NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

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PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: LIVESTOCK VETERINARY ENGINEER

LEVEL: NTA 7

TABLE OF CONTENT

CONTENTS

ABBREVIATIONS

ATP	Adenosine Triphosphate
cDNA	Complementary Deoxyribonucleic Acid
CBET	Competency Based Education and Training
DNA	Deoxyribonucleic Acid
DR	Digital Radiography
ELISA	Enzyme-linked Immunosorbent Assay
ERP	Enterprise Resource Planning
MR	Methyl Red
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	Occupational Standards
PCR	Polymerase Chain Reaction
PBS	Phosphate Buffered Saline
qPCR	Real-time Quantitative PCR Detecting System
RNA	Ribonucleic Acid
RT-PCR	Reverse Transcription-Polymerase Chain Reaction
SPF	Specific Pathogen Free

TET	Technical Education and Training
TVET	Technical and Vocational Education and Training
VP test	Voges-Proskauer (VP) Test
VP reagent	VP Reagent (Solution A: 6% α-naphthol Ethanol Solution; Solution B: 40% Potassium Hydroxide Solution)

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. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
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.

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. 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 of Tanzania has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupational Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing 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 delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational Standards are defined in terms of activities performed by a person in a selected occupation (such as livestock veterinary engineers performing animal surgeries and managing surgical emergencies) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the Occupational Standards and the training standards to respond to demands of the labour market.

In TET delivery, Tanzania 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. TET institutions will be required to benchmark their curricula with relevant Occupational Standards.

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 (TET).

The Livestock Veterinary Engineer Occupation has its own set of occupational standards. 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 Occupational Standards development process began with an examination of major documents that guide Tanzanian skill development. The 10-year National Skills Development Strategy (2016-2026) was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE 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 workshop comprised of experts and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The Occupational Standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, Supervisory Technicians on the job, and experienced Livestock Veterinary Engineers were key informants in the survey to discover occupational trends. The information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ..... online surveys were completed by experts from the labour market across the country. Apart from the survey aiding in defining the scope for the occupational

analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR LIVESTOCK VETERINARY ENGINEER

The standards cover a broad range of duties and tasks that can be performed by a Livestock Veterinary Engineer. 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 Livestock Veterinary Engineer 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.

Livestock Veterinary Engineers should inspect the operation and management of farms, monitor and address epidemic diseases, assess performance, and implement selective breeding and pairing under the supervision of senior engineers in this program or other relevant professional engineers. In the workshop, engineers complete various technical tasks, ranging from simple performance test, animal castration, handling of affected animals, immunization of livestock and poultry, use of precision instruments, to surgeries, prevention and control of epidemic diseases, laboratory diagnostics, biosafety assessment and reconstruction, operation and management of farms, animal disease prevention and control, inspection and quarantine of animals and their products, and improvement of livestock and poultry breeds. Generally, the Livestock Veterinary Engineer performs the following responsibilities:

a) Animal castration

b) Use of biological precision instruments

c) Handling of affected animals

d) Culture and identification of pathogenic bacteria

e) Monitoring of epidemic diseases on the farm

f) Disposal of animal epidemic diseases

g) Epidemic disease investigation

h) Performance test and selective breeding and pairing techniques

i) Virus culture

j) Surgery

k) Biosafety assessment and reconstruction

l) Prevention and control of epidemic diseases

m) Molecular biological diagnosis and analysis

n) Inspection and testing technique management

o) Serological experiment

p) Preparation of breed improvement and breeding plans

q) Operation and management of farms

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA 7 and 8.

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 LIVESTOCK VETERINARY ENGINEER - NTA 7

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	ANIMAL CASTRATION	**DUTY NO.**	701
TASK TITLE	CASTRATION OF FEMALE LIVESTOCK	**TASK NO.**	7011
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the castration of female livestock in accordance with the castration procedures and relevant standards.		
RANGE STATEMENT	The task can be performed in animal operating rooms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Surgical equipment: monitor, operating table, shadowless lamp, sphygmomanometer, respiratory anesthesia machine, oxygen tank, autoclave, drying oven, veterinary hematology analyzer, animal biochemical analyzer, and animal electrocardiograph; 2. Complete set of animal castration instruments: scalpel handle, surgical blade with compatible handle, straight tweezer (without hook), toothed tweezer (with hook), pointed scissors, blunt scissors, tissue forcep, retractor, straight hemostatic forcep, curved hemostatic forcep, needle holder, towel clamp, sponge forcep, and suture scissors; 3. Surgical supplies and consumables: indwelling needle, syringe, medical tape, stethoscope, scalp needle, three-edged needle, suture, suture round needle, and sterile cotton ball; 4. Drugs: hemostatic, anesthetic, painkiller, anti-inflammatory drug, sodium chloride, glucose, lactated Ringer's solution, cardiac tonic, oxygen, vasopressor, 75% alcohol, iodophor, atropine, isoflurane, propofol, and sedative.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate instruments, equipment, consumables, and drugs based on different animals; 2. Assess the health of the surgical animal; 3. Apply proper fixation techniques for the surgical animal; 4. Calculate the correct anesthesia dosage based on the animal's weight;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose the surgical approach for the removal of the ovaries in female livestock; 1.2 Perform tissue separation, hemostasis, and suturing at the surgical site.

5. Choose the correct surgical approach for the removal of the ovaries in female livestock; 6. Remove hair from the surgical site of the animal; 7. Disinfect the surgical site of the animal; 8. Incise the skin, muscles, and other tissues at the surgical site; 9. Manage bleeding during the castration; 10. Suture different tissues along the surgical approach; 11. Take prompt action in handling complications during the castration; 12. Treat and care for postoperative inflammation in the surgical animal.	**2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Aseptic principles of surgery; 2.2 Principle of surgical anesthesia. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Methods for assessing the health of surgical animals; 3.2 Preoperative preparation processes for castration of female livestock; 3.3 Surgical procedures for castration of female livestock; 3.4 Procedures for handling complications in surgical animals; 3.5 Postoperative treatment and care methods for female livestock. **4.0 Essential Skills** 4.1 Equipment application inspection skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Observation and analysis skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The ovaries in female livestock are removed in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal physiology; 2. Knowledge of animal microbiology; 3. Knowledge of animal pharmacology; 4. Knowledge of animal surgery; 5. Knowledge of animal pathology; 6. Animal welfare; 7. Occupational health and safety; 8. Waste disposal methods.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	ANIMAL CASTRATION	**DUTY NO.**	701
TASK TITLE	CASTRATION OF MALE LIVESTOCK	**TASK NO.**	7012
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the castration of male livestock in accordance with technical requirements and relevant castration standards.		
RANGE STATEMENT	The task can be performed in animal operating rooms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Surgical equipment: operating table, sphygmomanometer, oxygen tank, autoclave, drying oven, veterinary hematology analyzer, animal biochemical analyzer, and animal electrocardiograph; 2. Complete set of animal castration instruments: scalpel handle, surgical blade with compatible handle, straight tweezer (without hook), toothed tweezer (with hook), pointed scissors, tissue forcep, straight hemostatic forcep, curved hemostatic forcep, needle holder, towel clamp, sponge forcep, and suture scissors; 3. Surgical supplies and consumables: indwelling needle, syringe, medical tape, stethoscope, scalp needle, three-edged needle, suture, suture round needle, and sterile cotton ball; 4. Drugs: hemostatic, anesthetic, painkiller, anti-inflammatory drug, sodium chloride, glucose, lactated Ringer's solution, cardiac tonic, oxygen, vasopressor, 75% alcohol, iodophor, atropine, isoflurane, propofol, and sedative.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate instruments, equipment, consumables, and drugs based on different animals; 2. Assess the health of the surgical animal; 3. Apply proper fixation techniques for the surgical animal; 4. Calculate the correct anesthesia dosage based on the animal's weight; 5. Choose the correct surgical approach for the removal of the testicles in male livestock; 6. Remove hair from the surgical site of the animal;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose the correct surgical approach for the removal of the testicles in male livestock; 1.2 Perform tissue separation, hemostasis, and suturing at the surgical site. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Aseptic principles of surgery;

7. Disinfect the surgical site of the animal; 8. Incise the skin, muscles, and other tissues at the surgical site; 9. Manage bleeding during the castration; 10. Suture different tissues along the surgical approach; 11. Take prompt action in handling complications during the castration; 12. Treat and care for postoperative inflammation in the surgical animal.	2.2 Principle of surgical anesthesia. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Methods for assessing the health of surgical animals; 3.2 Preoperative preparation processes for castration of male livestock; 3.3 Procedures for castration of male livestock; 3.4 Methods for managing surgical emergencies; 3.5 Postoperative treatment and care processes for male livestock. **4.0 Essential Skills** 4.1 Equipment application inspection skills; 4.2 Communication skills; 4.3 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The testicles in male livestock are removed in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Knowledge of animal physiology; 3. Knowledge of animal microbiology; 4. Knowledge of animal pharmacology; 5. Knowledge of animal surgery; 6. Knowledge of animal pathology; 7. Waste disposal methods; 8. Animal welfare.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	USE OF BIOLOGICAL PRECISION INSTRUMENTS	**DUTY NO.**	702
TASK TITLE	USE OF PRECISION INSTRUMENTS	**TASK NO.**	7021
PERFORMANCE CRITERIA	The person performing this task must be able to manage various precision instruments and equipment after their daily use in accordance with technical requirements and the actual situation of biological precision instruments.		
RANGE STATEMENT	The task can be performed under the supervision of senior engineers or other relevant professionals during disease diagnosis or laboratory research. The tools and equipment to be used include: 1. Commonly-used instruments and equipment, such as refrigerator, freezer, biological incubator, hot air sterilizer, general balance, water distiller, plate washer, and micro-oscillator; 2. General instruments and equipment, such as general centrifuge, autoclave, pH meter, clean bench, biological microscope, and electronic balance; 3. Other instruments and equipment, such as high-speed centrifuge, water purifier, tissue slicer, ELIASA, fluorescence microscope, spectrophotometer, CO_2 incubator, analytical balance, PCR/RT-PCR instrument, electrophoresis apparatus, and nucleic acid gel imager.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the health and safety prevention measures; 2. Implement an "exclusive management and sharing" approach, and designate specific individuals responsible for the instruments and equipment; 3. Select appropriate instruments and equipment for the task; 4. Operate various instruments and equipment; 5. Provide guidance to others on the proper use of instruments; 6. Read the data results from the instruments and equipment; 7. Fill in the instrument using records; 8. Properly store different instruments and	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Follow the procedure for operating precision instruments and equipment; 1.2 Interpret the data results from the instruments and equipment; 1.3 Fill in the using records of precision instruments and equipment. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Functions of the main machine and auxiliary facilities of precision instruments and equipment;

equipment; 9. Clean the tools, equipment and workplaces; 10. Perform daily maintenance of precision instruments and equipment.	2.2 Operational principles of the main machine and auxiliary facilities of precision instruments and equipment. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Instructions for using precision instruments and equipment; 3.2 Techniques for interpreting data results from the instruments; 3.3 Applicability of precision instruments and equipment; 3.4 Working environment for precision instruments and equipment; 3.5 Standards for the daily management of precision instruments and equipment. **4.0 Essential Skills** 4.1 Safety protection skills; 4.2 Consciousness of responsibility; 4.3 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The person performing this task is required to select appropriate precision instruments and equipment based on the requirements of different experimental operations and keep the using records.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Waste disposal methods for precision instruments.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	USE OF BIOLOGICAL PRECISION INSTRUMENTS	**DUTY NO.**	702
TASK TITLE	STORAGE AND MAINTENANCE OF PRECISION INSTRUMENTS	**TASK NO.**	7022
PERFORMANCE CRITERIA	The person performing this task must be able to properly store and maintain various instruments and equipment after their daily use in accordance with technical requirements and the actual situation of biological precision instruments.		
RANGE STATEMENT	The task can be performed under the supervision of senior engineers or other relevant professionals during disease diagnosis or laboratory research. The tools and equipment to be used include: 1. Commonly-used instruments and equipment, such as refrigerator, freezer, biological incubator, hot air sterilizer, general balance, water distiller, plate washer, and micro-oscillator; 2. General instruments and equipment, such as general centrifuge, autoclave, pH meter, clean bench, biological microscope, and electronic balance; 3. Other instruments and equipment, such as high-speed centrifuge, water purifier, tissue slicer, ELIASA, fluorescence microscope, spectrophotometer, CO_2 incubator, analytical balance, PCR/RT-PCR instrument, electrophoresis apparatus, and nucleic acid gel imager.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the health and safety prevention measures; 2. Strictly adhere to relevant regulations, and standardize the use and records of precision instruments; 3. Choose the appropriate environment or rooms to properly and neatly place precision instruments, with dust covers provided; 4. Promptly check and properly store new precision instruments, along with their accessories and related materials; 5. Only operate precision instruments after receiving training and obtaining qualifications;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Store precision instruments and equipment; 1.2 Develop operational procedures and maintenance methods for precision instruments and equipment; 1.3 Maintain precision instruments and equipment; 1.4 Establish records of precision instruments and equipment. **2.0 Principles** The person performing this task must be able to explain the following principles:

6. Establish records and registers, assign dedicated personnel for the safekeeping of precision instruments, and develop operational procedures and maintenance methods in accordance with the user's manual; 7. Regularly maintain precision instruments, and keep records; 8. Clean the tools, equipment and workplaces; 9. Perform daily maintenance of precision instruments and equipment.	2.1 Functions of the main machine and auxiliary facilities of precision instruments and equipment; 2.2 Operational principles of the main machine and auxiliary facilities of precision instruments and equipment. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Precautions for power supply and switch operation before using precision instruments and equipment; 3.2 Troubleshooting methods for abnormal situations with precision instruments and equipment; 3.3 Power-off and cleaning maintenance procedures after using precision instruments and equipment; 3.4 Purchase date and service life of precision instruments and equipment; 3.5 Operating procedures and precautions for precision instruments and equipment; 3.6 Standards for the daily management of precision instruments and equipment; 3.7 Applicability of precision instruments and equipment. **4.0 Essential Skills** 4.1 Safety protection skills; 4.2 Consciousness of responsibility; 4.3 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The person performing this task must be able to properly store and maintain various instruments and equipment after their daily use in accordance with technical requirements and the actual situation of biological precision instruments.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Laboratory safety hazard identification methods; 2. Disposal methods of scrapped precision instruments;

	3. Occupational health and safety.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	HANDLING OF AFFECTED ANIMALS	**DUTY NO.**	703
TASK TITLE	ESTABLISHMENT OF MEDICAL RECORDS	**TASK NO.**	7031
PERFORMANCE CRITERIA	The person performing this task must be able to establish comprehensive and detailed medical records for affected animals in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in the animal hospitals or disease diagnosis and treatment rooms at farms under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Medical record book or electronic medical record system (software); 2. Computer.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Ensure personal safety protection while performing the task; 2. Record detailed basic information of affected animals; 3. Document in detail the course of the disease and clinical symptom outcomes of affected animals; 4. Record in detail the results of examinations and tests conducted on affected animals; 5. Document in detail the treatment process and drugs administered to affected animals; 6. Document in detail the nursing process for affected animals; **7.** Store text and image data via computers, and use an electronic medical record software system.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop a medical record book; 1.2 Use an electronic medical record system (software); 1.3 Record the essential content of medical records. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Objectivity principle of medical records of affected animals; 2.2 Accuracy principle of medical records of affected animals; 2.3 Truthfulness principle of medical records of affected animals; 2.4 Timeliness principle of medical records of affected animals; 2.5 Completeness principle of medical records of affected animals;

	2.6 Standardization principle of medical records of affected animals; 2.7 Standards for medical record documentation; 2.8 Importance and significance of establishing medical records. **3.0 Theories** The person performing this task must master the following contents: 3.1 Processes for medical record documentation; 3.2 Contents of medical record documentation; 3.3 Instructions for using electronic medical record systems (software). **4.0 Essential Skills** 4.1 Communication skills; 4.2 Basic computer operation skills; 4.3 Data collection and reduction skills; 4.4 Customer service skills; 4.5 Teamwork skills; 4.6 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A complete and detailed medical record of affected animals is established in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal anatomy; 2. Knowledge of animal physiology; 3. Knowledge of animal microbiology; 4. Knowledge of animal pharmacology; 5. Knowledge of animal surgery; 6. Knowledge of animal pathology; 7. Knowledge of animal clinical diagnosis; 8. Knowledge of animal epidemiology; 9. Occupational health and safety.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	HANDLING OF AFFECTED ANIMALS	**DUTY NO.**	703
TASK TITLE	HANDLING OF INTERNAL DISEASES OF DIGESTIVE SYSTEM OF LIVESTOCK AND POULTRY	**TASK NO.**	7032
PERFORMANCE CRITERIA	The person performing this task must be able to handle internal diseases of the digestive system of livestock and poultry in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms and laboratories under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Veterinary thermometer; 2. Stethoscope; 3. Disposable syringe; 4. Personal protective equipment, such as masks, disposable latex gloves, and protective clothing; 5. Platform scales or weighing scales.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Abide by the preventive measures for health and safety when performing this task; 2. Conduct epidemiological investigations and clinical symptom examinations for digestive system diseases; 3. Properly diagnose digestive system diseases based on clinical and laboratory examinations; 4. Implement appropriate treatment methods for digestive system diseases.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Conduct epidemiological investigations on digestive system diseases of livestock and poultry; 1.2 Diagnose digestive system diseases of livestock and poultry; 1.3 Treat digestive system diseases of livestock and poultry. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principle of etiology-based treatment for the diagnosis of common digestive system diseases of livestock and poultry;

	2.2 Principle of symptomatic treatment for the management of digestive system diseases of livestock and poultry. **3.0 Theories** The person must be able to explain the following: 3.1 Diagnostic methods for internal diseases of the digestive system of livestock and poultry; 3.2 Treatment methods for internal diseases of the digestive system of livestock and poultry; 3.3 Types of internal diseases of the digestive system of livestock and poultry; 3.4 Causes of occurrence of common digestive system diseases of livestock and poultry; 3.5 Symptoms of common internal diseases of the digestive system of livestock and poultry. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Report writing skills; 4.3 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Internal diseases of the digestive system of livestock and poultry are properly handled in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal anatomy; 2. Knowledge of animal physiology; 3. Knowledge of animal microbiology; 4. Knowledge of animal pharmacology; 5. Knowledge of animal surgery; 6. Knowledge of animal pathology; 7. Knowledge of animal clinical diagnosis; 8. Knowledge of animal epidemiology; 9. Knowledge of animal parasitology; 10. Occupational health and safety.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	HANDLING OF AFFECTED ANIMALS	**DUTY NO.**	703
TASK TITLE	HANDLING OF INTERNAL DISEASES OF RESPIRATORY SYSTEM IN LIVESTOCK AND POULTRY	**TASK NO.**	7033
PERFORMANCE CRITERIA	The person performing this task must be able to properly handle internal diseases of the respiratory system of livestock and poultry in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms and laboratories under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Veterinary thermometer; 2. Stethoscope; 3. Disposable syringe; 4. Personal protective equipment, such as masks, disposable latex gloves, and protective clothing; 5. Platform scales or weighing scales.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Abide by the preventive measures for health and safety when performing this task; 2. Conduct epidemiological investigations and clinical symptom examinations for respiratory system diseases; 3. Properly diagnose respiratory system diseases based on clinical and laboratory examinations; 4. Implement appropriate treatment methods for respiratory system diseases.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Conduct epidemiological investigations on respiratory system diseases of livestock and poultry; 1.2 Diagnose respiratory system diseases of livestock and poultry; 1.3 Treat respiratory diseases of livestock and poultry. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principle of etiology-based treatment for the diagnosis of common respiratory system diseases of livestock and poultry;

	2.2 Principle of symptomatic treatment for the management of respiratory system diseases of livestock and poultry. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Diagnostic methods for internal diseases of the respiratory system of livestock and poultry; 3.2 Treatment methods for internal diseases of the respiratory system of livestock and poultry; 3.3 Types of common internal diseases of the respiratory system of livestock and poultry; 3.4 Causes of occurrence of common respiratory system diseases of livestock and poultry; 3.5 Symptoms of common internal diseases of the respiratory system of livestock and poultry. **4.0 Essential Skills** 4.1 Clinical analysis and diagnosis skills of diseases; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Internal diseases of the respiratory system of livestock and poultry are properly handled in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal anatomy; 2. Knowledge of animal physiology; 3. Knowledge of animal microbiology; 4. Knowledge of animal pharmacology; 5. Knowledge of animal surgery; 6. Knowledge of animal pathology; 7. Knowledge of animal clinical diagnosis; 8. Knowledge of animal epidemiology; 9. Knowledge of animal parasitology.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	HANDLING OF AFFECTED ANIMALS	**DUTY NO.**	703
TASK TITLE	HANDLING OF COMMON OBSTETRIC DISEASES	**TASK NO.**	7034
PERFORMANCE CRITERIA	The person performing this task must be able to handle common obstetric diseases of livestock and poultry in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms and laboratories under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Veterinary thermometer; 2. Obstetric traction rope; 3. Disposable syringe, oxytocin, etc.; 4. Personal protective equipment, such as masks, disposable long-cuff latex gloves, and protective clothing; 5. Antibiotics and other antibacterial drugs.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Abide by the preventive measures for health and safety when performing this task; 2. Perform a clinical examination on affected animals; 3. Determine the causes of obstetric diseases of livestock and poultry; 4. Treat the affected animals based on the principles and methods of treating common obstetric diseases of livestock and poultry.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Diagnose common obstetric diseases of livestock and poultry; 1.2 Treat common obstetric diseases of livestock and poultry. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principle of etiology-based treatment for the diagnosis of common obstetric diseases of livestock and poultry; 2.2 Principle of symptomatic treatment for the management of common obstetric diseases of livestock and poultry; 2.3 Principle of nursing care for the management of common obstetric diseases of livestock and poultry;

	2.4 Principle of treatment for common obstetric diseases. **3.0 Theories** The person must be able to explain the following: 3.1 Main causes of common obstetric diseases; 3.2 Methods for managing common obstetric diseases; 3.3 Symptoms of common obstetric diseases. **4.0 Essential Skills** 4.1 Clinical analysis and diagnosis skills; 4.2 Calm analysis skills; 4.6 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Common obstetric diseases of livestock and poultry are properly handled in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of the physiological structure of the reproductive system in livestock and poultry; 2. Knowledge of the physiological function and application of reproductive hormones in livestock and poultry; 3. Knowledge of postpartum care.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	HANDLING OF AFFECTED ANIMALS	**DUTY NO.**	703
TASK TITLE	HANDLING OF COMMON SURGICAL DISEASES	**TASK NO.**	7035
PERFORMANCE CRITERIA	The person performing this task must be able to handle common surgical diseases of livestock and poultry in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms and surgical operating rooms under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Veterinary thermometer; 2. Operating table; 3. Disposable syringe; 4. Iodophor, cotton ball, and other disinfection tools; 5. Personal protective equipment, such as masks, disposable latex gloves, and protective clothing.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Abide by the preventive measures for health and safety when performing this task; 2. Observe the clinical symptoms of affected animals; 3. Collect samples for laboratory examination; 4. Diagnose common surgical diseases of livestock and poultry based on clinical and laboratory examinations; 5. Treat common surgical diseases of livestock and poultry correctly.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Diagnose common surgical diseases of livestock and poultry; 1.2 Treat common surgical diseases of livestock and poultry. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Aseptic principles in the handling of common surgical diseases of livestock and poultry; 2.2 Principles of nursing care for common surgical diseases of livestock and poultry. **3.0 Theories** The person must be able to explain the following: 3.1 Basic physiological structure of animal tissues;

	3.2 Types and symptoms of common surgical diseases of livestock and poultry, such as joint sprain, contusion, wound, abscesses, cellulitis, rheumatism, conjunctivitis, and hoof rot. **4.0 Essential Skills** 4.1 Clinical analysis and diagnosis skills; 4.2 Calm analysis skills; 4.3 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Common surgical diseases of livestock and poultry are correctly handled in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal anatomy; 2. Knowledge of animal physiology; 3. Knowledge of animal microbiology; 4. Knowledge of animal pharmacology; 5. Knowledge of animal surgery; 6. Knowledge of animal pathology; 7. Knowledge of animal clinical diagnosis; 8. Protection against animal infectious diseases.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	HANDLING OF AFFECTED ANIMALS	**DUTY NO.**	703
TASK TITLE	HANDLING OF CLOSED FRACTURE	**TASK NO.**	7036
PERFORMANCE CRITERIA	The person performing this task must be able to correctly perform the reduction and fixation of closed fractures in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms and laboratories under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Splint; 2. Bandage; 3. Plaster bandage; 4. Procaine; 5. DR; 6. Personal protective equipment, such as masks, disposable latex gloves, and protective clothing.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Abide by the preventive measures for health and safety when performing this task; 2. Conduct an examination of affected animals with a closed fracture; 3. Reduce the closed fracture based on the actual situation; 4. Apply clinical orthopedic instruments and tools; 5. Fix the site of the fracture based on the location and type of fracture, and local soft tissue damage.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Inspect the closed fracture; 1.2 Reduce the closed fracture; 1.3 Fix the closed fracture. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of bone reduction and fixation; 2.2 Principles of immobilization after fracture surgery. 2.3 Significance and precautions of external fixation for fractures. **3.0 Theories**

	The person must be able to explain the following: 3.1 Basic physiological structure of animal bones and joints; 3.2 Basic techniques for fracture reduction; 3.3 Postoperative care for closed fractures. **4.0 Essential Skills** 4.1 Calm analysis skills; 4.2 Report writing skills; 4.3 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Closed fractures of livestock and poultry are handled in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal anatomy; 2. Knowledge of animal physiology; 3. Knowledge of animal microbiology; 4. Knowledge of animal pharmacology; 5. Knowledge of animal surgery; 6. Knowledge of animal pathology; 7. Knowledge of animal clinical diagnosis; 8. Knowledge of animal epidemiology; 9. Nursing methods and precautions for affected animals.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	CULTURE AND IDENTIFICATION OF PATHOGENIC BACTERIA	**DUTY NO.**	704
TASK TITLE	ANTIBIOTIC SENSITIVITY TEST	**TASK NO.**	7041
PERFORMANCE CRITERIA	The person performing this task must be able to conduct antibiotic sensitivity tests in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in laboratories under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Inoculation ring; 2. Alcohol burner; 3. Alcohol cotton ball; 4. Thermostat; 5. Clean bench; 6. Antibiotic sensitivity paper; 7. Casein hydrolysate agar medium; 8. Tweezer; 9. Vernier caliper or straightedge; 10. Disposable sterile gloves; 11. Disposable mask; 12. Marker pen.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate operation tools and equipment for this task; 2. Prepare or make antibiotic sensitivity paper; 3. Prepare a casein hydrolysate agar medium; 4. Inoculate bacteria onto the medium; 5. Apply antibiotic sensitivity paper; 6. Culture bacteria; 7. Observe, record, and interpret the results of the bacterial antibiotic sensitivity test; 8. Clean up the experimental materials and reagents after the test;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Prepare or make antibiotic sensitivity paper according to test bacteria; 1.2 Prepare a casein hydrolysate agar medium; 1.3 Inoculate bacteria onto the medium; 1.4 Apply antibiotic sensitivity paper; 1.5 Interpret the results of the bacterial antibiotic sensitivity test. **2.0 Principles**

9. Dispose of samples, and disinfect the laboratory after the test.	The person performing this task must be able to explain the following principles: 2.1 Aseptic operation principle; 2.2 Significance of antibiotic sensitivity test. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Preparation or production method of antibiotic sensitivity paper; 3.2 Preparation method of casein hydrolysate agar medium; 3.3 Bacterial inoculation method; 3.4 Method for interpreting the results of the antibiotic sensitivity test. **4.0 Essential Skills** 4.1 Aseptic operation skills; 4.2 Safety protection skills; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The antibiotic sensitivity test is conducted in accordance with technical requirements and relevant experimental procedures.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal microbiology; 2. Animal infectious diseases; 3. Veterinary pharmacology; 4. Laboratory biosafety management; 5. Disposal methods of waste pollutants.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	CULTURE AND IDENTIFICATION OF PATHOGENIC BACTERIA	**DUTY NO.**	704
TASK TITLE	ISOLATION AND CULTURE OF PATHOGENIC BACTERIA	**TASK NO.**	7042
PERFORMANCE CRITERIA	The person performing this task must be able to isolate and culture pathogenic bacteria in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in laboratories under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Inoculation ring; 2. Cautery knife; 3. Scissors; 4. Alcohol burner; 5. Alcohol cotton ball; 6. Thermostat; 7. Clean bench; 8. Medium (nutrient broth, ordinary agar medium, etc.); 9. Disposable sterile gloves; 10. Disposable mask; 11. Marker pen.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate operation tools and equipment for this task; 2. Prepare commonly-used media; 3. Prepare clean benches; 4. Use inoculation rings to collect bacteria; 5. Inoculate bacteria onto the medium; 6. Culture bacteria; 7. Observe, identify, and record bacterial growth characteristics; 8. Clean up the experimental materials and reagents after the test; 9. Dispose of samples, and disinfect the laboratory after the test.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Prepare commonly-used media; 1.2 Use an autoclave sterilizer; 1.3 Use a clean bench; 1.4 Inoculate bacteria via the streak plate method; 1.5 Cultivate bacteria in a bacterial incubator; 1.6 Observe, identify, and record bacterial growth characteristics. **2.0 Principles** The person performing this task must be able to explain the following principles:

	2.1 Aseptic operation principle; 2.2 Significance of isolation and culture of pathogenic bacteria. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Instructions for using autoclave sterilizers; 3.2 Instructions for using clean benches; 3.3 Preparation method of commonly-used media; 3.4 Streak plate method for bacterial isolation; 3.5 Bacterial culture method; 3.6 Observation methods for bacterial growth characteristics in media. **4.0 Essential Skills** 4.1 Aseptic operation skills; 4.2 Safety protection skills; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Single pathogenic bacterial colonies are isolated and cultured in accordance with technical requirements and relevant experimental procedures.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal microbiology; 2. Animal infectious diseases; 3. Laboratory biosafety management; 4. Disposal methods of waste pollutants.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	CULTURE AND IDENTIFICATION OF PATHOGENIC BACTERIA	**DUTY NO.**	704
TASK TITLE	MORPHOLOGICAL IDENTIFICATION OF PATHOGENIC BACTERIA	**TASK NO.**	7043
PERFORMANCE CRITERIA	The person performing this task must be able to identify the morphology of pathogenic bacteria in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in laboratories under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Glass slide; 2. Inoculation ring; 3. Alcohol burner; 4. Scissors; 5. Tweezer; 6. Staining jar; 7. Staining rack; 8. Gram staining solution; 9. Methylene blue staining solution; 10. Wright staining solution; 11. Saline; 12. Lens wiping paper; 13. Ordinary optical microscope; 14. Cedar oil; 15. Disposable sterile gloves; 16. Disposable mask.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate operation tools and equipment for this task; 2. Prepare bacterial specimen slides; 3. Determine the bacterial staining method; 4. Stain the bacteria; 5. Observe the bacteria using a microscope with an oil immersion lens;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Prepare bacterial specimen slides; 1.2 Determine the staining method based on the type of pathogenic bacteria; 1.3 Stain the bacteria via commonly-used staining methods;

6. Observe and record the morphological characteristics of the bacteria; 7. Organize the experimental materials and reagents after the test; 8. Dispose of samples, and disinfect the laboratory after the test.	1.4 Observe the bacteria using a microscope with an oil immersion lens. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Aseptic operation principle; 2.2 Suitable targets for commonly-used bacterial staining methods; 2.3 Significance of morphological identification of pathogenic bacteria; 2.4 Morphological characteristics of pathogenic bacteria. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Method for preparing bacterial specimen slides; 3.2 Method of bacterial staining; 3.3 Instructions for using a microscope with an oil immersion lens. **4.0 Essential Skills** 4.1 Aseptic operation skills; 4.2 Safety protection skills; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Pathogenic bacteria can be morphologically identified in accordance with technical requirements and relevant experimental procedures.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal microbiology; 2. Animal infectious diseases; 3. Laboratory biosafety management; 4. Disposal methods of waste pollutants.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	CULTURE AND IDENTIFICATION OF PATHOGENIC BACTERIA	**DUTY NO.**	704
TASK TITLE	BIOCHEMICAL IDENTIFICATION OF PATHOGENIC BACTERIA	**TASK NO.**	7044
PERFORMANCE CRITERIA	The person performing this task must be able to carry out biochemical identification of pathogenic bacteria in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in laboratories under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Thermostat; 2. Inoculation ring; 3. Inoculation needle; 4. Clean bench; 5. Dunham's peptone water medium; 6. Sugar fermentation medium; 7. Acetate agar medium; 8. Simon's agar medium; 9. Bromothymol blue indicator; 10. Methyl red (MR) reagent; 11. VP reagent; 12. Indole reagent; 13. Alcohol burner; 14. Alcohol cotton ball; 15. Test tube; 16. Suction tube; 17. Beaker; 18. Measuring cylinder; 19. Disposable sterile gloves; 20. Disposable mask.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select the appropriate type of the biochemical test for the task;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to:

2. Choose the appropriate tools and equipment based on the type of the biochemical test; 3. Prepare media based on the type of the biochemical test; 4. Inoculate bacteria onto the medium; 5. Culture bacteria; 6. Adding reagents based on the type of the biochemical test; 7. Observe, record, and interpret the results of the bacterial biochemical test; 8. Clean up the experimental materials and reagents after the test; 9. Dispose of samples, and disinfect the laboratory after the test.	1.1 Select the appropriate type of the biochemical test for the task; 1.2 Prepare reagents based on the type of the biochemical test; 1.3 Prepare media based on the type of the biochemical test; 1.4 Inoculate and culture bacteria; 1.5 Observe, record, and interpret the results of the bacterial biochemical test. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Aseptic operation principle; 2.2 Significance of bacterial biochemical test. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Preparation of sugar fermentation medium, Dunham's peptone water medium, acetate agar medium, and Simon's agar medium; 3.2 Preparation of bromothymol blue indicator, methyl red (MR) reagent, VP reagent, and indole reagent for biochemical experiments; 3.3 Operational methods for sugar fermentation test, methyl red (MR) test, VP test, indole test, hydrogen sulfide test, and citrate utilization test; 3.4 Bacterial inoculation and culture methods; 3.5 Determination methods for the results of the bacterial biochemical test. **4.0 Essential Skills** 4.1 Aseptic operation skills; 4.2 Bacterial inoculation skills; 4.3 Safety protection skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Pathogenic bacteria can be biochemically identified in accordance with technical requirements and relevant experimental procedures.

CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal microbiology; 2. Animal infectious diseases; 3. Biochemistry; 4. Laboratory biosafety management; 5. Disposal methods of waste pollutants.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	MONITORING OF EPIDEMIC DISEASES ON THE FARM	**DUTY NO.**	705
TASK TITLE	MONITORING OF EPIDEMIC DISEASES OF CATTLE AND SHEEP	**TASK NO.**	7051
PERFORMANCE CRITERIA	The person performing this task must be able to monitor epidemic diseases of cattle and sheep in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Veterinary blood collector; 2. Electrothermostat; 3. Benchtop low-speed centrifuge; 4. Pipette; 5. 96-well V-shaped coagulation plate; 6. ELIASA; 7. Tray balance; 8. Oscillator; 9. Sterilized glass bottle/capped centrifuge tube/plate; 10. Microscope; 11. PCR instrument/RT-PCR instrument; 12. Mask and disposable latex glove; 13. Protective clothing; 14. Refrigerator.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate operation tools and equipment for this task; 2. Configure the required standard reagents; 3. Collect appropriate samples from different epidemic disease detection subjects, and complete sample submission forms accurately;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Collect appropriate samples from different epidemic disease detection subjects, and complete sample submission forms accurately; 1.2 Make preliminary judgments on epidemic diseases of cattle and sheep based on relevant clinical symptoms and pathological changes;

4. Perform clinical examinations and pathological autopsies on cattle and sheep; 5. Perform bacterial isolation and culture, and microscopic tests; 6. Perform PCR/RT-PCR tests; 7. Perform blood clotting tests. 8. Perform enzyme-linked immunosorbent assays; 9. Determine quarantine results; 10. Write reports, provide feedback, and communicate with clients; 11. Clean the disinfection tools, equipment and workplaces; 12. Store tools and equipment safely.	1.3 Select appropriate laboratory detection methods for different epidemic diseases of cattle and sheep; 1.4 Interpret and analyze quarantine results. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Anatomical physiology of cattle and sheep; 2.2 Quarantine of epidemic diseases of cattle and sheep; 2.3 Clinical diagnosis of epidemic diseases of cattle and sheep; 2.4 Pathological anatomy of epidemic diseases of cattle and sheep; 2.5 Procedures for early warning and forecasting of major epidemic diseases of cattle and sheep. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Key points of on-site quarantine and pathological autopsy of cattle and sheep; 3.2 Key points of bacterial isolation and culture, and microscopic test; 3.3 Key points of PCR/RT-PCR test; 3.4 Key points of blood clotting test; 3.5 Key points of enzyme-linked immunosorbent assay; 3.6 Key points of timely feedback and report of monitoring results. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Judgment skills of quarantine results; 4.4 Customer service skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Epidemic diseases of cattle and sheep are monitored, aiming to achieve scientific breeding and precise prevention and control.

CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal pharmacology; 2. Biosafety; 3. Disposal methods of pathological materials and wastes.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	MONITORING OF EPIDEMIC DISEASES ON THE FARM	**DUTY NO.**	705
TASK TITLE	MONITORING OF EPIDEMIC DISEASES OF CHICKENS AND PIGS	**TASK NO.**	7052
PERFORMANCE CRITERIA	The person performing this task must be able to monitor epidemic diseases of chickens and pigs in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Veterinary blood collector; 2. Electrothermostat; 3. Benchtop low-speed centrifuge; 4. Pipette; 5. 96-well V-shaped coagulation plate; 6. ELIASA; 7. Tray balance; 8. Oscillator; 9. Sterilized glass bottle/capped centrifuge tube/plate; 10. Microscope; 11. PCR instrument/RT-PCR instrument; 12. Mask and disposable latex glove; 13. Protective clothing; 14. Refrigerator.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate operation tools and equipment for this task; 2. Configure the required standard reagents; 3. Collect appropriate samples from different epidemic disease detection subjects, and complete sample submission forms accurately; 4. Perform clinical examinations and pathological autopsies on chickens and pigs;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Collect appropriate samples from different epidemic disease detection subjects, and complete sample submission forms accurately; 1.2 Make preliminary judgments on epidemic diseases of chickens and pigs based on relevant clinical symptoms and pathological changes;

5. Perform bacterial isolation and culture, and microscopic tests; 6. Perform PCR/RT-PCR tests; 7. Perform blood clotting tests. 8. Perform the lateral flow device (LFD) test/enzyme-linked immunosorbent assay; 9. Determine quarantine results; 10. Write reports, provide feedback, and communicate with clients; 11. Clean the disinfection tools, equipment and workplaces; 12. Store tools and equipment safely.	1.3 Select appropriate laboratory detection methods for different epidemic diseases of chickens and pigs; 1.4 Interpret and analyze quarantine results. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Anatomy and physiology of chickens and pigs; 2.2 Quarantine of epidemic diseases of chickens and pigs; 2.3 Clinical diagnosis of epidemic diseases of chickens and pigs; 2.4 Pathological anatomy of epidemic diseases of chickens and pigs; 2.5 Procedures for early warning and forecasting of major epidemic diseases of chickens and pigs. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Key points of on-site quarantine and pathological autopsy of chickens and pigs; 3.2 Key points of bacterial isolation and culture, and microscopic test; 3.3 Key points of PCR/RT-PCR test; 3.4 Key points of blood clotting test; 3.5 Key points of lateral flow device (LFD) test/enzyme-linked immunosorbent assay; 3.6 Key points of timely feedback and report of monitoring results. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Judgment skills of quarantine results; 4.4 Customer service skills; 4.5 Report writing skills.

DESCRIPTION OF THE END PRODUCT / SERVICE	Epidemic diseases of chickens and pigs are monitored, aiming to achieve scientific breeding and precise prevention and control.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal pharmacology; 2. Biosafety; 3. Disposal methods of pathological materials and wastes.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	DISPOSAL OF ANIMAL EPIDEMIC DISEASES	**DUTY NO.**	706
TASK TITLE	REPORT OF EPIDEMIC DISEASES	**TASK NO.**	7061
PERFORMANCE CRITERIA	The person performing this task must be able to report animal epidemic diseases in accordance with technical requirements and relevant national laws and regulations.		
RANGE STATEMENT	The task can be performed under the authorization and supervision of the farm manager in livestock and poultry farming enterprises. The equipment to be used include: 1. Office (equipped with office desks and chairs, document cabinets, computers, printers, etc.); 2. Livestock and poultry farm production management software (including mobile APP); 3. Personal protective equipment, such as masks, disposable latex gloves, and work clothes.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe biosafety measures; 2. Classify animal epidemic diseases; 3. Identify the person responsible for reporting animal epidemic diseases; 4. Fill out the animal epidemic disease report; 5. Take necessary control and handling measures promptly; 6. Fill out the epidemic disease report.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Report epidemic diseases. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Procedures for and contents and filling records of reporting animal epidemic diseases. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Animal Epidemic Prevention Law and related laws and regulations; 3.2 Procedures for reporting animal epidemic diseases;

	3.3 Contents of reporting animal epidemic diseases; 3.4 Necessary control and handling measures. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Expression competence; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Animal infections or suspected infections are reported promptly when discovered.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal epidemic prevention and quarantine; 2. Occupational health and safety; 3. Knowledge of handling major animal epidemic diseases. 4. Waste disposal methods.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	DISPOSAL OF ANIMAL EPIDEMIC DISEASES	**DUTY NO.**	706
TASK TITLE	QUARANTINE	**TASK NO.**	7062
PERFORMANCE CRITERIA	The person performing this task must be able to quarantine affected animals and animals suspected of infection separately from healthy livestock in accordance with technical requirements and the actual situation of the animals.		
RANGE STATEMENT	The task can be performed in various production lines, production workshops, and quarantine areas under the authorization and supervision of the farm manager in livestock and poultry farming enterprises. The tools and equipment to be used include: 1. Quarantine sheds (equipped with disinfectants and equipment, etc.); 2. Feed, forage, bedding, etc.; 3. Drugs, vaccines, etc.; 4. Quarantine observation records and files; 5. Personal protective equipment, such as masks, disposable latex gloves, and work clothes.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe biosafety measures; 2. Differentiate affected animals, assumed healthy animals, and healthy animals; 3. Quarantine affected animals and animals suspected of infection separately from healthy livestock; 4. Disinfect and quarantine the quarantine area, and manage the duty shifts in the quarantine area; 5. Handle animals brought into the quarantine area from external sources; 6. Manage on-site personnel in the quarantine area; 7. Provide necessary materials for quarantined animals; 8. Perform quarantine inspection on	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the quarantined objects and methods; 1.2 Manage the quarantine area; 1.3 Carry out harmless treatment of infected animals and waste. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Concept and meaning of quarantine. **3.0 Theories** The person performing this task must be able to

quarantined animals; 9. Make quarantine observation records and reports.	explain the following: 3.1 Methods of differentiating affected animals, assumed healthy animals, and healthy animals; 3.2 Methods of quarantine; 3.3 Management of quarantine areas; 3.4 Knowledge of vaccination and reaction management. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Management skills; 4.3 Data collection skills; 4.4 Teamwork skills; 4.5 Report writing skills; 4.6 Data analysis skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Affected animals and animals suspected of infection are quarantined separately from healthy livestock in order to control the epidemic disease within the smallest possible range and eliminate it on-site.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Disinfection technology; 2. Knowledge of drug treatment; 3. Harmless treatment of infected animals and waste; 4. Occupational health and safety; 5. Animal Epidemic Prevention Law and related laws and regulations.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	DISPOSAL OF ANIMAL EPIDEMIC DISEASES	**DUTY NO.**	706
TASK TITLE	BLOCKADE	**TASK NO.**	7063
PERFORMANCE CRITERIA	The person performing this task must be able to promptly and accurately assist the relevant departments in implementing blockade measures in accordance with technical requirements and the actual situation of the animals.		
RANGE STATEMENT	The task can be performed under the authorization and supervision of the farm manager in livestock and poultry farming enterprises. The tools and equipment to be used include: 1. Animal quarantine and disinfection inspection station; 2. Epidemic prevention quarantine board; 3. Personal protective equipment, such as masks, disposable latex gloves, and work clothes.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe biosafety measures; 2. Establish blockade areas (with the epidemic spot as the center, within a radius of 3km); 3. Implement blockade; 4. Determine animal culling methods (blunt force, bleeding, poisoning, electric shock, neck twisting, carbon dioxide asphyxiation, etc.) based on the type of epidemic disease; 5. Cull infected animals; 6. Lift the blockade.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Divide the blockade area; 1.2 Implement the blockade; 1.3 Lift the blockade. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Purpose and significance of the blockade. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Objects and principles of the blockade; 3.2 Requirements for the division of the epidemic spot, epidemic area, and threatened area; 3.3 Procedures for initiating the blockade;

	3.4 Control measures to be taken in the blockade area; 3.5 Conditions for lifting the blockade. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Management skills; 4.3 Data collection skills; 4.4 Safety protection skills; 4.5 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	In case of a certain significant epidemic disease, closure measures are taken against the epidemic focus on the basis of quarantine to prevent the spread of the epidemic disease from the epidemic area to the safe area, which helps in eliminating the epidemic.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal Epidemic Prevention Law and related laws and regulations; 2. Knowledge of animal epidemic prevention and quarantine; 3. Disinfection technology; 4. Knowledge of drug treatment; 5. Knowledge of immunization and reaction management; 6. Cull infected animals; 7. Basic operation technology of biosafety treatment; 8. Occupational health and safety.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	DISPOSAL OF ANIMAL EPIDEMIC DISEASES	**DUTY NO.**	706
TASK TITLE	HARMLESS TREATMENT	**TASK NO.**	7064
PERFORMANCE CRITERIA	The person performing this task must be able to implement harmless treatment measures for diseased and affected animals and related animal products in accordance with technical requirements and the actual situation of the animals.		
RANGE STATEMENT	The task can be performed under the authorization and supervision of the farm manager in livestock and poultry farming enterprises. The tools and equipment to be used include: 1. Personal protective equipment, such as protective suits, masks, goggles, rubber boots, and gloves; 2. Gauze, cotton, etc.; 3. Mortuary vehicles, animal body bags, etc.; 4. Disinfectants and disinfection facilities.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe biosafety measures; 2. Select appropriate operation tools and equipment for this task; 3. Select an appropriate transportation vehicle: use a specially-designed mortuary vehicle, and strictly disinfect it before loading and after unloading; 4. Properly handle animal carcasses before loading: fill all natural orifices of the carcass tightly with damp gauze or cotton soaked in disinfectant, and place small animals and poultry in plastic bags to prevent leakage of feces, secretions, and blood polluting the surrounding environment; 5. Disinfect: thoroughly disinfect the tools and vehicles used for transporting carcasses, as well as gloves, clothing, and rubber boots used by workers.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Transport affected animal carcasses and related animal products; 1.2 Select appropriate methods for harmless treatment of affected animal carcasses, such as incineration, rendering, high-temperature treatment, deep burial, or chemical treatment. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Purpose and significance of harmless treatment. **3.0 Theories** The person performing this task must be able to

	explain the following: 3.1 Requirements for the transport of affected animal carcasses and products; 3.2 Operating methods and applicable targets for the incineration method; 3.3 Operating methods and applicable targets for the rendering method; 3.4 Operating methods and applicable targets for the high-temperature treatment method; 3.5 Operating methods and applicable targets for the deep burial method; 3.6 Operating methods and applicable targets for the chemical treatment method. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Management skills; 4.3 Data collection skills; 4.4 Safety protection skills; 4.5 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The pathogens carried by diseased and affected animal carcasses are completely eliminated, thus preventing the spread and transmission of animal epidemic diseases, and ensuring the quality and safety of animal products.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Animal Epidemic Prevention Law and related laws and regulations; 2. Knowledge of animal epidemic prevention and quarantine; 3. Disinfection technology; 4. Basic operation technology of biosafety treatment; 5. Occupational health and safety.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	EPIDEMIC DISEASE INVESTIGATION	**DUTY NO.**	707
TASK TITLE	FORMULATION OF AN EPIDEMIC DISEASE INVESTIGATION PLAN	**TASK NO.**	7071
PERFORMANCE CRITERIA	The person performing this task must be able to formulate an epidemic disease investigation plan in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Desktops or laptop computers; 2. Printers.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Record the basic information about the farm, including geographical and climatic conditions, incoming and outgoing livestock and poultry, sources of feed and water, and hygiene measures and conditions; 2. Record the farm's epidemic prevention measures, including immunization status, past epidemic disease records, prevalence of epidemic diseases in the area, and the epidemic disease situation of surrounding areas; 3. Investigate the morbidity rate, infection rate, incidence rate, mortality rate, and fatality rate of affected animals; 4. Develop a diagnostic plan for affected animals (such as laboratory examination and pathological autopsy); 5. Record the measures implemented on the farm and their effectiveness (such as emergency vaccination, quarantine, and disinfection).	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the content required for the epidemic disease investigation; 1.2 Determine the methods to be employed for conducting the epidemic disease investigation. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Overview of the farm's breeding, epidemic prevention, and hygiene conditions; 2.2 Situation of diseased animals on the farm; 2.3 Diagnosis plan and its basis. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Methods for epidemiological investigation of animal epidemic diseases; 3.2 Methods of biostatistics.

	4.0 Essential Skills 4.1 Computer operation; 4.2 Use of office software.
DESCRIPTION OF THE END PRODUCT / SERVICE	A reasonable and applicable epidemic disease investigation plan is formulated.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal epidemiological investigation; 2. Animal Epidemic Prevention Law; 3. Biosafety; 4. Medical waste disposal methods.

<table>
<tr><td>OCCUPATION</td><td>LIVESTOCK VETERINARY ENGINEER</td><td>OCCUPATION CODE</td><td></td></tr>
<tr><td>DUTY TITLE</td><td>EPIDEMIC DISEASE INVESTIGATION</td><td>DUTY NO.</td><td>707</td></tr>
<tr><td>TASK TITLE</td><td>IMPLEMENTATION OF EPIDEMIC DISEASE INVESTIGATION</td><td>TASK NO.</td><td>7072</td></tr>
<tr><td>PERFORMANCE CRITERIA</td><td colspan="3">The person performing this task must be able to conduct epidemic disease investigations in accordance with technical requirements.</td></tr>
<tr><td>RANGE STATEMENT</td><td colspan="3">The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include:
1. Mask and disposable latex glove;
2. Protective clothing;
3. Paper and pen;
4. Consumables required for pathological material collection;
5. Instruments and equipment related to molecular biology detection;
6. Instruments and equipment related to serological detection;
7. Instruments and equipment related to pathological autopsy.</td></tr>
<tr><td colspan="4">EVIDENCE REQUIREMENT</td></tr>
<tr><td colspan="2">PRACTICAL PERFORMANCE</td><td colspan="2">UNDERPINNING KNOWLEDGE</td></tr>
<tr><td colspan="2">The person performing this task must be able to do the following:
1. Inquire about the epidemic disease-related information from the farm manager and breeders;
2. Conduct on-site observations and field investigations on the farm's breeding, epidemic prevention, and hygiene conditions;
3. Conduct epidemic disease statistics, including the morbidity rate, infection rate, incidence rate, mortality rate, and fatality rate of affected animals.
4. Collect pathological materials;
5. Perform laboratory examinations or pathological autopsies;
6. Record the investigation results.</td><td colspan="2">Detailed knowledge about:
1.0 Methods
The person performing this task must be able to explain how to:
1.1 Conduct an epidemiological investigation of animal epidemic diseases;
1.2 Compile statistics on the situation of affected animals;
1.3 Implement diagnosis based on epidemic disease investigation data;
1.4 Record the investigation results.

2.0 Principles
The person performing this task must be able to explain the following principles:
2.1 Epidemiology of epidemic diseases in farms;
2.2 Diagnosis based on epidemic disease investigation data.

3.0 Theories</td></tr>
</table>

	The person performing this task must be able to explain the following: 3.1 Epidemiological investigation of animal epidemic diseases; 3.2 Biostatistics; 3.3 Collection of pathological materials; 3.4 Molecular biology and serological detection; 3.5 Pathological autopsy. **4.0 Essential Skills** 4.1 Investigation and statistical skills; 4.2 Laboratory examination skills; 4.3 Field investigation skills; 4.4 Analysis and discussion skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Effective epidemic disease investigation and epidemic disease diagnosis are carried out, and proper records are made.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal epidemiological investigation; 2. Laboratory detection methods; 3. Animal pathological autopsy methods; 4. Biosafety; 5. Medical waste disposal methods.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	EPIDEMIC DISEASE INVESTIGATION	**DUTY NO.**	707
TASK TITLE	REPORT ON EPIDEMIC DISEASE INVESTIGATION	**TASK NO.**	7073
PERFORMANCE CRITERIA	The person performing this task must be able to report epidemic diseases in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Desktops or laptop computers; 2. Printers; 3. Telephones.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Report to veterinarians or auxiliary professionals within 24 hours if animals are infected, suspected of being infected, or have died from unknown causes; 2. Ensure that veterinarians or auxiliary professionals confirm if animals have died from notifiable infectious diseases; 3. Report the results of the animal epidemic disease investigation to supervisors by veterinarians or auxiliary professionals; 4. Confirm that all individuals report to the local government authority in charge of the area before handling the carcass if unable to report to supervisors within 12 hours after animal death.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Follow the procedures for reporting animal epidemic diseases in accordance with the Animal Epidemic Prevention Law; 1.2 Report to the supervisors within the specified timeframe orally, in writing, and by telephone or email. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 System of reporting animal epidemic diseases. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Reporters and recipients of animal epidemic diseases; 3.2 Contents of reporting animal epidemic diseases; 3.3 Methods of reporting animal epidemic diseases;

	3.4 Timeliness and precautions of reporting animal epidemic diseases. **4.0 Essential Skills** 4.1 Report writing skills; 4.2 Analysis and judgment skills; 4.3 Communication and discussion skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The epidemic diseases are reported to the relevant departments and responsible persons.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Procedures for reporting animal epidemic diseases; 2. Biosafety.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PERFORMANCE TEST AND SELECTIVE BREEDING AND PAIRING TECHNIQUES	**DUTY NO.**	708
TASK TITLE	FEEDING EXPERIMENT	**TASK NO.**	7081
PERFORMANCE CRITERIA	The person performing this task must be able to design and implement animal feeding experiment schemes based on the requirements and production conditions of feed mills and farms.		
RANGE STATEMENT	Animal feeding experiments are conducted on the farm under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Test animals; 2. Test feed; 3. Feeding equipment (trough, water tank, etc.); 4. Platform scales or weighing scales; 5. Computer (data analysis software).		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Analyze the purpose and significance of animal feeding experiments; 2. Design the animal feeding experiment scheme; 3. Prepare the materials for the animal feeding experiment; 4. Implement the animal feeding experiment (pre-feeding period and experimental period); 5. Measure the feeding experiment indicators (body weight, feed consumption, performance, etc.); 6. Analyze the data from the feeding experiment; 7. Write a summary of the feeding experiment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Design feeding experiment schemes; 1.2 Carry out animal feeding experiments. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of scientific advancement in the design of feeding experiments; 2.2 Principles of nutritional balance in the design of feeding experiments; 2.3 Principles of economic feasibility in the design of feeding experiments; 2.4 Principles of safety and legality in the design of feeding experiments. **3.0 Theories**

	The person performing this task must be able to explain the following: 3.1 Precautions for animal feeding experiments; 3.2 Processing and analysis of data from animal feeding experiments; 3.3 Contents and writing requirements of animal feeding experiment reports. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Management skills; 4.3 Data collection and analysis skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A summary of the feeding experiment is written based on the data from animal feeding experiments.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Biosafety; 2. Occupational health and safety; 3. Medical waste disposal methods.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PERFORMANCE TEST AND SELECTIVE BREEDING AND PAIRING TECHNIQUES	**DUTY NO.**	708
TASK TITLE	PERFORMANCE TEST	**TASK NO.**	7082
PERFORMANCE CRITERIA	The person performing this task must be able to complete the animal performance tests based on the requirements and production conditions of the farm.		
RANGE STATEMENT	Animal performance tests are conducted on the farm under the supervision of a Livestock Veterinary Engineer. The tools and equipment to be used include: 1. Test animals; 2. Test feed; 3. Feeding equipment (trough, water tank, etc.); 4. Platform scales or weighing scales; 5. Measuring tools: backfat caliper, vernier caliper, meat quality analyzer, egg quality analyzer, milk quality analyzer, etc.; 6. Computer (data analysis software).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select the test animals; 2. Specify the test time (phases); 3. Determine the test items and methods (growth performance, reproductive performance, meat performance, egg performance, milk performance, etc.); 4. Implement the animal performance test; 5. Process and analyze the experimental data; 6. Write animal performance test reports.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the test items and methods based on the requirements and production conditions of the farm; 1.2 Use measuring instruments to test the growth performance, reproductive performance, meat performance, egg performance, and milk performance of livestock and poultry. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of backfat test; 2.2 Principles of water retention test; 2.3 Safety operation principles for performance test.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Precautions for animal performance tests; 3.2 Processing and analysis of data from animal performance tests; 3.3 Contents and writing requirements of animal performance test reports. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Management skills; 4.3 Data collection and analysis skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Animal performance tests are conducted in accordance with technical requirements, and a test report is written based on the test data.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal anatomy; 2. Knowledge of animal physiology; 3. Knowledge of animal biochemistry; 4. Occupational health and safety; 5. Production safety.

OCCUPATION	LIVESTOCK VETERINARY TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORMANCE TEST AND SELECTIVE BREEDING AND PAIRING TECHNIQUES	**DUTY NO.**	708
TASK TITLE	UTILIZATION OF ANIMAL HETEROSIS	**TASK NO.**	7083
PERFORMANCE CRITERIA	The person performing this task must be able to carry out livestock crossbreeding based on the local genetic resources and obtain hybrid offspring with excellent performance.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The materials and equipment to be used include: 1. Office (equipped with office desks and chairs, document cabinets, computers, printers, etc.); 2. Farm production management software; 3. Body measurement tools (measuring tape, measuring rod, weighing scale, etc.); 4. Personal protective equipment, such as masks, disposable latex gloves, and work clothes.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with local livestock laws and regulations when performing the task; 2. Analyze the performance of breeds; 3. Determine utilization goals: high productivity, adaptability, etc.; 4. Reasonably select hybrid parent breeds; 5. Determine the crossbreeding mode; 6. Evaluate the crossbreeding effect: compare the performance of hybrid offspring with parents to determine the crossbreeding effect.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose hybrid parent breeds; 1.2 Obtain hybrid offspring; 1.3 Compare the performance of hybrid offspring with that of parents. **2.0 Principle**s The person performing this task must be able to explain the following principles: 2.1 Heterosis principle; 2.2 Concept and significance of animal crossbreeding; 2.3 Methods and standards for selection of breeding animals.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Methods for selection of hybrid parent breeds; 3.2 Operational methods of animal crossbreeding; 3.3 Evaluation methods of heterosis; 3.4 Measurement methods of heterosis; 3.5 Knowledge of animal genetics. **4.0 Essential Skills** 4.1 Analysis and judgment skills; 4.2 Exchange and cooperation skills; 4.3 Solidarity and cooperation skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The performance is optimized through the acquisition of superior offspring via crossbreeding.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Ethical and moral norms; 2. Waste disposal methods; 3. Occupational health and safety.

OCCUPATION	LIVESTOCK VETERINARY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PERFORMANCE TEST AND SELECTIVE BREEDING AND PAIRING TECHNIQUES	**DUTY NO.**	708
TASK TITLE	SELECTIVE BREEDING AND PAIRING OF ANIMALS	**TASK NO.**	7084
PERFORMANCE CRITERIA	The person performing this task must be able to conduct rational selective breeding and pairing of animals in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Office (equipped with office desks and chairs, document cabinets, computers, printers, breeding records files, pedigree information, etc.); 2. Farm production management software; 3. Body measurement tools (measuring tape, measuring rod, weighing scale, etc.); 4. Personal protective equipment, such as masks, disposable latex gloves, and work clothes.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Assess the growth, development, body conformation, and productivity level of animals; 2. Assess the breeding value of animals, and make reasonable selection and retention decisions; 3. Establish a rational selective pairing system; 4. Assess the effectiveness of implementing selective breeding and pairing.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Select and retain excellent breeding animals; 1.2 Establish a selective pairing system; 1.3 Assess the effectiveness of implementing selective breeding and pairing. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Purpose and significance of selective breeding and pairing of animals. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Unisexual and bisexual selection of breeding animals;

	3.2 Selective pairing of individuals and populations. **4.0 Essential Skills** 4.1 Observation and analysis skills; 4.2 Exchange and cooperation skills; 4.3 Calm analysis skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The performance is optimized through the acquisition of superior offspring via selective breeding and pairing.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Basic principles of animal genetics; 2. Basic principles of animal breeding; 3. Occupational health and safety; 4. Waste disposal methods.

OCCUPATION	LIVESTOCK VETERINARY TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORMANCE TEST AND SELECTIVE BREEDING AND PAIRING TECHNIQUES	**DUTY NO.**	708
TASK TITLE	ANIMAL REPRODUCTION REGULATION	**TASK NO.**	7085
PERFORMANCE CRITERIA	The person performing this task must be able to perform reproduction regulations on animals in accordance with technical requirements, including estrus induction, synchronized estrus, superovulation, and induced parturition techniques.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The tools and equipment to be used include: 1. Reproductive hormone preparations; 2. Breeding record files; 3. Disposable syringe; 4. Personal protective equipment, such as masks, disposable latex gloves, and protective clothing; 5. Platform scales or weighing scales.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with farm waste disposal regulations when performing the task; 2. Clean the disinfection tools, equipment and workplaces; 3. Select appropriate treatment methods based on the intended purpose; 4. Select appropriate hormone drugs based on the intended purpose; 5. Select the appropriate administration period; 6. Weigh and accurately calculate the dosage of drugs; 7. Select the appropriate administration method; 8. Accurately assess the treatment effectiveness; 9. Store drugs safely.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Induce estrus; 1.2 Achieve synchronized estrus; 1.3 Achieve superovulation; 1.4 Induce parturition. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of exogenous reproductive hormone regulation on animal estrus, ovulation, and parturition. **3.0 Theories** The person performing this task must be able to explain the following:

	3.1 Reproductive hormones and physiological changes in animal organisms; 3.2 Reproductive hormone regulation of development activities of reproductive system. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Time management.
DESCRIPTION OF THE END PRODUCT / SERVICE	The relevant aspects of animal reproduction are regulated during the breeding process.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal pharmacology; 2. Biosafety; 3. Medical waste disposal methods.

OCCUPATION	LIVESTOCK VETERINARY TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORMANCE TEST AND SELECTIVE BREEDING AND PAIRING TECHNIQUES	**DUTY NO.**	708
TASK TITLE	BOVINE EMBRYO TRANSFER	**TASK NO.**	7086
PERFORMANCE CRITERIA	The person performing this task must be able to carry out embryo transfer in accordance with technical requirements and relevant laws and regulations.		
RANGE STATEMENT	The task can be performed in farms under the supervision of senior engineers in this program or other relevant professional engineers. The animals, instruments, and drugs to be used include: 1. Breeding animals: healthy, mature cows with normal reproductive performance, aged between 3 to 8 years; 2. Frozen embryos; 3. Dissecting microscope; 4. Transfer gun, pipette head, and metal protective jacket; 5. Autoclave; 6. Prostaglandin.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select and determine recipient cows; 2. Manage feeding and management of recipient cows before the procedure; 3. Synchronize estrus of recipient cows; 4. Observe estrus; 5. Identify embryos; 6. Grade embryos; 7. Perform embryo transfer; 8. Conduct pregnancy diagnosis.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Select donor and recipient cows; 1.2 Achieve synchronized estrus in donor and recipient cows; 1.3 Achieve superovulation in donor cows; 1.4 Perform artificial insemination; 1.5 Collect, identify, and preserve embryos; 1.6 Perform embryo transfer. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principle of consistency between donor and recipient species; 2.2 Principle of physiological consistency between donor and recipient species;

	2.3 Principle of consistency in embryo collection and transfer sites. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Principle of identity in embryo transfer; 3.2 Factors affecting embryo transfer. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Time management.
DESCRIPTION OF THE END PRODUCT / SERVICE	The bovine embryo transfer is carried out in accordance with technical requirements and relevant operational steps.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of animal pharmacology; 2. Biosafety; 3. Medical waste disposal methods; 4. Physiological structure of cattle.

TABLE 1: DACUM CHARTS FOR LIVESTOCK VETERINARY ENGINEER - NTA 7

DUTIES	TASKS	ENABLERS
1.0 Animal castration	1.1 Castration of female livestock.	**General skills and knowledge** · Division of labor for surgical personnel · Selection of fixation methods · Selection of anesthesia types · Preparation of drugs and instruments · Preoperative examination and precautions for animals · Correct selection of surgical approach · Aseptic techniques during surgery · Prevention and first aid measures for surgical complications · Postoperative care, treatment, and feeding and management · Cleaning tools, equipment and workplaces · Storage of tools and equipment · Animal welfare · Occupational health and safety · Waste disposal methods **Tools and equipment** · Thermometer, stethoscope, and ultraviolet lamp · Fixation instruments, and 10ml syringe · Scalpel, microtome, surgical scissors, and surgical forceps · Hemostatic forceps, needle holder, and suture needle · Retractor, towel clamp, and probe **Materials** · Surgical consumables: gauze, cotton swabs, sutures, sterile drapes, surgical gowns, and surgical gloves · Disinfectants: 5% iodine tincture, 75% alcohol, 2% lysol, and 0.1% bromogeramine
	1.2 Castration of male livestock.	

DUTIES	TASKS	ENABLERS
		· Anesthetic: 2% procaine hydrochloride, 1% adrenaline, atropine sulfate, xylazine, rompun, isoflurane, and propofol **Worker behaviors** · Conscientiousness and meticulousness professionalism, teamwork spirit, and emphasis on animal welfare
2.0 Use of biological precision instruments	2.1 Use of precision instruments. 2.2 Storage and maintenance of precision instruments.	**General skills and knowledge** · Use and daily maintenance of refrigerator · Use and daily maintenance of freezer · Use and daily maintenance of biological incubator · Use and daily maintenance of hot air sterilizer · Use and daily maintenance of general balance · Use and daily maintenance of water distiller · Use and daily maintenance of plate washer · Use and daily maintenance of micro-oscillator · Use and daily maintenance of general centrifuge · Use and daily maintenance of autoclave · Use and daily maintenance of pH meter · Use and daily maintenance of clean bench · Use and daily maintenance of biological microscope · Use and daily maintenance of electronic balance · Use and daily maintenance of high-speed centrifuge · Use and daily maintenance of water purifier · Use and daily maintenance of tissue slicer · Use and daily maintenance of ELIASA

DUTIES	TASKS	ENABLERS
		· Use and daily maintenance of fluorescence microscope · Use and daily maintenance of spectrophotometer · Use and daily maintenance of CO_2 incubator · Use and daily maintenance of analytical balance · Cleaning tools, equipment and workplaces · Storage of tools and equipment · Occupational health and safety · Waste disposal methods **Tools and equipment** · Commonly-used instruments and equipment, such as refrigerator, freezer, biological incubator, hot air sterilizer, general balance, water distiller, plate washer, and micro-oscillator · General instruments and equipment, such as general centrifuge, autoclave, pH meter, clean bench, biological microscope, and electronic balance · Instruments and equipment, such as high-speed centrifuge, water purifier, tissue slicer, ELIASA, fluorescence microscope, spectrophotometer, CO_2 incubator, and analytical balance **Materials** · Gauze, and cotton swab · 75% alcohol, and disinfectant · Record book **Worker behaviors** · Conscientiousness and meticulousness professionalism, and honesty and trustworthiness · Reasonable time management

DUTIES	TASKS	ENABLERS
		· Service consciousness, teamwork spirit, and rigorous attitude
3.0 Handling of affected animals	3.1 Establishment of medical records. 3.2 Handling of internal diseases of digestive system of livestock and poultry. 3.3 Handling of internal diseases of respiratory system in livestock and poultry. 3.4 Handling of common obstetric diseases. 3.5 Handling of common surgical diseases. 3.6 Handling of closed fracture.	**General skills and knowledge** · Basic knowledge of anatomical physiology of livestock and poultry · Basic knowledge of pathology of livestock and poultry · Basic knowledge of pharmacology of livestock and poultry · Basic skills for clinical disease examination and diagnosis · Commonly-used laboratory testing skills for clinical diagnosis and treatment · Skills for interpreting clinical diseases and laboratory results · Basic skills for administration in clinical practice · Skills for using clinical treatment equipment · Basic skills for clinical disease nursing · Safety operations during clinical disease diagnosis and treatment · Cleaning tools, equipment and workplaces · Storage of tools and equipment · Occupational health and safety · Waste disposal methods · Teamwork skills **Tools and equipment** · Stethoscope · Percussion hammer, and flashlight · Syringe · Blood collection tube · Blood cell analyzer, blood biochemical analyzer, etc. · B-mode ultrasound and digital radiography · Complete set of surgical equipment and tools for the operating room

DUTIES	TASKS	ENABLERS
		Materials · Gauze, cotton swabs, and tweezers · Conventional drugs: anesthetics, antibiotics, saline, glucose injection, etc. · Bandage, and splint · Disinfectants: iodophor, 75% alcohol, and 0.1% benzalkonium bromide **Worker behaviors** · Teamwork spirit, scientific spirit, safety consciousness, and caring for affected animals
4.0 Culture and identification of pathogenic bacteria	4.1 Antibiotic sensitivity test. 4.2 Isolation and culture of pathogenic bacteria. 4.3 Morphological identification of pathogenic bacteria. 4.4 Biochemical identification of pathogenic bacteria.	**General skills and knowledge** · Standard operating procedure for medium preparation · Standard operating procedure for bacterial inoculation · Bacteria culture · Standard operating procedure for bacterial staining · Standard operating procedure for bacterial antibiotic sensitivity test · Standard operating procedure for bacterial biochemical test · Observation of bacterial culture characteristics · Observation of pathogenic bacterial morphology · Interpretation and criteria for antibiotic sensitivity test results · Interpretation and criteria for bacterial biochemical test results · Use of clean bench · Use of autoclave sterilizer · Use of microscope with an oil immersion lens · Aseptic operation skills · Cleaning tools, equipment and workplace · Storage of tools and equipment

DUTIES	TASKS	ENABLERS
		· Occupational health and safety · Waste disposal methods **Tools and equipment** · Thermostat · Clean bench · Ordinary optical microscope · Autoclave sterilizer · Inoculation ring, and inoculation needle · Marker pen, lighter, and alcohol burner · Vernier caliper or straightedge · Disposable sterile gloves, and disposable masks · Tweezers, cautery knives, and scissors · Glass slide · Staining jar, and staining rack · Measuring cylinder, beaker, test tube, and straw **Materials** · Media: nutrient broth, ordinary agar medium, casein hydrolysate agar medium, Dunham's peptone water medium, sugar fermentation medium, acetate agar medium, and Simon's agar medium · Staining solutions: Gram staining solution, methylene blue staining solution, and Wright staining solution · Reagents: bromothymol blue indicator, MR reagent, VP reagent, and indole reagent · Antibiotic sensitivity paper · Saline · Lens wiping paper, and cedar oil · Gauze, and cotton · Disinfectants: 75% alcohol, 2% lysol, and 0.1% benzalkonium bromide **Worker behaviors**

DUTIES	TASKS	ENABLERS
		· Conscientiousness and meticulousness professionalism, and honesty and trustworthiness · Reasonable time management
5.0 Monitoring of epidemic diseases on the farm	5.1 Monitoring of epidemic diseases of cattle and sheep. 5.2 Monitoring of epidemic diseases of chickens and pigs.	**General skills and knowledge** · Epidemiological characteristics of animal epidemic diseases · Animal clinical diagnosis · Techniques for animal pathological autopsy · Techniques for histopathology · Techniques for collecting pathological materials of animal epidemic diseases · Preparation of control standard systems · Preparation of bacterial media · Techniques for preparing experimental reagents · Isolation and culture of pathogenic bacteria · Identification of pathogenic bacteria · Examination of parasitic organisms · Extraction of test samples (such as serum, and tissue fluid) · Safety operation of blood clotting tests · Safety operation of enzyme-linked immunosorbent assays · Safety operation of PCR/RT-PCR tests · Safety operation of gel electrophoresis experiment · Interpretation and reporting of experimental results · Standard report writing · Customer communication skills · Cleaning tools, equipment and workplaces · Storage of tools and equipment · Occupational health and safety · Waste disposal methods

DUTIES	TASKS	ENABLERS
		Tools and equipment · Veterinary blood collectors · Electrothermostat · Benchtop low-speed centrifuge · Pipette · 96-well V-shaped coagulation plate · ELIASA · Tray balance · Oscillator · Sterilized glass bottle/capped centrifuge tube/plate · Microscope · PCR instrument/RT-PCR instrument · Electrophoresis apparatus · Mask and disposable latex glove · Protective clothing · Refrigerator · Computer **Materials** · Standard antigen material · Standard positive serum · Saline · Electrophoresis buffer · Agar powder, and serum · ELISA antibody detection kit · Deionized water · Aldehydated erythrocyte · Athogen universal primer · PCR/RT-PCR premix enzyme · Pathogen extraction reagent kit for test samples · Disinfectants: 2.5% iodine tincture, 75% alcohol, 2% lysol, and 0.1% benzalkonium bromide **Worker behaviors** · Conscientiousness and meticulousness professionalism, honesty and

DUTIES	TASKS	ENABLERS
		trustworthiness, and reasonable time management
6.0 Disposal of animal epidemic diseases	6.1 Report of epidemic diseases. 6.2 Quarantine. 6.3 Blockade. 6.4 Harmless treatment.	**General skills and knowledge** · Communication skills · Expression abilities · Teamwork skills · Report writing skills · Data collection and analysis skills · Correct completion of the epidemic disease report · Management of quarantine areas · Clinical symptoms and treatment measures for common epidemic diseases · Division of epidemic spots, epidemic areas, and threatened areas, and effective management of blockade areas · Skills for handling dead and affected animal carcasses · Preparation and use of medicament · Safe storage of drugs, and tools and equipment · Tanzania's Animal Epidemic Prevention Law and relevant regulations · Animal epidemic prevention and quarantine technology · Disinfection methods and skills · Biosafety protection · Waste disposal methods **Tools and equipment** · Masks, disposable latex gloves, protective clothing, protective masks, experimental clothes, and other personal protective equipment · Desktop computers or laptops · Printers · Quarantine sheds (equipped with disinfectants and equipment, etc.) · Animal quarantine and disinfection inspection station

DUTIES	TASKS	ENABLERS
		· Mortuary vehicle · Disinfectant preparation equipment: balances and measuring cylinders **Materials** · Epidemic prevention quarantine boards · Animal body bags · Epidemic disease reports and quarantine observation records and files · Drugs, vaccines, etc. · Disinfectants: ethanol, sodium hydroxide, potassium permanganate, iodine tincture, hydrated lime and lime milk **Worker behaviors** · Conscientiousness and meticulousness professionalism, and honesty and trustworthiness · Reasonable time management
7.0 Epidemic disease investigation	7.1 Formulation of an epidemic disease investigation plan. 7.2 Implementation of epidemic disease investigation. 7.3 Report on epidemic disease investigation.	**General skills and knowledge** · Understanding of the breeds, uses, and prevalence of epidemic diseases of affected animals · Knowledge of the geographical and climatic conditions, as well as the sources of feed and water on the farm · Understanding of the hygiene measures and conditions on the farm · Familiarity with the immunization status and previous epidemic disease records on the farm · Awareness of the incoming and outgoing livestock and poultry on the farm and the epidemic disease situation of surrounding areas · Investigation of the morbidity rate, infection rate, incidence rate, mortality rate, and fatality rate of affected animals · Development of a diagnostic plan for affected animals (such as laboratory examination and pathological autopsy)

DUTIES	TASKS	ENABLERS
		· Knowledge of the measures implemented on the farm and their effectiveness · Implementation of epidemiological investigations of animal epidemic disease by statistical methods · Collection of pathological materials · Molecular biology detection of pathological materials · Serological detection of pathological materials · Pathological autopsy of affected animals · Diagnosis based on epidemic disease investigation data · Familiarity with the procedures for reporting animal epidemic diseases · Understanding of the reporters and recipients, as well as the contents, methods, timeliness, and precautions of reporting animal epidemic diseases **Tools and equipment** · Desktops or laptop computers · Printers · Telephones · Instruments and equipment related to molecular biology detection · Instruments and equipment related to serological detection · Instruments and equipment related to pathological autopsy **Materials** · Mask and disposable latex glove · Protective clothing · Paper and pen · Consumables for collecting pathological materials · Consumables for molecular biology detection · Consumables for serological detection

DUTIES	TASKS	ENABLERS
		Worker behaviors · Service consciousness, biosafety awareness, teamwork spirit, rigorous attitude, and meticulousness professionalism
8.0 Performance test and selective breeding and pairing techniques	8.1 Feeding experiment. 8.2 Performance test. 8.3 Utilization of heterosis. 8.4 Selective breeding and pairing techniques. 8.5 Reproduction regulation techniques. 8.6 Embryo transfer.	**General skills and knowledge** · Principles, methods, and steps of animal feeding experiments · Precautions for animal feeding experiments · Design of feeding experiment schemes · Selection of experimental animals and preparation of materials · Formulation of feeding experiment processes · Measurement of feeding experiment indicators · Processing and analysis of the experimental data · Test report writing · Performance test · Mechanism of heterosis · Selection of breeding animals · Selective pairing of individuals · Selective pairing of populations · Strain culture · Crossbreeding mode · Animal identification techniques · Reproductive hormones and their applications · Biosafety · Medical waste disposal · Selection of donors and recipients · Synchronized estrus · Artificial insemination · Collection and identification of embryos · Embryo transfer · Pregnancy diagnosis

DUTIES	TASKS	ENABLERS
		Tools and equipment · Feeding equipment (trough, water tank, etc.) · Platform scale or weighing scale · Computer (data analysis software) · Measuring tool · Artificial insemination instrument · Performance file · B-mode ultrasound · Supplies for embryo collection **Materials** · Animal · Fodder · Data record form · Marker pens · Reproductive hormone preparation · Syringe · Disinfection supplies **Worker behaviors** · Conscientiousness and meticulousness professionalism, and honesty and trustworthiness · Reasonable time management