record animal breeding data; 1.7 Organize animal breeding files. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of animal reproductive physiology; 2.2 Principles of determining the direct mating proportion of the animal; 2.3 Principles of predicting the expected date of delivery of animals; 2.4 Principles of breeding and selective pairing technology of breeding animals; 2.5 Principles of artificial insemination of animals. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Breeding methods and feeding patterns of animals; 3.2 Technical requirements for artificial insemination of animals; 3.3 Procedures of animal breeding. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Planning skills; 4.6 Communication skills; 4.7 Overall management skills.

DESCRIPTION OF THE END PRODUCT / SERVICE	Selective pairing technology of livestock and poultry is carried out according to production goals, and complete breeding files for breeding animals are established.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal genetics; 2. Genetic improvement techniques; 3. Animal physiology and reproduction; 4. Animal nutrition; 5. Health management and disease prevention and control; 6. Animal welfare regulations and ethical principles.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY BREEDING THROUGH ARTIFICIAL INSEMINATION TECHNOLOGY	**DUTY NO.**	502
TASK TITLE	CARRY OUT BREEDING DATA RECORDING AND ARCHIVING	**TASK NO.**	5026
PERFORMANCE CRITERIA	The person performing this task must be able to formulate the breeding plan for livestock and poultry , keep the breeding data records and do archiving according to the standard data archiving.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Computer; 2. Breeding management software; 3. Animal behaviour recording facilities and equipment; 4. Data statistics software; 5. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Compile corresponding breeding record sheets according to the animal breeding data; 2. Prepare animal growth and development tables according to the production and development of animals; 3. Determine animal growth and breeding performance indicators based on breeding goals; 4. Summarize and enter breeding record data; 5. Record data indicators and production performance based on calculation, statistics and analysis of breeding; 6. Develop a complete breeding data file; 7. Manage breeding data; 8. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Create breeding data sheets; 1.2 Measure and record animal body size, production and breeding traits; 1.3 Make breeding animal cards and numbers; 1.4 Master statistical analysis principles and methods of breeding data. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Breeding-related performance and indicator calculation formulas; 2.2 Statistical analysis logic and rules of breeding data; 2.3 Usage principles for breeding data software. **3.0 Theories** The person performing this task must be able to explain the following:

	3.1 Concepts related to animal breeding; 3.2 Calculation method of animal breeding related achievements. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Planning skills; 4.6 Communication skills; 4.7 Problem analysis skills. 4.8 Computer skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Breeding data recording and archiving is carried out in accordance with approved standards and specifications
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety protection and animal restraining; 2. Data recording and collection; 3. Data logic and data organization; 4. Information technology and database management.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK OBSTETRICS	**DUTY NO.**	503
TASK TITLE	PERFORM CATTLE AND SHEEP OBSTETRICS	**TASK NO.**	5031
PERFORMANCE CRITERIA	The person performing this task must be able to conduct cattle and sheep obstetrics timely to complete delivery stages according to the best obstetrics practices		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Delivery room; 2. Padding: bedding; 3. Protective equipment: protective hat, mask, disposable long-arm gloves, short-arm gloves, work clothes, work shoes; 4. Disinfecting equipment: sprayer; 5. Environmental disinfectants: sodium hydroxide or carbolic acid or plant ash; 6. Skin and mucous disinfectants: Iodine, lysol, bromogeramine or potassium permanganate; 7. Obstetric drugs: oxytocin; 8. Obstetrics appliances: obstetric ropes, bandages or strings, lubricants, scissors, tweezers, towels, brushes, washbasins, obstetrics devices, etc. 9. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and drugs for the task; 2. Check the breeding and pregnancy records of cattle and sheep; 3. Calculate the expected date of delivery of cattle and sheep; 4. Identify and monitor cattle and sheep during delivery; 5. Disinfect the external birth canal of cows and sheep; 6. Identify cows and sheep with dystocia; 7. Rescue cows and sheep with dystocia in time; 8. Nurse new-born calves and lambs; 9. Clean delivery room and tools;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Calculate the expected date of delivery of cattle and sheep; 1.2 Identify the delivery status of cattle and sheep; 1.3 Use disinfectants; 1.4 Distinguish the dystocia of cattle and sheep; 1.5 Rescue cows and sheep in various dystocia states; 1.6 Nurse new-born calves and lambs. **2.0 Principles** The person performing this task must be able to explain the following principles:

10. Observe health, occupational and environmental safety rules and regulations.	2.1 Factors that determine the course of delivery (force of labour, birth canal, relationship of fetus to mother); 2.2 Criteria for judging dystocia of cattle and sheep; 2.3 Principles of artificial obstetrics technology. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The correct configuration and disinfection method of disinfectants; 3.2 Methods for judging dystocia of cattle and sheep; 3.3 Obstetrics measures for cows and sheep with dystocia; 3.4 First aid measures for new-born calves and lambs. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Learning skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The cattle and sheep obstetrics carried out according to the best obstetrics practices.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal physiology and anatomy; 2. Health and medical knowledge; 3. Emergency and complication management; 4. Animal ethics and welfare.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK OBSTETRICS	**DUTY NO.**	503
TASK TITLE	PERFORM RABBIT OBSTETRICS	**TASK NO.**	5032
PERFORMANCE CRITERIA	The person performing this task must be able to conduct rabbit obstetrics timely to complete delivery stages according to the best livestock obstetrics practices		
RANGE STATEMENT	The task can be performed in a rabbit house under the supervision of animal breeding engineers or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Delivery room; 2. Padding: Bedding; 3. Protective equipment: protective hat, mask, disposable long-arm gloves, short-arm gloves, work clothes, work shoes; 4. Disinfecting equipment: sprayer; 5. Environmental disinfectants: sodium hydroxide or carbolic acid or plant ash; 6. Skin and mucous disinfectants: Iodine, lysol, bromogeramine or potassium permanganate; 7. Obstetric drugs: oxytocin, sodium cloprostenol; 8. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and drugs for the task; 2. Check the breeding and pregnancy records of rabbits; 3. Calculate the expected date of delivery of rabbits; 4. Identify and monitor female rabbits during delivery; 5. Identify female rabbits with dystocia; 6. Rescue female rabbits with dystocia; 7. Nurse new-born rabbits; 8. Clean delivery room and tools; 9. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Calculate the expected date of delivery of rabbits; 1.2 Recognize clinical signs of labour in rabbits; 1.3 Use disinfectants; 1.4 Rescue female rabbits in various dystocia states; 1.5 Nurse new-born rabbits. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Production characteristics of rabbits; 2.2 Principles of distinguishing female rabbit with dystocia;

	2.2 Principles of artificial obstetrics technology. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The correct configuration and disinfection method of disinfectants; 3.2 Obstetrics measures for dystocia female rabbits. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Learning skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The rabbit obstetrics is carried out according to the best livestock obstetrics practices.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Knowledge of rabbit biology; 3. Birth complications:

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK OBSTETRICS	**DUTY NO.**	503
TASK TITLE	PERFORM PIG OBSTETRICS	**TASK NO.**	5033
PERFORMANCE CRITERIA	The person performing this task must be able to conduct pig obstetrics timely to complete delivery stages according to the best livestock obstetrics practices		
RANGE STATEMENT	The task can be performed in a pig delivery room under the supervision of animal breeding engineers or senior animal breeding technicians, animal scientist. The tools and equipment to be used include: 1. Delivery room; 2. Padding: Bedding; 3. Protective equipment: protective hat, mask, disposable long-arm gloves, short-arm gloves, work clothes, work shoes; 4. Disinfecting equipment: sprayer; 5. Environmental disinfectants: sodium hydroxide or carbolic acid or plant ash; 6. Skin and mucous disinfectants: Iodine, lysol, bromogeramine or potassium permanganate; 7. Obstetric drugs: Oxytocin, cloprostenol, estrogen; 8. Obstetrics appliances: lubricants, obstetric rope, scissors, towels, brushes, washbasins, obstetrics devices, etc. 9. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and drugs for the task; 2. Check the breeding and pregnancy records of pigs; 3. Calculate the expected date of delivery of pigs 4. Identify and monitor sows during delivery; 5. Disinfect the external birth canal of sows; 6. Identify sows with dystocia; 7. Rescue sows with dystocia; 8. Nurse new-born pigs; 9. Clean delivery room and tools; 10. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Carry out health protection and take safety precautions; 1.2 Calculate the expected date of delivery of pigs; 1.3 Identify the delivery status of sows; 1.4 Use disinfectants; 1.5 Identify sow dystocia status; 1.6 Rescue sows in dystocia; 1.7 Provide first aid for new-born piglets; 1.8 Nurse new-born piglets. **2.0 Principles** The person performing this task must be able to explain the following principles:

	2.1 Factors that determine the course of delivery (force of labour, birth canal, relationship of fetus to mother); 2.2 Criteria for judging dystocia of pigs; 2.3 Principles of artificial obstetrics technology. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The correct configuration and disinfection method of disinfectants; 3.2 Judgment methods for sow dystocia; 3.3 Obstetrics measures for sows with dystocia; 3.4 First aid measures for new-born piglets. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Learning skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The pig obstetrics is carried out according to the best obstetrics practices. .
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Reproductive physiology of pigs; 2. Management of production environment; 3. Data recording and analysis; 4. Regulations and ethics.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ENSURE BALANCED LIVESTOCK AND POULTRY NUTRITION	**DUTY NO.**	504
TASK TITLE	PROVIDE BALANCED NUTRIENTS AND ENERGY	**TASK NO.**	5041
PERFORMANCE CRITERIA	The person performing this task must be able to supply livestock and poultry with balanced nutrients and according to the energy requirements of livestock and poultry at each growth and development stage from the feeding standards, and according to the required energy demands.		
RANGE STATEMENT	The task can be performed in a farm office under the supervision of animal breeding engineers or senior animal breeding technicians; animal scientist. The tools and equipment to be used include: 1. Computer; 2. Statistical software; 3. Stationery; 4. Tablet/Smart phone; 5. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Study about animal breeds and stages; 2. Analyse feed ingredients; 3. Choose the appropriate feed to provide nutrients and energy according to different situations; 4. Calculate protein, vitamin and mineral requirements; 5. Develop the feeding plan; 6. Monitor animal growth, weight changes and health status, and adjust feeding plans regularly; 7. Establish a recording system to regularly evaluate the feeding effect; 8. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose the suitable energy system; 1.2 Choose the suitable feed; 1.3 Develop the feeding plan; 1.4 Monitor animal growth and adjust the feeding plan; 1.5 Evaluate feeding effects. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Source of energy; 2.2 Composition of nutrients in the feed; 2.3 Concept of gross energy, digestible energy, metabolizable energy and net energy. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Factors affecting nutrient composition; 3.2 Comparison between composition of animal feed and composition of plant feed;

	3.3 Effective judgments. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Memory skills; 4.6 Problem-solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Balanced nutrients and energy are provided to the livestock and poultry according to the requirements of livestock and poultry at each growth and development stage from the feeding standards
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Digestive physiology of animals; 2. Nutritional needs in special circumstances; 3. Emerging nutrition research.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ENSURE BALANCED LIVESTOCK AND POULTRY NUTRITION	**DUTY NO.**	504
TASK TITLE	PROVIDE BALANCED PROTEIN NUTRITION	**TASK NO.**	5042
PERFORMANCE CRITERIA	The person performing this task must be able to supply livestock and poultry with balanced protein nutrition according to the requirements of livestock and poultry at each growth and development stage from the feeding standards.		
RANGE STATEMENT	The task can be performed in a farm office under the supervision of animal breeding engineers or senior animal breeding technicians; animal scientist. The tools and equipment to be used include: 1. Computer; 2. Statistical software; 3. Stationery; 4. Tablet/Smart phone; 5. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Correctly judge the protein deficiency according to the actual situation; 2. Use the feeding standards to query the protein requirement; 3. Reasonably add non-protein nitrogen feed in ruminant feed; 4. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Assess the nutritional value of protein; 1.2 Query the protein requirement; 1.3 Apply feeding standards. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Composition of protein; 2.2 Protein trophism; 2.3 Concepts of essential amino acids, non-essential amino acids, and limiting amino acids. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Dangers of protein deficiency and excess; 3.2 Protein digestion process; 3.3 Protein absorption process **4.0 Essential Skills**

	4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Memory skills; 4.6 Problem-solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Balanced protein nutrition is provided in accordance to approved standards and specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Ideal protein; 2. Dietary amino acid balance; 3. Protein and environmental sustainability; 4. Laws, regulations and policies applicable to the agribusiness sector.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ENSURE BALANCED LIVESTOCK AND POULTRY NUTRITION	**DUTY NO.**	504
TASK TITLE	PROVIDE BALANCED FAT NUTRITION	**TASK NO.**	5043
PERFORMANCE CRITERIA	The person performing this task must be able to supply livestock and poultry with balanced fat nutrition according to the requirements of livestock and poultry at each growth and development stage from the feeding standards		
RANGE STATEMENT	The task can be performed in a farm office under the supervision of animal breeding engineers or senior animal breeding technicians; animal scientist. The tools and equipment to be used include: 1. Computer; 2. Statistical software; 3. Stationery; 4. Tablet/Smart phone; 5. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select suitable fat sources in feed; 2. Determine the appropriate fat content according to animal performance and feed cost; 3. Check the fat oxidation degree, odour and other indicators to ensure the quality of the fat; 4. Blend selected fat sources with other feed ingredients; 5. Add fat to the feed by mixing, coating, spraying, and other methods; 6. Arrange the amount and frequency of fat feeding according to the growth stage and production performance of animals; 7. Monitor animal performance and health regularly; 8. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose the fat source; 1.2 Set the fat content; 1.3 Assess fat mass; 1.4 Conduct fat formulation; 1.5 Reasonably add fat to different livestock and poultry feeds according to the actual situation; 1.6 Manage feeding; 1.7 Adjust and optimize plans. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Composition of fat; 2.2 Nutritional and physiological functions of fat; 2.3 Concept of essential fatty acids and trans fatty acids. **3.0 Theories** The person performing this task must be able to explain the following:

	3.1 Hazards of essential fatty acid deficiency; 3.2 Fat digestion process; 3.3 Process of fat absorption. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Memory skills; 4.6 Problem-solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Balanced fat nutrition is provided in accordance
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Effect of feed fat on the quality of animal products; 2. Laws, regulations and policies applicable to the agribusiness sector. 3. Fat and environmental sustainability.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ENSURE BALANCED LIVESTOCK AND POULTRY NUTRITION	**DUTY NO.**	504
TASK TITLE	PROVIDE BALANCED CARBS NUTRITION	**TASK NO.**	5044
PERFORMANCE CRITERIA	The person performing this task must be able to supply livestock and poultry with balanced carbs nutrition according to the requirements of livestock and poultry at each growth and development stage from the feeding standards		
RANGE STATEMENT	The task can be performed in a farm office under the supervision of animal breeding engineers or senior animal breeding technicians; animal scientist. The tools and equipment to be used include: 1. Computer; 2. Statistical software; 3. Stationery; 4. Tablet/Smart phone; 5. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the nutritional requirements of carbs according to different animal species, growth stages, genders, production goals and other factors; 2. Analyse the carbs composition of the feed; 3. Select carbs sources in the feed according to the actual situation; 4. Design the reasonable feed formula according to the animal's nutritional requirements and the selected carbs source; 5. Prepare by mixing different feed ingredients according to the formula ratio; 6. Divide the feed into different supply stages according to the growth stages and production goals of animals; 7. Regularly monitor animal performance and health; 8. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the needs of keeping animals; 1.2 Understand feed ingredients; 1.3 Choose carbs sources; 1.4 Design feed formula; 1.5 Process and modulate coarse fodder; 1.6 Supply feed in stages; 1.7 Monitor and adjust plans. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Concepts of monosaccharides, oligosaccharides, polysaccharides, nitrogen-free extracts, and crude fibres; 2.2 Nutritional and physiological functions of carbs; 2.3 Special role of crude fibre. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Digestion of carbs;

	3.2 Absorption process of carbs. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Memory skills; 4.6 Problem-solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Balanced carbs nutrition is provided in accordance with approved standards and specifications
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Special role of oligosaccharides; 2. Carbs and fermentation; 3. Carbs and environmental sustainability; 4. Laws, regulations and policies applicable to the agribusiness sector.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ENSURE BALANCED LIVESTOCK AND POULTRY NUTRITION	**DUTY NO.**	504
TASK TITLE	PROVIDE BALANCED MINERALS AND VITAMINS	**TASK NO.**	5045
PERFORMANCE CRITERIA	The person performing this task must be able to supply livestock and poultry with minerals and vitamins nutrition according to the requirements of livestock and poultry at each growth and development stage from the feeding standards.		
RANGE STATEMENT	The task can be performed in a farm office under the supervision of animal breeding engineers or senior animal breeding technicians, and animal scientist. The tools and equipment to be used include: 1. Computer; 2. Statistical software; 3. Stationery; 4. Tablet/Smart phone; 5. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the deficiencies of animal minerals and vitamins; 2. Select the source of minerals and vitamins in the feed according to the actual situation; 3. Select the appropriate feed formula according to the feeding goals and needs of animals; 4. Determine the mineral and vitamin content of feed ingredients; 5. Formulate feed according to mineral and vitamin requirements; 6. Mix the feed evenly; 7. Monitor animal health and performance regularly; 8. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Judge the deficiencies of animal minerals and vitamins; 1.2 Identify sources of minerals and vitamins in feed; 1.3 Calculate mineral and vitamin dosage; 1.4 Determine and adjust feed formula; 1.5 Evenly mix feed; 1.6 Monitor and adjust; 1.7 Monitor and adjust. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Concept of essential minerals and vitamins; 2.2 Neurophysiological roles of minerals and vitamins. **3.0 Theories** The person performing this task must be able to explain the following:

	3.1 Hazards of essential minerals and vitamin deficiencies; 3.2 Process of digestion of essential minerals and vitamins; 3.3 Process of absorption of essential minerals and vitamins. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Memory skills; 4.6 Problem-solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Balanced minerals and vitamins are provided in accordance with approved standards and specifications. .
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Development trend and application of mineral and vitamin nutrition; 2. Laws, regulations and policies applicable to the agribusiness sector.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	APPLY EXPERTISE IN LIVESTOCK AND POULTRY BREEDING FACILITIES	**DUTY NO.**	505
TASK TITLE	CHOOSE SUITABLE BREEDING FACILITY	**TASK NO.**	5051
PERFORMANCE CRITERIA	The person performing this task must be able to correctly choose the right breeding facility in accordance with the standard livestock breeding facilities. .		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians. The facilities and equipment available include: 1. Feeding facilities and equipment of the pig house: pig pen equipment, floor equipment, pig house manure removal equipment, insulation equipment; 2. Feeding facilities and equipment of the cattle house: cattle pen equipment, floor equipment, cattle house manure removal equipment, insulation equipment; 3. Feeding facilities and equipment of the chicken house: chicken coop equipment, floor equipment, chicken house manure removal equipment, insulation equipment; 4. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for the task; 2. Select the appropriate breeding barn; 3. Install and debug ground facilities; 4. Use facilities on the ground; 5. Maintain ground facilities; 6. Choose different insulation equipment and use insulation equipment correctly according to the standards of livestock and poultry separation; 7. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Select the breeding stall; 1.2 Select floor cleaning equipment; 1.3 Choose manure treatment equipment. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principles of livestock and poultry breeding equipment; 2.2 Principles for selection of livestock and poultry breeding equipment. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Application of various breeding stalls;

	3.2 Application of various floors under different breeding needs; 3.3 Advantages and disadvantages of different manure treatment methods. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Time management skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The suitable breeding facility is chosen according to approved standards and specifications the according to the needs of production and operation and the standard livestock breeding facilities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Basic knowledge of plumbing; 2. Manure discharge requirements.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ENSURE EXPERTISE IN LIVESTOCK AND POULTRY BREEDING FACILITIES	**DUTY NO.**	505
TASK TITLE	CHOOSE THE SUITABLE FEEDING FACILITIES	**TASK NO.**	5052
PERFORMANCE CRITERIA	The person performing this task must be able to correctly choose the facilities and equipment for livestock and poultry feeding according to the production needs and the standard livestock feeding facilities.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians. The facilities and equipment available include: 1. Feeding facilities and equipment of the pig house: cribs, feed trucks, feed transport vehicles, storage towers, feed conveyors, metering bins, drinking water equipment; 2. Feeding facilities and equipment of the cattle house: silage pits, silage piles, silage towers, mixers, cribs, drinking water equipment; 3. Feeding facilities and equipment of the chicken house: cribs, mechanized feeding equipment, drinking water equipment; 4. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for this task; 2. Install and debug ground facilities; 3. Use the feeding equipment appropriately; 4. Clean and maintain feeding equipment; 5. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose the appropriate feeding method for different livestock and poultry; 1.2 Choose the appropriate drinking water equipment for different livestock and poultry. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The selection principle of feeding equipment; 2.2 The selection principle of drinking water equipment. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Advantages, disadvantages and applicability of various feeding equipment;

	3.2 Advantages, disadvantages and applicability of various drinking water equipment. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Time management skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The suitable feeding facilities are chosen according to the production needs and the standard livestock feeding facilities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Dietary modes of different livestock and poultry; 2. Digestive characteristics of different livestock and poultry; 3. Feed characteristics of different livestock and poultry; 4. Basic knowledge of plumbing.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	IMPLEMENT MANURE TREATMENT	**DUTY NO.**	506
TASK TITLE	CARRY OUT BIOLOGICAL TREATMENT OF LIVESTOCK MANURE	**TASK NO.**	5061
PERFORMANCE CRITERIA	The person performing this task must be able to formulate reasonable and harmless manure treatment methods according to the harmless standard treatments of livestock manure.		
RANGE STATEMENT	The task can be performed on livestock farms or farmer manure dumps under the supervision of animal breeding engineers or senior animal breeding technicians. The tools and equipment to be used include: 1. Fly maggots (or earthworms, or black soldier flies); 2. Feeding cage for fly maggots (or earthworms, or black soldier flies); 3. Brown sugar; 4. Thermometer and hygrometer; 5. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select and breed fly maggots (or earthworms, or black soldier flies) according to their growth conditions; 2. Add the number of fly maggots (or earthworms, or black soldier flies); 3. Calculate the use amount of fly maggots (or earthworms, or black soldier flies) according to the amount of manure; 4. Pile the mixture of manure and fly maggots (or earthworms, or black soldier flies) on a suitable site for treatment. Place an appropriate amount of fly maggots (or earthworms, or black soldier flies); 5. Assess the degree of harmless treatment of manure according to the treatment by fly maggots (or earthworms, or black soldier flies); 6. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Breed fly maggots (or earthworms, or black soldier flies); 1.2 Calculate the use amount of fly maggots (or earthworms, or black soldier flies); 1.3 Place fly maggots (or earthworms, or black soldier flies); 1.4 Assess the degree of harmless treatment of manure by fly maggots (or earthworms, or black soldier flies). **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Basic principles of biological treatment; 2.2 Principles for selecting livestock manure biological treatment technology; 2.3 Standards for harmless treatment of livestock manure biological treatment technology. **3.0 Theories** The person performing this task must be able to

	explain the following: 3.1 Application process of livestock manure biological treatment technology; 3.2 Biological reaction process; 3.3 Monitoring and control of microbial activity. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5. Planning skills; 4.6 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The biological treatment of livestock manure is carried out according to approved standard treatments of livestock manure.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. By-product utilization; 2. Health and environmental standards; 3. Gas treatment and utilization; 4. Technical feasibility and economic evaluation; 5. New technology development.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	IMPLEMENT MANURE TREATMENT TECHNOLOGY	**DUTY NO.**	506
TASK TITLE	CARRY OUT FERMENTATION TREATMENT TECHNOLOGY OF POULTRY MANURE	**TASK NO.**	5062
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the fermentation of poultry manure according to approved standard fermentation treatment of poultry manure.		
RANGE STATEMENT	The task can be performed on farms or farmer manure dumps under the supervision of animal breeding engineers, animal scientist or senior animal breeding technicians. The tools and equipment to be used include: 1. Strain; 2. Brown sugar; 3. Padding; 4. Manure turning machine; 5. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Calculate the amount of padding according to the amount of manure; 2. Turn over the manure according to the fermentation temperature; 3. Spray the bacteria solution on the mixed manure; 4. Treat the manure; 5. Assess the degree of harmless treatment of manure according to the fermentation status; 6. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Revive strain; 1.2 Calculate the amount of bacteria solution used; 1.3 Choose the right padding; 1.4 Choose the right ratio to mix with padding. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Basic principles of biological fermentation of poultry manure; 2.2 Standards for harmless treatment of poultry manure. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Regulatory methods for fermentation conditions; 3.2 Methods of processing fermentation products and metabolites;

	3.3 Fermentation equipment and process content. **4.0 Essential Skills** 4.1 Learning skills; 4.2 Operations skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Planning skills; 4.6 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The fermentation treatment of poultry manure is carried out according to harmless standard fermentation treatments of poultry manure.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Microbiology basis; 2. Construction and management of fermentation beds; 3. Utilization of fermentation products; 4. Environmental protection and sustainable development 5. Regulatory policy and social impact.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY IMMUNIZATION	**DUTY NO.**	507
TASK TITLE	CONDUCT LIVESTOCK IMMUNIZATION	**TASK NO.**	5071
PERFORMANCE CRITERIA	The person performing this task must be able to conduct the livestock immunization according to approved standard livestock immunization procedures.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians, animal scientist. The tools and equipment to be used include: 1. Personal medical protective equipment: disposable gloves, protective suit, masks, headgear, disposable medical gloves, etc.; 2. Syringe: (10-20) ml metal syringes for pigs, cattle and sheep; 3. Needle: (7-12) needles for pigs, (9-16) needles for cattle, and (7-12) needles for sheep and goats; 4. Vaccine: it needs to be diluted before inoculation; 5. Skin disinfectants: Iodine, lysol, bromogeramine or potassium permanganate; 6. Disinfection equipment: autoclave, etc. 7. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Develop the immunization schedule; 2. Check animal and immunization sign; 3. Prepare immunization equipment; 4. Prepare disinfection equipment and drugs; 5. Prepare safety supplies and restraint assistants; 6. Prepare immunization signs (ear tags or other); 7. Prepare first aid drugs and equipment (0.1% epinephrine adrenaline, disposable syringe); 8. Check and prepare vaccines before use; 9. Dilute vaccines; 10. Restrain inoculated animals; 11. Choose the method of immunization (drinking water, aerosol, stabbing, injection, eye dropping and nasal dripping, mixing materials, etc.);	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose the appropriate immunization route and dose according to the animal and vaccine; 1.2 Restrain inoculated animals; 1.3. Handle abnormal situations or side effects in animals after immunization; 1.4 Establish animal immunization files and mark immunization signs; 1.5 Dispose inoculation equipment and waste. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Exemption principles of animals; 2.2 Principles of harmless treatment of immunization waste.

12. Manage allergic reactions caused by immunization; 13. Clean up equipment and dispose waste; 14. Manage immunization files; 15. Evaluate immunization effects; 16. Observe health, occupational and environmental safety rules and regulations.	**3.0 Theories** The person performing this task must be able to explain the following: 3.1 Immunization procedure; 3.2 Method and route of immunization; 3.3 Evaluation of immunization effects. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Learning skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The livestock immunization conducted according to approved standard livestock immunization procedures epidemic diseases.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Prevalence of local epidemic diseases; 2. Harmless treatment of immunization waste; 3. Occupational health and safety.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY IMMUNIZATION	**DUTY NO.**	507
TASK TITLE	CONDUCT POULTRY IMMUNIZATION	**TASK NO.**	5072
PERFORMANCE CRITERIA	The person performing this task must be able to conduct poultry immunization according to approved standard poultry immunization procedures.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians, animal scientist. The tools and equipment to be used include: 1. Personal medical protective equipment: disposable gloves, protective suit, masks, headgear, disposable medical gloves, etc.; 2. Syringe: 1ml, 2ml, 5ml syringe or continuous syringe for the poultry; 3. Needle: 5-9 needles; 4. Vaccine: check it in detail and dilute it before inoculation; 5. Disinfectants: iodine, lysol, bromogeramine or potassium permanganate; 6. Disinfection equipment: autoclave, steamer, etc.; 7. Equipment required for other immunization methods; 8. Safety gear.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Develop the immunization schedule; 2. Check animal and immunization sign; 3. Prepare immunization equipment; 4. Prepare disinfection equipment and drugs; 5. Prepare and check vaccines before use; 6. Dilute vaccines; 7. Choose the suitable method of immunization (drinking water, aerosol, stabbing, injection, eye dropping and nasal dripping, mixing materials, etc.); 8. Restrain inoculated animals; poultry is generally restrained with bare hands, with the thumb and forefinger of the left hand holding the wings, and the little finger hooking a foot; 9. Manage allergic reactions caused by immunization; 10. Clean up equipment and dispose waste; 11. Manage immunization files;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose the appropriate immunization route and dose according to the animal and vaccine; 1.2 Restrain inoculated animals; 1.3 Use continuous syringes; 1.4 Handle abnormal situations or side effects in animals after immunization; 1.5 Establish immunization files and mark animals with immunization signs; 1.6 Dispose inoculation equipment and waste. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Exemption principles of animals; 2.2 Principles of harmless treatment of immunization waste.

12. Evaluate immunization effects; 13. Observe health, occupational and environmental safety rules and regulations.	**3.0 Theories** The person performing this task must be able to explain the following: 3.1 Immunization procedure; 3.2 Method and route of immunization; 3.3 Evaluation of immunization effects. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Learning skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The poultry immunization is conducted according to approved standard poultry immunization procedures.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Prevalence of local epidemic diseases; 2. Harmless treatment of immunization waste; 3. Occupational health and safety.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ARRY OUT LIVESTOCK AND POULTRY IMMUNIZATION	**DUTY NO.**	507
TASK TITLE	CARRY OUT LIVESTOCK AND POULTRY IMMIUNIZATION THROUGH TREATED DRINKING WATER	**TASK NO.**	5073
PERFORMANCE CRITERIA	The person performing this task must be able to carry out livestock and poultry immunization through t treated drinking water according to approved standard immunization procedures		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Personal medical protective equipment: disposable gloves, protective suit, masks, headgear, disposable medical gloves, etc.; 2. Water dispenser; 3. Vaccine: check the packaging in detail before inoculation and use it after diluting it into an aqueous solution as required; 4. Disinfectants: Iodine, lysol, bromogeramine or potassium permanganate; 5. Disinfection equipment: autoclave, steamer, etc. 6. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Control the amount of drinking water before taking the drug; 2. Dilute the vaccine and calculate the water requirement; 3. Limit water drinking; 4. Place the water dispenser; 5. Handle abnormal situations or side effects in animals after immunization; 6. Create immunization files; 7. Mark immune animal identification; 8. Clean drinking water utensils and harmless treatment of immunization waste; 9. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Clean and disinfect water dispensers; 1.2 Control the water drinking of animals; 1.3 Check and dilute drugs before use; 1.4 Implement administration by drinking; 1.5 Manage allergic reactions caused by drugs; 1.6 Control the duration of drinking drugs (within 2 hours of placing drugs); 1.7 Clean up equipment and dispose waste; 1.8 Manage immunization files; 1.9 Evaluate immunization effects. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Exemption principles of animals;

	2.2 Vaccines (drugs) and principles of immediate use after dispensing; 2.3 Principles of harmless treatment of waste. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Immunization procedure; 3.2 Evaluation of immunization effects. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Learning skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The livestock and poultry immunization through treated drinking water is carried out according approved standard immunization procedures
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Drugs or additives that are prohibited from being added to feed and drinking water; 2. Animal health status; 3. Occupational health and safety.

OCCUPATION	ANIMAL BREEDING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT LIVESTOCK AND POULTRY IMMUNIZATION	**DUTY NO.**	507
TASK TITLE	CARRY OUT IMMUNIZATION BY MIXING DRUGS WITH ANIMAL FEED	**TASK NO.**	5074
PERFORMANCE CRITERIA	The person performing this task must be able to carry out immunization of livestock and poultry by mixing drugs with animal feed, according to the standard drugs and materials mixing requirements.		
RANGE STATEMENT	The task can be performed in the farm under the supervision of animal breeding engineers or senior animal breeding technicians and animal scientist. The tools and equipment to be used include: 1. Personal medical protective equipment: disposable gloves, protective suit, masks, headgear, disposable medical gloves, etc.; 2. Sprayer; 3. Vaccine: check the packaging in detail before inoculation and use it after diluting it into an aqueous solution as required; 4. Disinfectants: Iodine, lysol, bromogeramine or potassium permanganate; 5. Disinfection equipment: autoclave, steamer, etc. 6. Safety gear.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Dilute vaccines; 2. Use the sprayer correctly; 3. Limit feeding (starve animals before administration); 4. Handle abnormal situations or side effects in animals after immunization; 5. Establish immunization files and mark animal signs; 6. Clean sprayers and conduct harmless treatment of waste; 7. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Take health protection and safety precautions; 1.2 Clean and disinfect sprayers; 1.3 Check and dilute drugs (vaccine) before use; 1.4 Spray drugs (vaccines) on the feed surface; 1.5 Dispose allergic reactions caused by administration; 1.6 Clean up equipment and conduct harmless treatment of waste; 1.7 Manage immunization files; 1.8 Evaluate immunization effects. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Exemption principles of animals;

	2.2 Vaccines (drugs) and principles of immediate use after dispensing; 2.3 Principles of harmless treatment of waste. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Immunization procedure; 3.2 Evaluation of immunization effects. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills; 4.5 Learning skills; 4.6 Math skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The livestock and poultry immunization by mixing drugs with animal feed is carried out according to approved standards and procedures
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Daily feed intake of the animal; 2. Occupational health and safety.

APPENDIX 1: DACUM CHARTS FOR ANIMAL BREEDING TECHNICIAN - NTA LEVEL 5

DUTIES	TASKS	ENABLERS
1.0 Preserve the semen of livestock and poultry	1.1 Conduct semen quality assessment. 1.2 Carry out semen dilution. 1.3 Produce frozen semen. 1.4 Carry out semen storage and transportation.	**General skills and knowledge** · Semen quality assessment knowledge · Semen dilution skills · Frozen semen production skills · Semen preservation and transportation knowledge · Breeding knowledge · Insemination skills · Breeding management knowledge · Obstetrics skills · Creativity and innovation skills · Problem-solving skills · Communication skills · Computer skills · Safety skills **Tools and equipment** · Printer · Computer · Reproductive control hormones · Commonly-used equipment and tools for breeding · Medical protective equipment · Semen quality assessment and processing equipment, etc. · Breeding, insemination equipment, etc. · Delivery drugs and utensils, etc. **Materials** · Reproductive control hormones **Requirements for employees** · Time management · Working hard · Keeping promises · Good morals · Being trustworthy · Self-motivation

DUTIES	TASKS	ENABLERS
2.0 Carry out livestock and poultry breeding through artificial insemination	2.1 Conduct artificial insemination of cattle 2.2 Conduct artificial insemination of sheep 2.3 Conduct artificial insemination of pigs 2.4 Conduct artificial insemination of chicken 2.5 Carry out selective pairing of livestock and poultry. 2.6 Carry out breeding data recording and archiving.	**General skills and knowledge** · Nutrition knowledge · Knowledge of feeding facilities and equipment selection · Immunization knowledge · Knowledge of administration by drinking and mixing drugs into materials. · Data recording and management · Creativity and innovation skills · Problem-solving skills · Communication skills · Computer skills · Safety skills **Tools and equipment** · Feeding facilities and equipment · Immunization drugs and utensils, etc. · Manure treatment equipment · Computer **Materials** · Feed **Requirements for employees** · Sense of responsibility · Being trustworthy · Integrity
3.0 Carry out livestock obstetrics	3.1 Perform cattle and sheep obstetrics. 3.2 Perform rabbit obstetrics. 3.3 Perform pig obstetrics.	**General skills and knowledge** · Knowledge of animal physiology · First aid measures · Young animal care and disease control · Data logging and monitoring · Communication and coordination skills · Animal welfare regulations and code of ethics · Continuous learning skills and ability to update knowledge **Tools and equipment** · Obstetrics tools · Protection equipment

DUTIES	TASKS	ENABLERS
		· Thermometer · Communication equipment · Surgical scissors, tweezers and other obstetrics appliances **Materials** · Padding · Gloves and Protective Equipment · Disinfectant, alcohol · Lubricant · Towels, gauze, cotton balls · Nutritional supplements · Recording tools such as pens and paper **Requirements for employees** · Teamwork spirit · Integrity · Keeping promises · Patience and endurance
4.0 Ensure balanced livestock and poultry nutrition	4.1 Provide balanced nutrients and energy. 4.2 Provide balanced protein nutrition 4.3 Provide balanced fat nutrition. 4.4 Provide balanced carbs nutrition. 4.5 Provide balanced minerals and vitamins.	**General skills and knowledge** · Underpinning knowledge of biology · Underpinning knowledge of chemistry · Nutrition basis · Knowledge of feed ingredients and ingredients · Feeding management knowledge · Data analysis and recording skills · Communication skills · Computing skills **Tools and equipment** · Computer · Statistical software · Stationery · Tablet/Smart phone **Materials** · Paper **Requirements for employees** · Learning ability and curiosity

DUTIES	TASKS	ENABLERS
		· Scientific research spirit · Responsibility and patience · Teamwork spirit
5.0 Ensure expertise in livestock and poultry breeding facilities	5.1 Choose suitable breeding facility 5.2 Choose suitable feeding facilities	**General skills and knowledge** · Basic knowledge of livestock and poultry biology · Security awareness and operational skills · Electrical knowledge · Mechanical underpinning knowledge · Automation technology · Feeding management knowledge · Environmental protection and sustainability **Tools and equipment** · Breeding barn · Environmental control equipment · Disinfecting equipment · Insulation equipment · Feeding equipment · Measuring and monitoring equipment · Maintenance tools such as screwdrivers and lubricants · Equipment connection materials such as wires and sockets · Cooling fans, heaters, etc. **Materials** · Tool spare parts **Requirements for employees** · Patience and carefulness · Teamwork spirit · Safety consciousness · Observation and judgment awareness · Responsibility and dedication · Continuous learning awareness and resilience
	6.1 Carry out biological treatment of livestock manure.	**General skills and knowledge**

DUTIES	TASKS	ENABLERS
6.0 Implement manure treatment technology	6.2 Carry out fermentation treatment of poultry manure.	· Environmental science fundamentals · Microbiology basis · Engineering principles and techniques · Data analysis and monitoring skills · Report writing skills **Tools and equipment** · Manure turning machine · Thermometer · Sterilization equipment · Organic fertilizer production equipment **Materials** · Strain · Earthworm · Brown sugar · Padding **Requirements for employees** · Safety consciousness · Awareness of continuous learning · Environmental protection and sustainable concept
7.0 Carry out livestock and poultry immunization	7.1 Conduct livestock immunization . 7.2 Conduct poultry immunization. 7.3 Carry out livestock and poultry immunization through treated drinking water. 7.4 Carry out immunization by mixing drugs with animal feed.	**General skills and knowledge** · Fundamentals of animal physiology and immunology · Knowledge of vaccinology · Design of immunization protocol · Vaccination technology · Ability to observe and analyse animal behaviour and health status · Data management and recording skills · Monitoring and diagnostic technologies **Tools and equipment** · Poultry house equipment · Sampling tools

DUTIES	TASKS	ENABLERS
		· Protection tools · Measuring tools · Biological safety cabinets and disinfection equipment · Microscope · Thermometer · Mixer and stirrer · Injection storage equipment **Materials** · Syringe and needle · Injection gun · Syringe · Straws and plastic bag · Bandage, disinfectant **Requirements for employees** · Teamwork consciousness · Responsibility and dedication · Awareness of continuous learning · Patience and carefulness · Safety consciousness