education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

SUBJECT GUIDELINES

FARM PLANNING AND MECHANISATION

NQF Level 4

September 2007

FARM PLANNING AND MECHANISATION – LEVEL 4

CONTENTS

INTRODUCTION

A. What is Farm Planning and Mechanisation?

The National Certificates (Vocational) extend from NQF Levels 2 to 4 in Further Education and Training Colleges. Soil Science (Levels 2 and 3) followed by Farm Planning and Mechanisation (Level 4) are Vocational subjects in the Primary Agriculture programme of the National Certificates (Vocational). The subject Farm Planning and Mechanisation covers the following areas of study:

- Some aspects of atoms and molecules (enabling students to understand concepts not only in Farm Planning and Mechanisation but also in Animal Production and Plant Production.)
- Soils and their components
- Plants' requirements to grow from soils
- Fertilisation of soils
- Soil water and evapo-transpiration
- Soil erosion and its prevention
- Planning an agricultural enterprise
- Agricultural mechanisation

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

B. Why is Farm Planning and Mechanisation important in the Primary Agriculture programme?

The Primary Agriculture programme is designed to equip learners with the necessary skills to enter a mixed farming situation. Soils and their successful management are central to understanding and successfully practising improved agricultural techniques. Planning an enterprise and using farm machinery successfully are similarly important. Recordkeeping and financial management are covered in the separate subject, Agri-business.

C. The link between the Farm Planning and Mechanisation 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 soils 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 have more information available and are able to consider a wider range of options.

D. Factors that contribute to achieving the Farm Planning and Mechanisation 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. For Topic 1 at Level 2 (Basic Aspects of Atoms and Molecules) a well-equipped school chemistry laboratory would suffice, with additional equipment for determining soil texture and measuring pH using both laboratory and field methods,. Practical field work with soils is likely to be done in the same locations as for Plant Production. For agricultural mechanisation at Level 4, it may be necessary to negotiate access to other locations having relevant farm machinery, though colleges presenting the National Certificates (Vocational) Primary

Agriculture programme should have a tractor, plough and soil cultivation equipment available for student use.

- 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 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 designing and implementing an agricultural enterprise
- Demonstrate an understanding of agricultural mechanisation

3 ASSESSMENT REQUIREMENTS

3.1 Internal assessment (50 percent)

Students will have to be prepared for assessment in accordance with the assessment policy of the institution.

3.1.1 Theoretical Component

The learner will be required to achieve all outcomes of the subject at this level. All topics in this subject will contribute to the internal assessment of the subject.

For Topic 1 (Planning an agricultural enterprise), 60 percent of the internal assessment will be for theory, and 40 percent for practical which includes simulation. For Topic 2 (Agricultural mechanisation), 30 percent of the internal assessment will be for theory and 70 percent for practical

3.1.2 Practical Component

The learner will be required to achieve all outcomes of this subject in this level. All topics in this subject will contribute to the internal assessment of the subject

- **Evidence in practical assessments**

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

- **Definition of the term "structured environment"**

"Structured environment" for the purposes of assessment refers to an actual or simulated workplace. In the case of Agricultural Mechanisation, students may have to obtain their practical experience outside of the college.

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 the student
- Site where the practical component was achieved
- List of outcomes achieved at the site (tasks, tests)
- Time period spent on the activity
- Comment on the outcomes (learner's reflection)
- Comment from assessor
- Learner 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 and by a learner.

3.1.3 Processing of internal assessment mark for the year

The total internal mark for Topic 1 (Planning an agricultural enterprise), with the theory/practical weighting described above, will be converted to a mark out of 40. The total internal marks for Topic 2 (Agricultural mechanisation), with the theory/practical weighting described above, will be converted to a mark out of 60.

A year mark out of 100 is calculated by adding together the total marks of the two topics.

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.

External assessment details are set out in the *Assessment Guidelines: Farm Planning and Mechanisation* (Level 4).

4 WEIGHTED VALUES OF TOPICS

TOPICS	WEIGHTED VALUE
1. Planning an agricultural enterprise	60%
2. Agricultural mechanisation	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 at least fifty (50) percent in ICASS and fifty percent (50) in the examination.

7 SUBJECT AND LEARNING OUTCOMES

On completion of Farm Planning and Mechanisation Level 4 the learner should have covered the following topics:

Topic 1: Planning an agricultural enterprise
Topic 2: Agricultural mechanisation

7.1 Topic 1: Planning an Agricultural Enterprise

7.1.1 Subject Outcome 1: Recognise the natural resources and other components of a sustainable farming system.

Learning Outcomess

The student should be able to:

- Recognise the natural resources required for an agricultural enterprise at a site, and the limitations they impose
  Range: Soil, water, climate, vegetation, topography.
- Recognise other components of a sustainable farming system.
  Range: Including people, markets.

7.1.2 Subject Outcome 2: Balance potentially competing requirements for an agri-enterprise.

Learning Outcomes

The student should be able to:

- Clarify the reasons for setting up the enterprise.
- Balance sustainability, productivity and the conservation of resources. This will include recognising social, economic, environmental and political sustainability, as well as the legal environment.

7.1.3 Subject Outcome 3: Identify infrastructural requirements for an agri-enterprise.

Learning Outcomes

The student should be able to:

- Describe and recognise infrastructural requirements of the proposed farming enterprise.
  Range: Including fencing, housing, water supply, electricity, animal handling facilities and access.

7.1.4 Subject Outcome 4: Choose appropriate livestock and crops.

Learning Outcome

The student should be able to:

- Choose appropriate livestock and crops for the enterprise.

7.1.5 Subject Outcome 5: Plan appropriate production procedures for the enterprise.

Learning Outcomes

The student should be able to:

- Plan a sequence of events for the year, bearing in mind past records and market information.
- Plan appropriate harvest and post-harvest procedures, bearing in mind health and hygiene as well as legal requirements.

7.1.6 Subject Outcome 6: Monitor and evaluate progress.

Learning Outcome

The student should be able to:

- Plan how to monitor progress during the year and use the information to review and modify plans as necessary.

7.2 Topic 2: Agricultural mechanisation

7.2.1 Subject Outcome 1: Demonstrate an understanding of the circumstances under which machines, manual labour and draught animals are appropriate.

Learning Outcome

The student should be able to:

- Explain what is involved in using machines, draught animals and manual labour, and explain under what circumstances each is appropriate.

7.2.2 Subject Outcome 2: Identify types of tractors and their components and carry out basic maintenance.

Learning Outcomes

The student should be able to:

- Describe the construction of different types of tractor, and identify the components.
- Carry out lubrication and simple maintenance.
  Range: Radiator coolant, engine oil level, air cleaner, fuel filter, all oil levels, tyres, battery, clutch, lubrication fittings.

7.2.3 Subject Outcome 3: Identify and describe the operation of farm implements.

Learning Outcomes

The student should be able to:

- Identify and describe the operation of various pieces of farm machinery.
  Range: Ideally students should be able to see the following types of machines in operation. The full list may not be available at all institutions offering this NCV and assessment procedures must allow for this.
  - *Ploughs*
  - *Cultivation machinery*
  - *Drills*
  - *Manure and fertilizer distribution machinery*
  - *Hay making machinery*
  - *Silage machinery*
  - *Balers*
  - *Harvesters*
  - *Sprayers*
- Use tractors, ploughs and sprayers, and such other machinery as may be available at the institution offering the NCV.
- Carry out basic maintenance on the machinery available.

7.2.4 Subject Outcome 4: Perform static calibration of farm implements.

Learning Outcome

The student should be able to:

- Explain and demonstrate the process of static calibration with regard to ground crop sprayers and any other relevant machinery (such as manure and fertilizer distribution machinery) at the institution.

7.2.5 Subject Outcome 5: Erect and maintain fences.

Learning Outcome

The student should be able to:

- Erect and maintain fences.
  Range: Constructing corner posts, straining posts, gate posts, boundary fences, wire netting, props, droppers, wire tension.

7.2.6 Subject Outcome 6: Describe and observe safety precautions.

Learning Outcomes

The student should be able to:

- Explain safety precautions when operating farm machinery, and demonstrate where possible.
- Explain safety precautions when handling farm chemicals (particularly herbicides, fungicides and insecticides), and demonstrate.

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 and poultry science • Teaching aids (data projectors, screen, DVD player etc.) • Computers with internet links • Library with relevant books and magazines