education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

SUBJECT GUIDELINES

ANIMAL PRODUCTION

NQF Level 4

September 2007

ANIMAL PRODUCTION – LEVEL 4

CONTENTS

INTRODUCTION

1 DURATION AND TUITION TIME

***2* SUBJECT LEVEL FOCUS**

3 ASSESSMENT REQUIREMENTS

3.1 Internal assessment

3.2 External assessment

4 WEIGHTED VALUES OF TOPICS

5 CALCULATION OF FINAL MARK

6 PASS REQUIREMENTS

7 SUBJECT AND LEARNING OUTCOMES

7.1 Advanced Animal Nutrition

7.2 Cattle Farming

7.3 Dairy Farming

7.4 Ostrich Farming

8 RESOURCE NEEDS FOR THE TEACHING OF PRIMARY AGRICULTURE

INTRODUCTION

A. What is Animal Production?

The National Certificates (Vocational) extends from NQF Levels 2 to 4 in Further Education and Training Colleges. Animal Production is a Vocational subject of in the Primary Agriculture programme. The subject covers the following fields of study:

- Basic understanding of animal anatomy and physiology
- Poultry production
- Goat production
- Sheep production
- Pig production
- Advanced animal nutrition
- Cattle farming and ostrich farming.

The subject aims to equip students with skills, values and knowledge necessary to progress through the levels of Animal Production. Whilst the subject is grounded in the South African context, it also incorporates global small-scale farming imperatives.

B. Why is Animal Production important in the Primary Agriculture programme?

The Primary Agriculture programme is designed to equip students with the necessary skills to enter a mixed farming situation. Livestock is a central concern of farming operations.

C. The link between the Animal Production Learning Outcomes and the Critical and Developmental Outcomes

The methods of teaching and assessment are vital for the achievement of the Critical Outcomes and Developmental Outcomes. During the three years of the National Certificates (Vocational) programme, students are responsible, individually and in groups, for live animals and crops, and consequently keep journals in which they answer, amongst others, reflective questions.

The assessment questions will require students to go beyond mere recall and into solving problems that relate to animals and the other topics linked to their practical work by asking “What if...?” and similar questions. Questions relating to the planning of farm activities can be used to promote in-depth thinking.

Given these teaching and assessment processes, by the end of the three years the students should have covered all seven Critical Outcomes to some extent and most if not all of the Developmental Outcomes. Critical thinking, critical evaluation and seeing the world as a set of interrelated systems will be easier to address by the third year of the programme, when the students are at NQF level 4; and they have more information available and are able to consider a wider range of options.

D. Factors that contribute to achieving the Animal Production Learning Outcomes

- Enabling environment – This subject should be presented in the context of small, micro and medium enterprises (SMMEs), emerging small-scale farmers and personal needs.
- Resources – Students should have access to all the necessary resources.
- Experiential exposure – Students should be exposed to real work and simulated work environments.
- Suitably qualified lecturers – Lecturers should have a solid command of subject knowledge and skills and be well informed about legislation, community issues and accessing support systems, for example systems provided by the Department of Agriculture.

1 DURATION AND TUITION TIME

This is a one year instructional programme comprising 200 teaching and learning hours. This is a full-time subject, however, it may be offered on a part-time basis provided all of the assessment requirements set out hereunder are adhered to.

Students with special education needs (LSEN) must be catered for in a way that eliminates barriers to learning.

2 SUBJECT LEVEL FOCUS

- Demonstrate an understanding of advanced animal nutrition.
- Demonstrate an understanding of cattle farming
- Demonstrate an understanding of *either* dairy farming *or* ostrich farming

3 ASSESSMENT REQUIREMENTS

3.1 Internal assessment (50 percent)

Students will have to be prepared for assessment following the assessment policy of the institution.

3.1.1 Theoretical Component

The student will be required to achieve all outcomes of the subject at this level. All topics in this subject will have an assessment that will form part of formative assessment at the end of the subject.

For Topic 1 (Advanced Animal Nutrition), 60 percent of the internal marks will be for theory and 40 percent for practical. For Topics 2 and 3 (Cattle and Dairy or Ostrich Farming), 40 percent of the internal marks will be for theory and 60 percent for practical.

3.1.2 Practical Component

The student will be required to achieve all outcomes of this subject in this level. All topics in this subject will have assessment that constitutes part of formative assessment at the end of the subject.

- **Definition of the term "Structured Environment"**

"Structured Environment" for the purposes of assessment refers to an actual or simulated workplace. In the case of Animal Production, the student must be exposed to workplace and fieldwork.

Evidence of this practical component must be provided in the form of a logbook with a clear listing of the competencies to be assessed. The following information must be contained in the logbook:

- Name of student
- Location where the practical component was achieved
- List of outcomes to be achieved in the environment (tasks, tests)
- Time period spent on the activity
- Comment on the outcomes (student's reflection)
- Comment from assessor
- Student signature, facilitator's or supervisor's signature

For the logbook to be regarded as valid evidence it must be signed off by an officially assigned supervisor.

- **Evidence in practical assessments**

All evidence pertaining to evaluation of practical work must be reflected in the students' Portfolio of Evidence. The assessment instruments used for the purpose of conducting such assessments must be part of the evidence contained in the PoE.

3.1.3 Processing of internal assessment mark for the year

A year mark out of 100 is calculated by adding together the marks of theoretical components and the practical components of the internal continuous assessment.

3.1.4 Moderation of internal assessment mark

Internal assessment is subject to both internal and external moderation procedures as contained in the *National Examinations Policy for FET College Programmes*.

3.2 External assessment (50 percent)

A national examination is conducted annually in October or November by means of a paper/s set externally and marked and moderated externally.

4 WEIGHTED VALUES OF TOPICS

TOPICS	WEIGHTED VALUE
1. Advanced animal nutrition	20%
2. Cattle farming	40%
Either 3. Dairy farming **or** 4. Ostrich farming	40%
TOTAL	**100**

5 CALCULATION OF FINAL MARK

Continuous assessment:	Student's mark/100 x 50/1 = a mark out of 50	(a)
Examination mark:	Student's mark/100 x 50/1 = a mark out of 50	(b)
Final mark:	**(a) + (b) = a mark out of 100**	

All marks are systematically processed and accurately recorded to be available as hard copy evidence for, amongst others, purposes of moderation and verification.

6 PASS REQUIREMENTS

The student must obtain fifty (50) percent in ICASS and fifty (50) percent in the examination.

7 SUBJECT AND LEARNING OUTCOMES

On completion of Animal Production Level 4 the student should have covered the following topics:

Topic 1: Advanced Animal Nutrition
Topic 2: Cattle Farming
Either
Topic 3: Dairy Farming
Or
Topic 4: Ostrich Farming

7.1 Topic 1: Advanced Animal Nutrition

7.1.1 Subject Outcome1: Explain the main components of the diet of farm animals and carry out simple food tests.

Learning Outcome

The student should be able to:

- Explain the main groups of food chemicals and (for larger molecules) the kinds of smaller molecules which join together to form them, and outline the main functions of each in the body.

  Range: Groups of food refers to carbohydrates (starch, glycogen, cellulose, sugars); lipids (fats, oils, fatty acids and glycerol); proteins (some examples, and amino acids including the essential amino acids); vitamins; mineral salts.
- Handle samples of the different groups in laboratory practical situations.
- Do simple food tests (e.g iodine for starch, biuret for protein, 'clear patch on paper' test for lipids) in laboratory on naturally occurring and packaged animal feedstuffs.

7.1.2 Subject Outcome 2: Explain how digestion and absorption occur in farm animals.

Range: Non-ruminants (pigs, poultry) and ruminants (sheep, goats, cattle.).

Learning Outcome

The student should be able to:

- Explain how digestion and absorption occur in the guts of farm animals, and point to the various parts in both diagrams and carcasses and say what each part does.

  Range: Structure and functions of the following components:
  - *Teeth*
  - *Saliva and its enzymes*
  - *Oesophagus (including peristalsis and sphincters)*
  - *Gizzard in birds*
  - *Stomach and its enzymes; acid medium*
  - *Chambers of the ruminant stomach and their functions, and the role of bacteria*
  - *Duodenum and small intestine and their enzymes*
  - *Caecum and large intestine*
  - *The role of the liver in processing absorbed molecules coming from the gut*

7.1.3 Subject Outcome 3: Estimate total nutritional requirements, what is provided by grazing, and the choice and use of food supplements.

Range: Metabolisable energy; proteins (with special reference to essential amino acids; vitamins; salts; fibre/roughage).

Learning Outcomes

The student should be able to:

- Outline the kinds of nutrients needed by animals kept under different conditions (e.g. grazing in rainy and dry seasons, intensive rearing) and provide some indication of quantities.
- Explain factors influencing nutrient needs, e.g. phases of growth, temperature, production of eggs or milk.
- Using tables of information provided, describe the composition of some common foodstuffs, including hay, supplementary concentrates, and complete diets such as different kinds of poultry mash or pig feeds.
- Explain with examples how to adjust the feed of livestock to fit changing circumstances. Adjust feed of livestock if appropriate circumstances arise.

7.1.4 Subject Outcome 4: Outline common problems in nutrition that affect the growth of livestock, and how these may be addressed.

Learning Outcomes

The student should be able to:

- Outline common problems in nutrition that affect the growth of livestock and how these may be addressed.

- Identify the groups of symptoms involved in such problems, in live animals and in pictures, and suggest appropriate action in each case.

7.2 Topic 2: Cattle Farming

7.2.1 Subject Outcome 1: Identify and describe the main types of cattle and breeds within the types, in terms of their suitability to production and adaptability to environmental conditions

Range: Environmental conditions refer to climate, and vegetation.

Learning Outcomes

The student should be able to:
- Identify the main types and breeds of cattle found in southern Africa.
- Explain the characteristics of each and the kinds of farm enterprise and location to which they are suited.

7.2.2 Subject Outcome 2: Identify and explain breeding cycles in cattle in order to ensure proper planning for calving times.

Range: Breeding cycles refers to reproduction cycle and milk production cycle.

Learning Outcomes

The student should be able to:
- Explain the oestrus cycle, including the main hormones involved.
- Explain how to tell when a cow is coming into heat and identify such animals in the field.
- Show how to plan calving and lactation times of animals within a herd.

7.2.3 Subject Outcome 3: Explain the principles of rearing calves for both dairy and meat production.

Learning Outcomes

The student should be able to:
- Outline a plan for rearing calves over a period of a year, explaining the reasons for each action.
- Care for calves, including handling, feeding, identifying problems and dealing with them with the help of a supervisor.

7.2.4 Subject Outcome 4: Explain feeding requirements of cattle in relation to their growth stages.

Learning Outcomes

The student should be able to:
- Work out exactly what the feeding requirements are for animals being kept at the college or teaching location, and explain the reasons for these requirements. After checking with supervisor, put the information to practical use.
- Given various scenarios such as changes in prices of feedstuffs, work out suitable modifications to the diet or even the feeding system, and present written proposals with justifications.

  Range: Feeding systems will include intensive stall feeding, natural grazing, sown pasture grazing and the use of supplements where appropriate.

7.2.5 Subject Outcome 5: Explain methods and principles for selection of breeding stock in order to produce quality stock.

Learning Outcomes

The student should be able to:
- Explain the desired characteristics to use and select breeding stock if possible

  Range: 3 breeds commonly used in the region of the college.
- Explain the criteria to use when selecting breeding stock.

  Range: Mendelian or other genetics is not required.

7.2.6 Subject Outcome 6: Identify and control diseases and parasites affecting cattle according to workplace procedures.

Learning Outcomes

The student should be able to:

- Identify diseases (bacterial, protozoan and viral) and parasites which are common in the area and affect the cattle.
- Identify the treatment used for different diseases and parasites.
- Explain the workplace procedures used for treatment of afflicted and infected cattle.
- Apply the above in the workplace environment.

7.2.7 Subject Outcome 7: Demonstrate an ability to handle cattle.

Learning Outcomes

The student should be able to:

- Explain different ways of handling cattle in different circumstances.
  Range: Circumstances include transportation, milking, branding, dehorning, castrating and treating.
- Apply appropriate ways of handling cattle at all stages of rearing and production.

7.2.8 Subject Outcome 8: Identify suitable areas for cattle production in terms of climatic conditions, vegetation and market availability.

Learning Outcome

The student should be able to:

- Identify and discuss suitable areas for cattle production in terms of climatic conditions, vegetation and market availability.
  Range: Areas discussed should include all the climatic zones in southern Africa.

7.3 Topic 3: Dairy Farming

7.3.1 Subject Outcome 1: Demonstrate an understanding of the operation of a milking parlour.

Learning Outcomes

The student should be able to:

- Explain milking theory.
  Range: Udder structure, milking stimuli, optimum pulsation rate and vacuum pressure of milking machines
- Explain ways of assessing milk quality and take preventative and remedial action.
  Range: Odours, colour, structure, bacterial load; group sick animals for separate milking and treatmen
- Explain and apply parlour hygiene requirements.
  Range: Disposal of wastewater and manure and control of flies; cleaning udders and equipment; explain importance of rapid cooling of freshly drawn milk.
- Explain the principles of operation of milk cooling devices and ensure they work correctly.
  Range: Monitor temperatures; identify needs for maintenance, report and call assistance.
- Explain how to keep and use records, and be able to diagnose problems using sample records provided.
  Range: Records of milk production by individual animals, mastitis incidence, stored milk temperature, milk tainting, cracks in udders, incidence of oestrus.
- Identify and briefly describe the end products of milk processing and illustrate examples of simple on-farm processing.
  Range: Products include butter, cheese, whey, maas, buttermilk or yoghurt; pasteurised, homogenised and sterilised whole milk.
- Calculate income and expenditure of a simple dairy operation, using templates provided by the instructor.

7.4 Topic 4: Ostrich Farming

7.4.1 Subject Outcome 1: Demonstrate an understanding of the processes involved in ostrich farming.

Learning Outcomes

The student should be able to:

- Describe ostriches in terms of their suitability to environmental and other conditions and demand for market products, and assess the feasibility of ostrich farming in a particular location.
  Range: Conditions will include climate and vegetation. Market products may include meat and feathers.
- Identify and describe ostrich breeds and possible housing arrangements, with advantages and disadvantages of each.
- Describe the different feeding needs of ostriches in relation to their production, and identify and explain the different ways of feeding ostriches.
  Range: Will include arrangements for organising grazing, and supplementary feeds as appropriate.
- Identify diseases and parasites which are common in the area that affect quality ostrich production.
  Range: Diseases refers to bacterial, protozoan and viral diseases. Parasites will include external and internal parasites.
- Outline the life cycles of the disease and parasite organisms, with particular reference to measures for prevention and control.
- Identify the treatments used for different diseases and parasites so as to apply the appropriate intervention.
- Explain the workplace procedures used to minimise infection, and for treatment of infected ostriches.
- Apply the above in the workplace environment.
- Explain the operation of, and use of, artificial brooding systems for ostriches.
- Handle ostriches in different circumstances during young and adult stages.

8 RESOURCE NEEDS FOR THE TEACHING OF PRIMARY AGRICULTURE

8.1 Phased development of training and demonstration farm

The following is a summarised phased development approach that is suggested for the establishment of a training and demonstration farm mainly for the NCV programme. It is suggested that the development of the programme be done in phases. Staff appointment has not been included

- **Phase 1:**
  - Farm layout or land use planning
  - Bush clearing on cropland
- **Phase 2:**
  - Build, equip and stock the broiler unit
  - Build, equip and stock the egg layer unit
  - Install irrigation reticulation
  - Establish vegetable field crops and seedling units
  - Establish a beekeeping unit
  - Erect external security fence
- **Phase 3**
  - Establish pastures
  - Erect internal fences and allocate grazing camps
- **Phase 4**
  - Build, equip and stock dairy, beef, goat and pig units
  - Extend training courses

8.2 Resource needs training and demonstration

FARM INFRASTRUCTURE	
1. BROILER PRODUCTION AND PROCESSING UNIT	• Building costs: 5 x 57.5m^2 • Equipment (brooders, drinkers, tube feeders) • Complete broiler processing equipment
2. LAYER AND EGG PROCESSING UNIT	• Building costs: 1 x 64m^2 • Equipment (includes cages) • 500 point of lay 20 week old pullets
3. DAIRY AND MILK PROCESSING UNIT	• Buildings • Equipment for milking and milk processing • 12 heifers
4. BEEF UNIT	• Sheltered beef feedlot unit: 1 x 30m • Beef handling pens and equipment • 12 Nguni heifers • 1 Nguni bull
5. GOAT UNIT	• 20 young nanny goats • 2 quality breeding billy goats • Goat handling pens and equipment
6. PIG UNIT	• Buildings • Equipment (brooders, farrowing rails, troughs) • 8 gilts and 2 boars
7. APIARY UNIT	• Apiary equipment including honey extractor
8. ESTABLISHED PASTURES	• Land preparation, fertilisation planting 8ha
9. IRRIGATION	• 1ha vegetables, 4ha maize/beans and 8ha pastures • Rising main from the river to reservoir and gravity flow (lower lands, paddocks) or booster pump (upper lands)
10. FARM TOOLS AND AGROCHEMICALS	• Equipment (hand tools, knapsacks, mower, wheelbarrows, spades etc.) • Farm shed
11. SEEDLING NURSERY (Vegetables, trees, shrubs)	• Shadecloth, poles, standpipes, equipment
12. WATER RETICULATION	• Reticulation to paddocks, livestock units
13. VEHICLES	• 1 tonne pick up and canopy • 1 medium size tractor • 1 mini bus for transporting learners • Tractor trailer and implements
14. FENCING	• External security fence: 2 km • Internal fences: 1.6km
15. MISCELLANEOUS	• Laboratory with equipment for plant and soil science • Laboratory with equipment for animal & poultry science • Teaching aids (data projectors, screen, DVD player etc.) • Computers with internet links • Library with relevant books and magazines