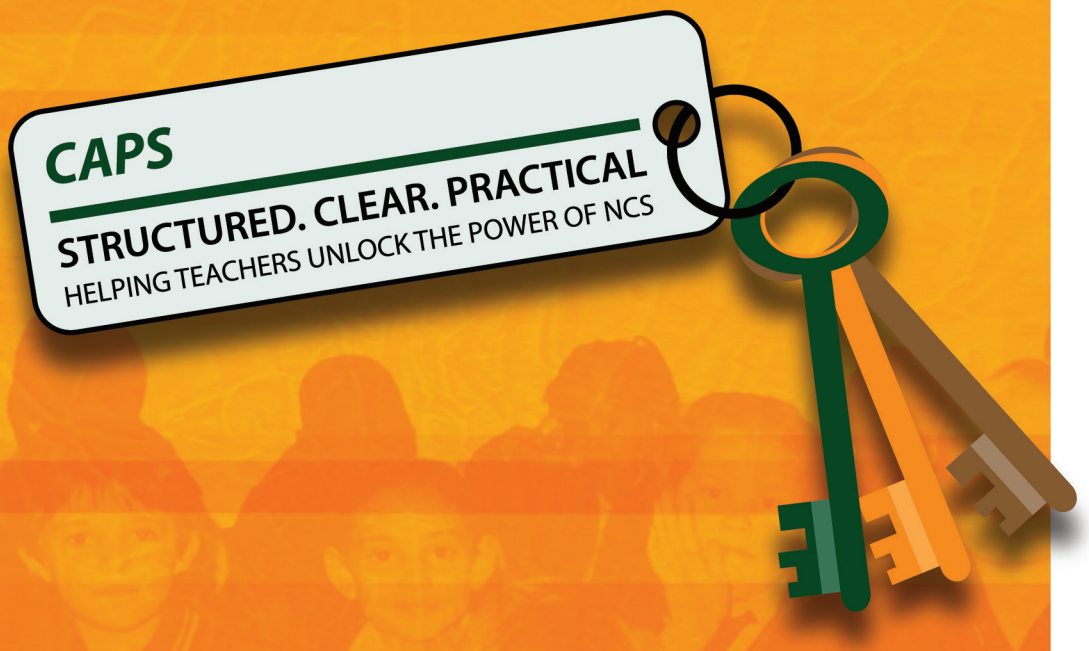
AGRICULTURAL SCIENCES

National Curriculum Statement (NCS)

Curriculum and Assessment Policy Statement



Further Education and Training Phase Grades 10-12

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

CURRICULUM AND ASSESSMENT POLICY STATEMENT
GRADES 10-12

AGRICULTURAL SCIENCE

Department of Basic Education

222 Struben Street
Private Bag X895
Pretoria 0001
South Africa
Tel: +27 12 357 3000
Fax: +27 12 323 0601

120 Plein Street Private Bag X9023
Cape Town 8000
South Africa
Tel: +27 21 465 1701
Fax: +27 21 461 8110
Website: http://www.education.gov.za

© 2011 Department of Basic Education

ISBN: 978-1-4315-0567-8

Design and Layout by: Ndabase Printing Solution

Printed by: Government Printing Works

FOREWORD BY THE MINISTER

Our national curriculum is the culmination of our efforts over a period of seventeen years to transform the curriculum bequeathed to us by apartheid. From the start of democracy we have built our curriculum on the values that inspired our Constitution (Act 108 of 1996). The Preamble to the Constitution states that the aims of the Constitution are to:

- heal the divisions of the past and establish a society based on democratic values, social justice and fundamental human rights;
- improve the quality of life of all citizens and free the potential of each person;
- lay the foundations for a democratic and open society in which government is based on the will of the people and every citizen is equally protected by law; and
- build a united and democratic South Africa able to take its rightful place as a sovereign state in the family of nations.

Education and the curriculum have an important role to play in realising these aims.

In 1997 we introduced outcomes-based education to overcome the curricular divisions of the past, but the experience of implementation prompted a review in 2000. This led to the first curriculum revision: the *Revised National Curriculum Statement Grades R-9* and the *National Curriculum Statement Grades 10-12* (2002).

Ongoing implementation challenges resulted in another review in 2009 and we revised the *Revised National Curriculum Statement* (2002) to produce this document.

From 2012 the two 2002 curricula, for *Grades R-9* and *Grades 10-12* respectively, are combined in a single document and will simply be known as the *National Curriculum Statement Grades R-12.* The *National Curriculum Statement for Grades R-12* builds on the previous curriculum but also updates it and aims to provide clearer specification of what is to be taught and learnt on a term-by-term basis.

The *National Curriculum Statement Grades R-12* accordingly replaces the Subject Statements, Learning Programme Guidelines and Subject Assessment Guidelines with the

(a) Curriculum and Assessment Policy Statements (CAPS) for all approved subjects listed in this document;

(b) *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12*; and

(c) *National Protocol for Assessment Grades R-12.*

MRS ANGIE MOTSHEKGA, MP
MINISTER OF BASIC EDUCATION

CONTENTS

SECTION 1: INTRODUCTION TO THE CURRICULUM AND ASSESSMENT POLICY STATEMENTS.. 3

1.1 Background 3

1.2 Overview 3

1.3 General aims of the South African Curriculum 4

1.4 Time allocation 6

1.4.1 Foundation phase 6

1.4.2 Intermediate phase 7

1.4.3 Senior phase 7

1.4.4 Grades 10-12 8

SECTION 2: INTRODUCTION TO AGRICULTURAL SCIENCES 8

2.1 Agricultural Sciences 8

2.2 Overview of topics 10

SECTION 3: ANNUAL TEACHING PLANS 14

3.1 Grade 10 Term 1 14

3.2 Grade 10 Term 2 17

3.3 Grade 10 Term 3 19

3.4 Grade 10 Term 4 23

3.5 Grade 11 Term 1 25

3.6 Grade 11 Term 2 28

3.7 Grade 11 Term 3 31

3.8 Grade 11 Term 4 35

3.9 Grade 12 Term 1 39

3.10 Grade 12 Term 2 46

3.11 Grade 12 Term 3 50

3.12 Grade 12 Term 4 54

SECTION 4: ASSESSMENT IN AGRICULTURAL SCIENCES 55

4.1 Introduction 55

4.2 Informal or daily assessment 55

4.3 Formal assessment 55

4.3.1 Formal assessment tasks 55

4.4 Programme of assessment 56

4.4.1 Grades 10 and 11 59

4.4.2 Grades 12 60

4.4.3 Examinations 62

4.5 Recording and reporting 63

4.6 Moderation of Assessment 64

4.7 General 64

4.8 Annexure 64

4.8.1 Exemplar assignment 64

4.8.2 Exemplar practical task 64

SECTION 1

INTRODUCTION TO THE CURRICULUM AND ASSESSMENT POLICY STATEMENTS FOR AGRICULTURAL SCIENCES GRADES 10-12

1.1 Background

The *National Curriculum Statement Grades R-12 (NCS)* stipulates policy on curriculum and assessment in the schooling sector.

To improve implementation, the National Curriculum Statement was amended, with the amendments coming into effect in January 2012. A single comprehensive Curriculum and Assessment Policy document was developed for each subject to replace Subject Statements, Learning Programme Guidelines and Subject Assessment Guidelines in Grades R-12.

1.2 Overview

(a) The *National Curriculum Statement Grades R-12 (January 2012)* represents a policy statement for learning and teaching in South African schools and comprises the following:

(i) Curriculum and Assessment Policy Statements for each approved school subject;

(ii) The policy document, National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12; and

(iii) The policy document, National Protocol for Assessment Grades R-12 (January 2012).

(b) The *National Curriculum Statement Grades R-12 (January 2012)* replaces the two current national curricula statements, namely the

(i) Revised National Curriculum Statement Grades R-9, Government Gazette No. 23406 of 31 May 2002, and

(ii) National Curriculum Statement Grades 10-12 Government Gazettes, No. 25545 of 6 October 2003 and No. 27594 of 17 May 2005.

(c) The national curriculum statements contemplated in subparagraphs b(i) and (ii) comprise the following policy documents which will be incrementally repealed by the *National Curriculum Statement Grades R-12 (January 2012)* during the period 2012-2014:

(i) The Learning Area/Subject Statements, Learning Programme Guidelines and Subject Assessment Guidelines for Grades R-9 and Grades 10-12;

(ii) The policy document, National Policy on assessment and qualifications for schools in the General Education and Training Band, promulgated in Government Notice No. 124 in Government Gazette No. 29626 of 12 February 2007;

(iii) The policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), promulgated in Government Gazette No.27819 of 20 July 2005;

(iv) The policy document, An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding learners with special needs, published in Government Gazette, No.29466 of 11 December 2006, is incorporated in the policy document, National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12; and

(v) The policy document, An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding the National Protocol for Assessment (Grades R-12), promulgated in Government Notice No.1267 in Government Gazette No. 29467 of 11 December 2006.

(d) The policy document, *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12*, and the sections on the Curriculum and Assessment Policy as contemplated in Chapters 2, 3 and 4 of this document constitute the norms and standards of the *National Curriculum Statement Grades R-12.* It will therefore, in terms of *section 6A* of the *South African Schools Act, 1996 (Act No. 84 of 1996,)* form the basis for the Minister of Basic Education to determine minimum outcomes and standards, as well as the processes and procedures for the assessment of learner achievement to be applicable to public and independent schools.

1.3 General aims of the South African Curriculum

(a) The *National Curriculum Statement Grades R-12* gives expression to the knowledge, skills and values worth learning in South African schools. This curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives. In this regard, the curriculum promotes knowledge in local contexts, while being sensitive to global imperatives.

(b) The National Curriculum Statement Grades R-12 serves the purposes of:

- equipping learners, irrespective of their socio-economic background, race, gender, physical ability or intellectual ability, with the knowledge, skills and values necessary for self-fulfilment, and meaningful participation in society as citizens of a free country;
- providing access to higher education;
- facilitating the transition of learners from education institutions to the workplace; and
- providing employers with a sufficient profile of a learner's competences.

(c) The National Curriculum Statement Grades R-12 is based on the following principles:

- Social transformation: ensuring that the educational imbalances of the past are redressed, and that equal educational opportunities are provided for all sections of the population;
- Active and critical learning: encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths;
- High knowledge and high skills: the minimum standards of knowledge and skills to be achieved at each grade are specified and set high, achievable standards in all subjects;
- Progression: content and context of each grade shows progression from simple to complex;

- Human rights, inclusivity, environmental and social justice: infusing the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa. The National Curriculum Statement Grades R-12 is sensitive to issues of diversity such as poverty, inequality, race, gender, language, age, disability and other factors;
- Valuing indigenous knowledge systems: acknowledging the rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution; and
- Credibility, quality and efficiency: providing an education that is comparable in quality, breadth and depth to those of other countries.

(d) The National Curriculum Statement Grades R-12 aims to produce learners that are able to:

- identify and solve problems and make decisions using critical and creative thinking;
- work effectively as individuals and with others as members of a team;
- organise and manage themselves and their activities responsibly and effectively;
- collect, analyse, organise and critically evaluate information;
- communicate effectively using visual, symbolic and/or language skills in various modes;
- use science and technology effectively and critically showing responsibility towards the environment and the health of others; and
- demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation.

(e) Inclusivity should become a central part of the organisation, planning and teaching at each school. This can only happen if all teachers have a sound understanding of how to recognise and address barriers to learning, and how to plan for diversity.

The key to managing inclusivity is ensuring that barriers are identified and addressed by all the relevant support structures within the school community, including teachers, District-Based Support Teams, Institutional-Level Support Teams, parents and Special Schools as Resource Centres. To address barriers in the classroom, teachers should use various curriculum differentiation strategies such as those included in the Department of Basic Education's *Guidelines for Inclusive Teaching and Learning* (2010).

1.4 Time Allocation

1.4.1 Foundation Phase

(a) The instructional time in the Foundation Phase is as follows:

SUBJECT	GRADE R (HOURS)	GRADES 1-2 (HOURS)	GRADE 3 (HOURS)
Home Language	10	8/7	8/7
First Additional Language		2/3	3/4
Mathematics	7	7	7
Life Skills • Beginning Knowledge • Creative Arts • Physical Education • Personal and Social Well-being	**6** (1) (2) (2) (1)	**6** (1) (2) (2) (1)	**7** (2) (2) (2) (1)
TOTAL	**23**	**23**	**25**

(b) Instructional time for Grades R, 1 and 2 is 23 hours and for Grade 3 is 25 hours.

(c) Ten hours are allocated for languages in Grades R-2 and 11 hours in Grade 3. A maximum of 8 hours and a minimum of 7 hours are allocated for Home Language and a minimum of 2 hours and a maximum of 3 hours for Additional Language in Grades 1-2. In Grade 3 a maximum of 8 hours and a minimum of 7 hours are allocated for Home Language and a minimum of 3 hours and a maximum of 4 hours for First Additional Language.

(d) In Life Skills Beginning Knowledge is allocated 1 hour in Grades R-2 and 2 hours as indicated by the hours in brackets for Grade 3.

1.4.2 Intermediate Phase

(a) The instructional time in the Intermediate Phase is as follows:

SUBJECT	HOURS
Home Language	6
First Additional Language	5
Mathematics	6
Natural Sciences and Technology	3,5
Social Sciences	3
Life Skills • Creative Arts • Physical Education • Personal and Social Well-being	**4** (1,5) (1) (1,5)
TOTAL	**27,5**

1.4.3 Senior Phase

(a) The instructional time in the Senior Phase is as follows:

SUBJECT	HOURS
Home Language	5
First Additional Language	4
Mathematics	4,5
Natural Sciences	3
Social Sciences	3
Technology	2
Economic Management Sciences	2
Life Orientation	2
Creative Arts	2
TOTAL	**27,5**

1.4.4 Grades 10-12

(a) The instructional time in Grades 10-12 is as follows:

SUBJECT	TIME ALLOCATION PER WEEK (HOURS)
Home Language	**4.5**
First Additional Language	**4.5**
Mathematics	**4.5**
Life Orientation	**2**
A minimum of any three subjects selected from **Group B** Annexure B, Tables B1-B8 of the policy document, *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12,* subject to the provisos stipulated in paragraph 28 of the said policy document.	**12 (3x4h)**
TOTAL	**27,5**

The allocated time per week may be utilised only for the minimum required NCS subjects as specified above, and may not be used for any additional subjects added to the list of minimum subjects. Should a learner wish to offer additional subjects, additional time must be allocated for the offering of these subjects.

SECTION 2

2.1 What is Agricultural science?

Agricultural Sciences is the study of the relationship between soils, plants and animals in the production and processing of food, fibre, fuel and other agricultural commodities that have an economic, aesthetic and cultural value.

The table below indicates the main topics in the Agricultural Sciences curriculum.

1. Soil Science
2. Plant Studies
3. Animal Studies
4. Agricultural Economics
5. Basic Agricultural Chemistry
6. Basic Genetics and Biological Concepts
7. Sustainable Natural Resource Utilization
8. Agro-ecology

In Agricultural Sciences learners will:

- Develop an awareness of the management and care of the environment, natural resources and the humane treatment of animals through application of science and related technology;
- Develop problem-solving mechanisms within the contexts of agricultural production, processing and marketing practices;
- Be aware of the social and economic development of the society at large through personal development in commercial and subsistence farming enterprises;
- Become informed and responsible citizens in the production of agricultural commodities, caring for the environment and addressing social justice issues; and
- Be aware of agricultural indigenous knowledge and practices through understanding agricultural sciences in historical and social contexts.

Time allocation of Agricultural Sciences in the curriculum

The teaching time for Agricultural Sciences is 4 hours per week.

Requirements to offer Agricultural Sciences as a subject

Technical equipment and other resources required to offer Agricultural Sciences more efficiently as a subject are the responsibility of the school.

1. Each learner should have a textbook.
2. The school should be equipped with a Agricultural Science laboratory where various practical work or experiments could be carried out or demonstrated.

Subject combination when offering Agricultural Sciences as a subject

It is strongly recommended that Agricultural Sciences be combined with Mathematics, Physical Sciences and/or Life Sciences.

Subject linkage

Agricultural Sciences is an integrated science. It combines knowledge and skills from Physical Sciences, Life Sciences, Social Sciences, Earth Sciences, Engineering, Mathematics and Economics. This subject must be seen within the holistic science framework rather than as an isolated science.

2.2 Overview of topics

Topic	Content	
Soil Science	Grade 10	• The concepts of soil • The basic components of soil • Soil minerals and rock formation • Weathering processes • The main soil forming processes and factors
	Grade 11	• The physical and morphological characteristics of the soil • Soil texture • Soil structure • Soil moisture • Soil pores • Soil temperature • Soil profile • Soil classification and evaluation • The chemical and colloidal properties of the soil • Soil organic matter (living and non-living)
	Grade 12	None
Plant Studies	Grade 10	• General classification, importance and economic value of plants • Suitability for crops based on the prevailing climatic conditions and their soil requirements • Field crops • Horticultural crops • Fodder crops • Forests
	Grade 11	• Photosynthesis • Water and nutrients • Mineral nutritional requirements • The fundamental minerals or elements needed by plants for optimal growth and production • Organic and inorganic fertilizers • Mineral supplementation in plants and the analysis of plant mineral status • The different methods of plant reproduction • Fertilization • Fruit setting • Seed germination • Plant improvement and biotechnology • Plant diseases and control • Plant pests and control • Integrated pest management and biological control • Plant weeds and control
	Grade 12	None

Topic	Content	
Animal Studies	Grade 10	• General importance, economic value and classification of farm animals • Animals' distribution and adaptation to various climatic areas • Cattle breeds • Sheep breeds • Goat breeds • Pig breeds • Poultry breeds • Horse breeds • Game animals
	Grade 11	None
	Grade 12	• Animal nutrition requirements, digestion and the alimentary canals of farm animals • The fundamental feed components including minerals/elements needed by animals for optimal growth and production • Scientific feeding, mineral and ration supplementation for animals, calculation of the digestibility of feeds and feed flow programmes • Types of animal production systems • Animal shelter, protection and housing • Behaviour and handling of farm animals • Reproductive organs of farm animals • Systems and processes of reproduction of farm animals • The most common livestock diseases, their prevention and control
Agricultural Economics	Grade 10	• The importance of the agricultural industry • Land redistribution, development and ownership • The economic values of various animals and plants • Value of indigenous knowledge systems (IKS) • The impact of secondary and tertiary agricultural development in South Africa • Agricultural organizations • Agricultural legislation
	Grade 11	None
	Grade 12	• The supply and demand of agricultural products • The marketing systems commonly used in agriculture • Price determination of agricultural products • Agricultural production factors • Risks in Agriculture • The concepts: market chain or supply and demand chain, entrepreneur, entrepreneurship and business plan

Topic	Content	
Basic Genetics and Biological Concepts	Grade 10	• The plant and animal cells • The structures or organelles in plant and animal cells • Cell divisions processes (mitosis and meiosis)
	Grade 11	None
	Grade 12	• Genetics and heredity • Mendel's laws of heredity • Variation and mutation • Selection and breeding processes • The pattern of inheritance that leads to different phenotypes • The concept: prepotency and atavism • Genetic modification/engineering
Basic Agricultural Chemistry	Grade 10	None
	Grade 11	• Basic chemistry terminology important in Agriculture: matter, atom, molecules, ions, valency, isotopes, elements, compounds and mixtures • The use and interpretation of the periodic table of elements • Chemical bonding • Organic and inorganic substance formations and their molecular structures • Alkanes and alcohols • Fatty acids • Lipids • Proteins • Carbohydrates
	Grade 12	None
Sustainable Natural Resource Utilization	Grade 10	• Agricultural resources • Sustainable utilization of natural resources in Agriculture • Soil conservation and management • Water quality and management • Agricultural pollution • Agriculture legislation for protection and conservation of the environment
	Grade 11	• Soil surveying and planning • Sustainable use of water in agriculture • Controlled agricultural production systems • Soil classification and evaluation for agricultural purposes
	Grade 12	None

Topic	Content	
Agro-ecology	Grade 10	• *The concepts:* biome, ecology, ecosystem, adaptation and ecological pyramid • Components of ecosystem (on ecological pyramid) • The biomes of Southern Africa • The grazing ecology and veld/pasture management • Farming systems that use Agro-ecological principles (organic farming, integrated farming, biological farming, alternative agriculture, etc.) • Climate change or effects of different weather phenomenon
	Grade 11	None
	Grade 12	None

SECTION 3

ANNUAL TEACHING PLAN

3.1 Grade 10 Term 1

Week (4 hours/ Week)	Topic	Content
1	**Agro-ecology** **Ecology and agro-ecology**	• *The concepts:* ecology, levels of organization (individual, species, population, community, ecosystem, biome, biosphere); • *The concepts*: agro-ecology, agro-ecosystems; • Components of ecosystems (biotic and abiotic factors); • The biotic and abiotic factors/components influencing an ecosystem: - *Abiotic factors*: Physiographic factors (slope, aspect, altitude); Climatic factors (sunlight, temperature, rainfall and wind) and Edaphic/soil factors (soil texture, soil depth, soil water, soil fertility); and - Biotic factors producers, consumers and decomposers.
2	**Interactions in ecosystems and ecological farming**	• Energy flow in ecosystems (food chains, food webs and food pyramids) • Nutrient cycling in ecosystems (water cycle, carbon cycle, nitrogen cycle) • Interaction between organisms in ecosystems (competition, predator-prey, mutualism, commensalism and parasitism • Ecological farming methods (ecological farming systems including organic, biological, conservation, game and sustainable/alternative farming)
3	**Grazing ecology**	• Pastures (natural and artificial) • Grazing ecology (ecological succession in grassland and adaptations to grazing by game animals before agriculture, selective and non-selective grazing, zero grazing) • Optimal grazing (carrying capacity/grazing capacity, stocking rate) • Veld types of Southern Africa (sweetveld, sourveld and mixed-veld) • Characteristics of grazing plants (grazing value in terms of palatability, nutritive value and resistance to grazing and ecological status) • Scientific approach to pasture evaluation and monitoring (methods used to determine the condition of pastures)
4	**Pasture or veld management**	• Importance of pastures for the livestock industry in South Africa • Relationship between pasture management and pasture condition • Veld management practices: - stocking rate; - Animal ratio; and - Grazing systems (slow rotational, continuous, game and communal farming and veld burning). • Veld management systems (use of camps/farming units) • Advantages and disadvantages of the various grazing systems • The pasture veld management practices which lead to poor pasture conditions

Week (4 hours/ Week)	Topic	Content
5	**Biomes of South Africa** **Climate change or effects of weather phenomena**	• A description of the main types of biomes of South Africa based on the following: location, climate, fauna and flora • Identification of the location of the main biomes on a map of Southern African • The human impact on the biomes of Southern Africa • The importance/significance of these biomes for Agriculture • *The concept*: climate change and global warming • The main factors that cause global warming • The impact of climate change or global warming on Agriculture • Long term weather predictions and cyclic pattern of rainfall in South Africa • Short term climate and weather predictions (weather bureau) • Agricultural adaptation measures to overcome climate change
6	**Agricultural Economics** **Importance of Agri-industry**	• Agri-industry (development of agriculture/changes in farming methods over time, importance of the agri-industry, economic value of agricultural products, food security and demand for foodstuffs) • Classification and utilization patterns of food products in South Africa (Fresh food and staple, preserved and processed food, utilization patterns of food)
7	**Population growth and economic value of plant and animal products**	• The impact of population growth and shift on agricultural production in South Africa • The impact of the demand for agricultural commodities on industries • Changes in the world's and South African population over the past 100 years (demand for agricultural products) • Impact of secondary and tertiary agricultural development in South Africa
8	**Land redistribution and reform** **Agricultural legislation**	• Land ownership models in South Africa • The land reform programmes in South Africa (land restitution, land redistribution and tenure reform) • Land redistribution and development after 1994 • *The following legal concepts*: The Constitution, Green Paper, Agricultural legislation/Laws (basic legislation), Amendments (Law) and Regulation/by laws • The aims/purposes of agricultural legislation • The important Laws which affect agriculture (directly or indirectly) such as labour, land, marketing, resource protection, disease control and chemicals, etc.
9	**Indigenous knowledge**	• The concept of indigenous (traditional) knowledge system (IKS) • A comparison between indigenous and "scientific" knowledge (past and present) • Indigenous knowledge used in agriculture (some examples of IK) • The constraints of using indigenous technical knowledge in agriculture • The advantages of using IK in agricultural production • The protection and management of Indigenous Knowledge Systems in South Africa

Week (4 hours/ Week)	Topic	Content
10	**Agricultural organizations**	• The basic aims of agricultural organizations • The national, provincial and local levels of agricultural organizations (with relevant examples) • The roles of the following agricultural organizations found in South Africa: Agricultural Research Council (ARC), National Agricultural Marketing Council (NAMC), and Council for Scientific and Industrial Research (CSIR) • At least FOUR benefits/advantages of nationally recognised agricultural organization for individual farmers

Formal assessment for Term 1 Control test 1: 75% Formal assessment task 1: 25%	**A formal assessment task 1: Term 1** 1. Choose a practical investigation, assignment or research project 2. Choose an appropriate formal assessment tasks that covers the topics covered in the first term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.

3.2 Grade 10 Term 2

Week (4 hours/ Week)	Topic	Content
1	**Sustainable Natural Resource Utilization** **Agricultural resources**	• *The concepts*: natural resources and agricultural resources • The different types of agricultural resources and their importance in Agriculture with relevant examples • The pressure exerted on the natural resources by the growing population to meet the demand for food • The sustainable utilization of natural resources in Agriculture
2	**Soil conservation and management**	• *The concept*: soil degradation • The types (physical, biological and chemical degradations) and processes of soil degradation (focus on causes, adverse effects and control) • The impact of soil degradation on agricultural productivity
3	**Water management**	• The criteria to define water quality • *The concepts*: water source and water supply (scarcity of water) • The different sources of water utilized in Agriculture/farming industry • The different forms/ways in which water is used specifically in Agriculture • Factors that affect the supply of water in Agriculture • The basic agricultural practices/activities that contribute to the pollution of soil water, subsoil or ground water and surface water (water quality) • The appropriate management practices/strategies which can be adopted to prevent and control water pollution including the National Water Act of 1998
4	**Agricultural pollution**	• *The concept*: agricultural pollution and different types of pollution • The major kinds/types of soil pollutants (causes, effects and control measures) • The economic impact of soil pollutants on natural resource sustainability for agricultural production • Waste management in Agriculture
5	**Soil Science** **Basic soil components**	• *The concept*: soil • The main functions/importance of soil in an ecosystem • *The following major components of soil:* organic matter, soil air, soil water and mineral particles
6	**Minerals (primary and secondary)**	• *The concept*: minerals • The main differences between primary and secondary minerals • Examples of primary minerals • Examples of secondary minerals • The main characteristics used in mineral identification
7	**Rocks and their formation**	• *The concept*: rocks/mother rock • The main types of rocks based on their origin (formation) that are important in soil formation processes (igneous rocks, sedimentary and metamorphic). The cultivation properties/suitability of soil that originate from different types of rocks
8-10		• Mid-year examination

Formal assessment for Term 2 Mid-year examination: 75% Formal assessment task 2: 25%	**A formal assessment task 2: Term 2** 1. Choose a practical investigation, assignment or research project (not similar to that completed in term 1) 2. Choose an appropriate formal assessment tasks that covers the topics covered in the second term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.

3.3 Grade 10 Term 3

Week (4 hours/ Week)	Topic	Content
1	**Weathering of rocks**	• *The concept:* weathering of rocks • The importance of the weathering of rocks • The weathering factors important in soil formation (physical/mechanical, chemical weathering and biological weathering)
2	**Soil forming factors**	• The description of the following main soil forming factors: - geographical/topographical factors (the altitude, slope, aspect and topographical factors that influence soil formation); - *climatic factors:* (the effects of temperature, rainfall, wind as climatic factors influencing soil formation); - organisms / biological factors that influence soil formation (plants/vegetation, mesofauna, animals); - The human activities that can have a direct impact on soil formation; - parent material (geology and mineralogy); and - Time.
3	**Soil forming processes**	• Soil forming processes that are active in soils: mineralization, humification, leaching, luviation, plinthite formation, inversion and bioturbation.
4	**Animal studies** **General importance, economic value and classification, of farm animals**	• Development and domestication of farm animals • The general economic importance of the livestock industry in South Africa with reference to: - Cattle (beef, milk, hides); - Sheep (wool, mutton, pelt and hides); - Goats (meat, mohair and hides); - Pigs (pork, pork products and bristle); - Poultry (broilers and eggs); - Horses, mules and donkeys (work, sport and recreation); and - General byproducts from animals (manure, bone meal, carcass meal, blood meal, etc.). • The basic differences between ruminants and non-ruminants with relevant examples The classification of the following farm animals: **Cattle** The differences between *Bos indicus* (African type) and *Bos taurus* (European type) cattle species The following main groups of cattle breeds based on their production purposes: • Beef cattle breeds: - The general characteristics of a beef bull and cow (basic structure and functionality of a male and female animal); and - A comparison of the following beef breeds based on their country of origin, unique characteristics and special adaptation features: **indigenous breeds** that include the: Afrikaner, Bonsmara, Drakensberger and Nguni. **Exotic breeds** that include the Hereford, Sussex, Charolais, Aberdeen Angus and Brahman.

Week (4 hours/ Week)	Topic	Content
5	**Cattle breeds**	• Dairy cattle breeds: - the general characteristics of a dairy bull and cow (basic structure and functionality of a male and female animal); and - A comparison of the following dairy breeds based on their country of origin, unique characteristics and special adaptation features: Friesland/Holstein, Jersey, Guernsey, and Ayrshire. • Dual purpose cattle breeds: - A comparison of the following dual purpose breeds based on their country of origin, unique characteristics and special adaptation features: Simmentaler, Red Poll and Pinzgauer
6	**Sheep breeds**	**Sheep** • The main groups of sheep breeds based on their utilization • The general characteristics of a functional ram and ewe (basic structure and functionality of a male and female animal): - Wool breed: Merino - Dual purpose sheep breeds: o The dual purpose breeds based on their history of origin and specific descriptions/characteristics (adaptation features): Dohne Merino (more emphasis on mutton) and Dorset Horn; and Dormer (more emphasis on wool), o The general characteristics of wool breed (size of skin area, wool follicles, and characteristics of the wool fibre). - Mutton breeds: Differentiate between the following mutton breeds based on their history of origin and specific adaptation features and fat tailed or pure mutton breeds: o Dorper; o Ronderib Afrikander; o Van Rooy; and o Damara The general characteristics of mutton breed (basic structure and functionality of a mutton breed) - Pelt breeds: o The Karakul sheep based on its history of origin and specific descriptions/characteristics (adaptation features)

Week (4 hours/ Week)	Topic	Content
7	**Goat breeds**	**Goats** Classification of the following main goat breeds based on their utilization: • Milk/dairy breeds: - The following milk breeds based on their history of origin and specific descriptions/characteristics (adaptation features): o Saanen; and o Toggenburg. o The general characteristics of milk breed goats • Meat breeds: - The meat breeds based on the country of origin and specific adaptation features: o Boer goat; o Savanna goat; and o Red Kalahari. o the general characteristics of a meat breed goat. • Mohair breeds: - the Angora goat in terms on its country of origin and specific adaptation features; - A comparison between mohair and wool fibers; and - The purpose/uses of mohair.
8	**Pig breeds**	**Pigs** • Classification of the main groups of pig breeds based on their production purposes • The differences between indigenous and improved breeds - Pork breeds: o The pork breeds based on their country of origin and specific adaptation features: □ Minnesota; □ Large white/Yorkshire; and □ Landrace. - Bacon breeds: o The bacon breeds based on their country of origin and specific adaptation features: □ Hampshire; and □ Tamworth.

Week (4 hours/ Week)	Topic	Content
9	**Poultry breeds**	**Poultry** • Classification of the main types of poultry and differentiate between the main chicken/fowl breeds (SA indigenous breeds, dual purpose breeds or heavy breeds, light breeds and ornamental/pedigree breeds) according to the following types of production: - Broiler production; and - Egg production. • Basic requirements for successful production (housing, management, breeding and nutrition)
10	**Horse breeds**	**Horses, donkeys and mules** • Classification of the main horse breeds based on their purposes • A distinction between warm-blood and cold-blood horses Riding/Light horse breeds: • The riding/light horse breeds based on their history of origin and specific descriptions/characteristics (adaptation features): - Arab horse; and - Saddle horse. • The general characteristics of a light horse breed Draught/draught horse breeds: • the draught horse breeds based on their history of origin and specific descriptions/characteristics (adaptation features): - Hackney; and - Percheron. • The general characteristics of a draught horse breed • Donkeys and mules
	Game animals	**Game animals** • Classification of the game animals (Buffalo, Elephant, Leopard, Lion and Rhino, antelope, Springbuck, Eland and Kudu and small carnivores) based on their purposes • Importance of game farming

Formal assessment for Term 3 Control test 2: 25% Formal assessment tasks 3: 75%	**A formal assessment task 3: Term 3** 1. Choose a practical investigation, assignment or research project (not similar to that completed in term 1 or term 2) 2. Choose an appropriate formal assessment tasks that covers the topics covered in the third term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.

3.4 Grade 10 Term 4

Week (4 hours/ Week)	Topic	Content
1	**Plant studies** **General classification, importance and economic value of plants in Agriculture** **Fields crops**	• The average volumes of production of economically important crops/plants • The main production areas of crops in South Africa (field crops, horticultural crops, fodder crops and wood production) • The general economic importance and utilization of crops (field crops, horticultural crops, fodder crops and wood production) • Criteria for successful crop production The following agricultural crop plants: • Field crops: - The climatic and soil requirements of field crops - The classification of the following field crops: o Grain crops (maize, wheat, sorghum); o Oil seed crops (sunflower, soya beans); and o Industrial crops (sugar cane, cotton).
2	**Horticultural crops:** **Vegetables, fruits, flowers and shrubs**	**Horticultural crops:** - Classification of horticultural crops - **Vegetables** The basic climatic and soil requirements of vegetables The classification of vegetables into the following groups with examples: o root vegetables (beetroot, carrots); o Leaf vegetable (cabbage, spinach); o Stem vegetable (potato); o Fruit vegetables (tomato); and o Flower vegetables (cauliflower). - **Fruits** The basic climatic and soil requirements of fruit crops The classification of fruit crops into the following main groups and examples: o Citrus (orange) o Tropical fruits (banana); o Subtropical fruit (avocados); and o Deciduous fruits (apples, grapes).
3	**Horticultural crops:** **Vegetables, fruits, flowers and shrubs**	**Flower crops** The basic climatic and soil requirements of the following main types of flower crops extensively used in South Africa: • fynbos (diversity and agro-tourism) • Garden flowers (flowers as features) • Cut flowers (floral shops, festive seasons, special occasions) - **Shrubs and indigenous crops:** The basic climatic and soil requirements for the following shrubs: o Rooibos; and o Honeybush.

Week (4 hours/ Week)	Topic	Content
4	**Fodder crops**	**Fodder crops** The basic climate and soil requirements of the following fodder crops (marginal crop fields): • Legume fodder crops and examples (Lucerne and Red clover); and • grass fodder crops (Kikuyu and Rye grass).
5	**Forests (wood production)**	• *The concept*: forests (wood production) • The classification of the main groups of forests crops/trees (hard wood types versus soft wood types) • The distinction between indigenous and exotic forests • Reasons for promoting and growing protected trees/plant and eradicating invasive tree/plant
6	**Biological concepts** **Plant and animal cells**	• *The basic concept:* cell, tissue and organs in living organism (organisational levels of a multi-cellular organism) • Plant and animal cells including the labelled diagrams of plant and animal cells • Identification of the main cell structures and organelles and their functions in both plant and animal cells • Differences between an animal cell and a plant cell
7	**Cell division**	• The cell division process and its application (the importance of cell division in plants and animals) • *The concept*: cell division • The types of cell division in plants and animals (mitosis and meiosis) • The description of process of both mitosis and meiosis cell division • The identification/description of the phases of mitosis and meiosis • How cell division (mitosis and meiosis) takes place • The differences between mitosis and meiosis
8-10	**End-of-the-year examinations**	

SBA 25%	**Examination 75%**	
Task based assessment: Practical investigation: 20 marks Assignment: 20 marks Research project: 20 marks Test based assessment: Control test 1: 10 marks Control test 2: 10 marks June examination: 20 marks	End-of year examination: 300 marks (paper 1 and paper 2)	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.
Total: 100 marks	**300 marks**	
Total mark: 400		

3.5 Grade 11 Term 1

Week (4 hours/ Week)	Topic	Content
1	**Basic Agricultural Chemistry**	**Introduction to basic chemistry** • *The following terminology:* matter, atom, molecules, periodic table and isotopes • The differences between elements, compounds and mixtures (with relevant examples) • The basic interpretation of the periodic table of elements • The difference between acids and bases • The general structure of an atom • The main types of particles of an atom and their respective charges • The relation between atomic numbers and number of particles in the nucleus • The formation of ions • The arrangement of electrons around the nucleus and valency
2	**Chemical bonding**	• A basic chemical bonding as it occurs to form a molecule • The following chemical bonding with their respective structural formulae: - covalent bonding (hydrogen gas, water, etc.); and - Ionic bonding (copper chloride, sodium chloride, etc).
3	**Inorganic and Organic compounds**	• The distinction between inorganic and organic compounds (with examples) • The chemical formulae, structural formulae, Lewis structures, importance and functions of the following inorganic compounds: - water; - Carbon dioxide; - Mineral salts, for example sodium chloride/table salt; and - Ammonia • The characteristics of the carbon atom (bonding on the carbon atom) and organic substances • The basic grouping of organic compounds
4	**Alkanes and alcohols**	Alkanes • the basic types of alkanes (not more than 5 carbon atoms) • Their chemical and structural formulae • Their importance in plants and animal metabolism • *The concept*: isomers as illustrated by simple alkane structures Alcohols • The basic types of alcohols (their structures and importance) with reference to methanol and ethanol • Comparison between alcohols and alkanes based on their general structural formulae

Week (4 hours/ Week)	Topic	Content
5	**Fatty acids and bio-molecules** **Lipids/fats**	Fatty acids • The chemical structure of a simple fatty acid • Differentiation between saturated and unsaturated fatty acids (their structures and importance) • The differences between fatty acids and alcohols based on their structural formulae Bio-molecules Lipids: • basic composition of a simple lipid/fat; • The differences between fats and oils, saturated and unsaturated fats; and • The main functions/importance of lipids/fats in living organisms.
6	**Proteins**	Proteins • General structure of the monomers of proteins (amino-acids) • The differences between simple and complex proteins (also refer to essential amino acids and non-essential amino acids) • The general structural of polypeptides/simple proteins • The synthesis and hydrolysis of proteins • The main functions/importance of proteins in living organisms
7	**Carbohydrates**	Carbohydrates • The basic chemical composition of carbohydrates • The general formulae of carbohydrates • Structural and chemical formulae of simple sugars (monosaccharides) • The main classifications of carbohydrates - monosaccharide, disaccharides and polysaccharide (with relevant examples) • The main functions of carbohydrates in living organisms
8	**Soil Science** **Soil texture**	Soil texture • *The concept*: soil texture • The main groupings of soil particles (clay, silt and sand) that determine the soil textures and their respective diameters • Scientific method to determine the quantity of sand, silt and clay in a soil sample (use of a sieve/mechanical/chemical method) • Determination of the textural classes (soil texture triangle) of soil and interpretation of textural triangle • The influences of sand and clay particle size/texture on soil characteristics/ behaviour • The two field methods to determine the soil texture class: - Sausage method/feeling method; and • The most important reasons for a farmer to know the textural class of his/her farm land

Week (4 hours/ Week)	Topic	Content
9	**Soil structure**	Soil structure • *The concept*: soil structure • The classification/types of soil structures (shape and size) • The factors influencing the development and stability of soil structure • The factors or malpractices that cause the destruction/decline in soil structure • The different methods which farmers can apply to improve a poor soil structure • The advantages of good soil structure with reference to: - The prevention of soil compaction; - Crusting, - Soil erosion; - Salt imbalances; and - limiting the effect of a drought and limit excessive wetness
10	**Soil colour and soil pores**	Soil colour • Differences between a homogeneous and non-homogenous soil colour • The main factors that determine the colour of soil • The interpretation of the following soil colours: - Dark; - Red; - Light; - Yellow; - Greyish coloured; and - Mottled appearance. Soil pores • The effect of soil texture, soil structure, soil depth and soil cultivation on the total pore space in a soil • The differences between macro pores and micro pores and their functions in a soil • The bulk density and porosity • The definitions of soil bulk density and porosity • Ways to determine, calculate and interpret the bulk density of a soil • Factors that influence the bulk density

Formal assessment for Term 1 Formal assessment task 1: 25% Control test 1: 75%	**A formal assessment task 1: Term 1** 1. Choose a practical investigation, assignment or research project 2. Choose an appropriate formal assessment tasks that covers the topics covered in the first term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.

3.6 Grade 11 Term 2

Week (4 hours/ Week)	Topic	Content
1	**Soil air**	Soil air • The factors that affect/influence storage and movement of soil air • Comparison between atmospheric and soil air (based on the nitrogen, oxygen and carbon dioxide content) • The importance/necessity of the following soil gases: oxygen, carbon dioxide and nitrogen
2	**Soil Science** **Soil moisture**	Soil water • The basic types of soil water and their characteristics • A description of soil water losses and ways to limit these losses • The forces of nature that have an effect on soil water (adsorption, electrostatic, capillarity, bonding, cohesion, etc.) • The different movements of water through the soil • The availability of soil water to a plant at the following limits of soil water content: - Saturation point; - Field water capacity; - Temporary wilting point; and - Permanent wilting point. • Scientific methods to illustrate the following aspects that are related to soil water: - capillary; and - Gravitational movement of water • Effective soil water management (based on the manipulation of the soil water balance)
3	**Soil temperature**	Soil temperature • The main factors influencing soil temperature • The scientific approach to measure the effect of these factors that influence soil temperature • The effects of soil temperature on physical, chemical and biological processes that take place in the soil • The ways/methods to manipulate soil temperature for better production (cultivation methods and controlled environment)

Week (4 hours/ Week)	Topic	Content
4	**Soil morphology**	Soil profiles • *The terminology:* soil profile, soil horizon and profile hole • The development and description of the following master horizons: - O-horizon; - A-horizon; - E-horizon; - B-horizon - G-horizon; - C-horizon; and - R-horizon (a schematic representation of a soil profile). • The soil profiles of the following: - Adult soil; - Young soil; - Wet/waterlogged soils; and - Eroded soils. • A practical identification of topsoil and subsoil horizons
5	**Soil classification**	Soil classification • Description of soil classification and the use of a binomial soil classification systems in South Africa • The procedures to be followed when identifying and classifying soil by the binomial system • The reasons/purposes/value of the classification of soils in agriculture • The description of diagnostic horizons of the topsoil and subsoil horizons
6	**Soil colloids and soil acidity**	Soil colloids • The description and characteristics of inorganic soil colloids • The differences between inorganic and organic colloids, cation adsorption and cation exchange in soil • Manipulation of the cations and cation exchange in the soil Soil Acidity • The ph scale and hydrogen ions concentration • *The concepts*: soil acidity (predominant cations). • The distinction between active acidity and reserve acidity • The factors influencing/causing the soil acidification process • The effects of soil acidity on crop production • The methods of preventing/controlling soil acidification • The exchange reaction in the soil that occurs during the reclamation process (chemical reaction)

Week (4 hours/ Week)	Topic	Content
7	**Soil alkalinity and salinity**	Soil alkalinity and salinity • *The concept*: soil alkalinity (predominant cations) • The differences between saline soils and sodic soils • The characteristics of saline soils/white brack soils • The factors influencing/causing brackishness/soil alkalinity/saltiness • The effects of alkaline/brack on crop productivity • The methods of preventing/controlling soil alkalinity • The procedures to be followed on the reclamation of alkaline/brackish soils
8-10		Mid-year examinations

Formal assessment for Term 2	**A formal assessment task 2: Term 2**	It is recommended to cover the given topics in the term indicated.
Formal assessment task 2: 25% Control test 1: 75%	1. Choose a practical investigation, assignment or research project (not similar to that completed in term 1) 2. Choose an appropriate formal assessment tasks that covers the topics covered in the second term	The sequence of the topics within the term is however, not fixed.

3.7 Grade 11 Term 3

Week (4 hours/ Week)	Topic	Content
1	**Soil Organic Matter** **Living organic matter**	Living organic matter • The differences between soil micro-organisms and macro-organisms (with examples) • The main groups of soil micro-organisms (with examples) • The importance and roles of soil micro- and macro-organisms • The requirements for soil micro- and macro-organisms • The carbon cycle/conversion by micro-organisms • The nitrogen cycle/conversion by micro-organisms • The process of symbiosis based on the following: mycorrhiza (fungus) and *Rhizobium* bacteria. • *The terminology:* ammonification, nitrification, denitrification, nitrogen assimilation, solubilization, immobilization and mineralization
2	**Non-living organic matter**	Non living organic matter • *Definitions of the following concepts:* fresh organic matter and humus • The physical, chemical and biological effects of organic matter on soils • The factors affecting the balance between gains and losses of organic matter in soils • The effects of the decline in organic matter content on soil degradation
3	**Plant Nutrition** **Photosynthesis**	Photosynthesis • The schematic representation of photosynthesis • The differences between photosynthesis and respiration • The main pigment involved with photosynthesis and its function in plants • The importance/role of photosynthesis • The dark and light reaction/phases of photosynthesis • The storage of food and various organs utilized for food storage in plants • The factors influencing the rate of photosynthesis • The manipulation of plants to increase the photosynthetic rate
4	**Water and nutrients**	Absorption and storage of water and nutrients • The importance/functions of water in plants • The movement of water from the soil to the roots of plants • The distinctions between osmosis and diffusion • *The differences between the following processes*: movement of water from the roots to the stems and leaves, movement of water from the leaf to the air (atmosphere) • *The terms:* transpiration pull and osmotic flow • Plants' adaptation features to reduce transpiration rate (how plants control transpiration) • Movement of the products of photosynthesis (nutrients)

Week (4 hours/ Week)	Topic	Content
5	**Mineral nutrition** **Macro- and micro-elements**	Nutritional elements of plants • The difference between micro/trace elements and macro-elements • *The different macro-elements:* Nitrogen, sulphur, phosphorus, potassium, calcium and magnesium (the importance/functions, form in which it is absorbed and the deficiency symptoms of each) • *The different micro-elements*: iron, manganese, boron, zinc, copper, molybdenum and cobalt (the importance/functions, form in which it is absorbed and the deficiency symptoms of each)
6	**Plant nutrient uptake and analysis**	• The plant nutrient/mineral uptake based on the following: - passive ion uptake by diffusion; and - active ion uptake by transport carrier molecules. • The forms in which nutrients/minerals are available to plants • The factors affecting/influencing nutrients/mineral such as phosphorus, potassium and nitrogen availability to plants • The importance of nutrient element analysis in crop production • Methods utilized in crop production to determine the nutritional status of the soil (soil samples, plant/leaf samples)
7	**Organic and inorganic fertilizers**	• A definition of the term fertilizer • The difference between organic and inorganic fertilizers Inorganic fertilizers • The main nitrogenous, phosphorus and potassium inorganic fertilizers (their uses/applications with relevant examples) • The calculation of the percentages of each plant nutrient in the fertilizer mixtures/multi-fertilizer mixtures • Impact of inorganic fertilizers on the environment Agricultural lime: • The differences between calcitic and dolomitic lime; and • the beneficial effects of liming (physical, chemical and biological effects). Gypsum • The use of gypsum

Week (4 hours/ Week)	Topic	Content
8	**Organic fertilizers and fertilization practices**	Organic fertilizers • The main types of organic fertilizers • Impact of organic fertilizers on the environment Green manure • *The concept*: green manure/manuring • The purpose/beneficial effects of green manuring • The characteristics of green manure crops Farm manure • Description of farm manure • The types of farm manure • The factors that affect/influence the composition of farm manure Compost • The description of compost • The preparation and requirements for compost production • The beneficial effects of compost (physical, chemical and biological effects) on plant growth • The common agricultural organic products and by products used to supplement plant nutrients Fertilization practices • *The different methods of fertilizer applications in relation to*: soil application (band placing, liquid or gas application or broadcasting), foliar application, application through irrigation water (fertigation), aerial application, top-dressing and plant mixtures (with examples of fertilizers which can be used)
9	**Plant reproduction** **Sexual reproduction and pollination**	Sexual reproduction • Definition of sexual reproduction in plants • The functions and structures of the following parts of a flower: - Stamen; - Pistil; and - Non-sexual parts, for example petals (corolla); sepals (calyx). • *The concept:* pollination • The differences between self pollination and cross pollination • The description of the main agents of pollination

Week (4 hours/ Week)	Topic	Content
10	**Fertilization and ablactation**	• The structure of a matured/ripe pollen grain and a receptive stigma (use illustration/diagrams to explain) • The germination of a ripe pollen grain on a receptive stigma until fertilization (use illustration/diagrams to explain) Fertilization process • *The terminology*: fertilization and double fertilization • The development of a fertilized ovule to form a seed/fruit (structural development) • The distinction between vegetative and stimulative parthenorcarpy • *The concept:* ablactation • The factors causing/influencing ablactation
	Seeds and fruit setting	Seeds and fruits setting • *The concept*: fruit setting and seed germination • The development of seeds/fruits from a fertilized flower (structures) • The different types of fruits according to the way in which they develop such as simple, compound, multiple and accessory fruits
	Seed germination	Seed germination • The process of seed germination • The distinction between seed dormancy and scarification • The basic requirements for seed germination

Formal assessment for Term 3 Formal assessment task 3: 25% Control test 1: 75%	**A formal assessment task 3: Term 3** 1. Choose a practical investigation, assignment or research project (not similar to that completed in term 1 or term 2) 2. Choose an appropriate formal assessment tasks that covers the topics covered in the third term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.

3.8 Grade 11 Term 4

Week (4 hours/ Week)	Topic	Content
1	**Plant reproduction** **Asexual reproduction**	Asexual reproduction • *The concept*: asexual reproduction/vegetative reproduction in plants • Types of asexual methods of reproduction (bulbs, tubers, cuttings, stolons and rhizomes) • Oculation and grafting • The advantages and disadvantages of using asexual reproduction methods to propagate plants
2	**Plant improvement and biotechnology**	Plant improvement • *Description of the methods used in plant breeding*: selection, hybridization (hybrid seeds) and mutation • The use of gene mutation by plant breeders to improve plant production Biotechnology • *The concept*: biotechnology • The advantages and disadvantages of genetic modified crops/plants (GMOS) • The characteristics of GMOs • Examples of genetically modified crops in South Africa, for example maize (Bt maize) and cotton (Bt cotton), etc.
3	**Plant pests/ parasites and diseases** **Weed control management**	Weed management • *The following terminologies:* weeds and herbicides • The harmful effects of weeds on plant growth • The adaptation features/modes of weeds which let them grow more easily than cultivated crops • The agents of weed dispersion/transmission from one field to the other • *The description of the methods of weed control*: mechanical, chemical, biological and integrated weed control management

Week (4 hours/ Week)	Topic	Content
4	**Plant diseases/ pests and control**	Plant diseases and their control • The types of micro-organisms causing diseases in plants • The various plant diseases caused by micro-organisms (mode of transmission, symptoms and affected plants): - Viral; - Bacterial; and - Fungal diseases • The preventative/control measures of plant disease Plant pests and their control • *The terminology:* pesticides • The description of main groups of plant pests and life-cycles of some of plant pests • The types of damage caused by plant pest on crops • The preventative/control measures/methods of plant pests Integrated Pest Management control (IPM) • *The concept:* integrated pest management • The benefits/advantages of practicing IPM by crop farmers • The fundamental principles/steps to be followed that determine IPM Insect control in stored seed and grass • The conditions which influence/increases insect damages on stored seeds/ grains • The life cycle of selected pests/insects of stored agricultural products • The various methods of controlling insects in stored seeds/grain The general role of the state in plant protection

Week (4 hours/ Week)	Topic	Content
5	**Optimal resource utilization** **Soil surveying and planning** **Water use/ irrigation**	Soil surveying and planning • *The concept*: soil survey • The purpose (aims and principles) of soil survey • The soil survey process in agriculture and steps which need to be followed during soil surveying Precision farming • *The concept*: precision farming • The basic principles/aims of precision farming • The main ultra-modern technologies utilized with precision farming Water use • *The terminology*: irrigation, irrigation schedule • The main sources of water for irrigation • The criteria to determine water quality for irrigation • The irrigation systems (advantages and disadvantages and conditions to use): - flood irrigation/furrow and basin irrigation; - sprinkler irrigation/center pivot; and - Drip irrigation/micro-irrigation • The reasons or advantages of irrigation scheduling • The use of the following instruments to determine the moisture content of soils: - Class A evaporation pan; - Tensiometer; and - Neutron moisture meter.
6	**Soil drainage systems, soil cultivation and crop rotation**	Soil drainage systems • *The term*: soil drainage • Different types of soil drainage systems • The critical areas which should be considered before installation of a pipe drainage system in the field Soil cultivation • The aims of primary and secondary soil cultivation • Different types of common implements utilized for soil cultivation • Differentiation between primary and secondary soil cultivation • The description and comparison of different types of soil cultivation systems Crop rotation • *The concept*: crop rotation • The differences between monoculture and crop rotation • The factors which play a fundamental role when a farmer plans a crop rotation programme • The advantages and disadvantages of crop rotation

Week (4 hours/ Week)	Topic	Content
7	**Greenhouse, hydroponics and aquaculture**	Greenhouse • *The concept*: greenhouse • The benefits/advantages and disadvantages of having a greenhouse for production of high value cash crops • The types of materials used by farmers to construct a greenhouse • The environmental factors to be considered when selecting/choosing the general locality of the greenhouse Hydroponics • *The concept*: hydroponics production system • The advantages/benefits of hydroponics production systems • Growing mediums that will support plants which can be used by growers in hydroponics systems • The advantages and disadvantages of closed and open systems in hydroponics' production • The differences between production in a hydroponic system and open field system Aquaculture • *The concept*: aquaculture • Common species which are included in aquaculture farming in South Africa • The common and simple structures that can be used for housing both marine and fresh water species • *The description of the fish culture systems*: open through flow system and closed or recirculation system • The basic requirements for aquaculture farmers to achieve high yields • The factors which may restrict farmers from choosing certain species for aquaculture farming
8-10		End-of-the-year examinations

SBA 25%	**examination 75%**	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the Term is however, not fixed.
Task based assessment: Practical investigation: 20 marks Assignment: 20 marks Research project: 20 marks **Test based assessment:** Control test 1: 10 marks Control test 2: 10 marks June examination: 20 marks	**End-of-year examination:** 300 marks (paper 1 and paper 2)	
Total: 100 marks	**300 marks**	
Total mark**: 100 + 300 = 400 ÷ 4 =** 100		

3.9 Grade 12 Term 1

Week (4 hours/ Week)	Topic	Content
1	**Animal nutrition**	• *A comparison on the external structure of the alimentary canal of:* a ruminant (cow and sheep) and non-ruminant (fowl and pig) • Functions and adaptations of various structures of the alimentary canal • Description of the internal structure of the following: - Rumen; - Reticulum; - Omasum; - abomasums; and - Small intestines
2	**Digestion in the non-ruminant (pig/fowl) and ruminants (cow)**	Digestion in non-ruminants • A brief explanation of the intake of feed • The process of digestion in the mouth, stomach, small intestine and the large intestine: - Mechanical; and - Chemical digestion (enzymes). • Functions of the accessory glands such as the liver, pancreas and intestinal glands Digestion in ruminants • *Terminology*: rumination, regurgitation, peristalsis • Explanation of the intake of food, chewing of the cud • The differences between a mature ruminant and a young ruminant based on the four stomach compartments (size, functionality, etc) Digestion in the rumen • *The concept*: rumen microbes • The different types of rumen microbes • Important requirements for normal functioning of rumen microbes/micro-organisms • The functions of the rumen microbes • The absorption of food in the rumen directly by osmosis and diffusion into the blood stream

Week (4 hours/ Week)	Topic	Content
3	**Components of feed**	Components of feed • The functions (importance) of each of the following: - Water; - Proteins; - Carbohydrates (sugar, starch and crude fibre); - Fats and Oils (ether extract) in animal production and growth • The bio-chemical functions (importance and deficiencies) of the following mineral constituents: - *Macro-elements:* calcium, phosphorus, magnesium, sodium, chlorine, potassium, sulphur; and - *Trace-elements*: iron, iodine, zinc, selenium, copper, cobalt
4	**Digestibility of feeds** **Quality of feed, energy value of feeds and nutritive ratio**	• The functions and two deficiencies of the following vitamins: - *Water-soluble*: Vitamin B1; B2 ; B6 and B12 (Vitamin B complex); and - *Fat-soluble*: Vitamin A, D,E and K Digestibility of feed • *The concepts:* digestibility and digestibility coefficient of feeds • The factors that affect/influence/determine the digestibility of feeds • The methods of improving/increasing digestibility of feeds • Calculation and interpretation of the digestibility coefficient of a feed ***Quality of feed*: biological value of proteins** • *The concepts*: biological value (BV), essential amino acid index and ideal proteins. • The importance of animal proteins in rations • The evaluation of feed protein in terms of biological value, for example egg and milk Energy value of feed • The units in which energy value is expressed • *The terminology*: gross energy, metabolic energy, digestible and nett energy • The purpose/aims of calculating energy value of the feed • Schematic representation of feed energy flow • Calculation of feed energy flow and interpretation of the results Nutritive ratio • *The concept*: nutritive ratio (NR) • The purpose/aims of nutritive ratio in animal feeding • Calculation of the nutritive value of a feed and interpretation of the results

Week (4 hours/ Week)	Topic	Content
5	**Types of feed** **Planning a feed flow programme**	**Types of feed** • Classification of animal feeds • *The concept*: roughages, and concentrates • The characteristics of roughages and concentrates • The description of different types of roughages and concentrates • The schematic representation of different types of animal feeds • The functions (importance) of roughages and concentrates **Subdivision of feeds** • The comparison between protein-rich and carbohydrate-rich types of feeds (examples of protein-rich and carbohydrate-rich feeds) Supplements to rations • *The different ways of supplementing*: minerals, vitamins, non-protein nitrogen and growth stimulants Planning a feed flow programme • *The terminology:* feed flow program, maintenance and production ration • A brief overview of the Pearson square method (feed formulation) • Calculation and the drawing of feed requirements using a Single Pearson Square method • The interpretation of the Pearson Square results for feed mixtures • Fodder/feed flow/fodder production planning • The importance of fodder flow/fodder production planning • Basic calculation of a feed/fodder flow program for a group of livestock (number of animals and feed needed over a period of time)
6	**Animal production** **Increasing animal production** **Intensive farming** **Extensive farming**	Animal production systems • Description and comparison of intensive and extensive animal production systems • The differences between small-scale/subsistence and large-scale/commercial farming systems Examples of intensive farming productions • Factors to increase animal production under intensive farming (broiler production): - Nutrition/feeding; - Environment; - Reproduction/breeding; and - General enterprise management. Examples of extensive farming productions • Factors to increase animal production in extensive farming (beef production): - Nutrition/feeding; - Environment; - Reproduction; and - General production enterprise management

Week (4 hours/ Week)	Topic	Content
7	**Animal shelter/ protection/housing**	Animal shelter/protection/housing • The importance or reasons for shelter/housing • The different structures used for sheltering/housing livestock Intensive animal production system • The different intensive production systems: - Backyard systems; - Intensive/semi-intensive systems; and - Free range systems (poultry/pig/dairy production systems). • The basic housing or shelter requirements/guidelines for an intensive production system (holding shed, feed shed, holding pens, etc.) • The different equipments/tools for intensive housing systems (feeders, water supply, bedding and lighting, etc.)
	Behaviour and handling of farm animals	Behaviour of farm animals • The common behaviours of the following farm animals under various conditions: - Large ruminants (cattle); - Small ruminants (sheep); - Intensive non-ruminants (pigs); and - Poultry. Handling of farm animals • The reasons/importance of handling farm animals • The effect of incorrect handling on farm animals (harm and effect) • The basic guidelines for handling the following farm animals: - Large ruminants (cattle); - Small ruminants (sheep); - Intensive non-ruminants (pigs); and - Poultry. • The different techniques/tools/aids utilized to handle farm animals • The basic guidelines/requirements for transporting/moving farm animals from one farm to another/abattoirs

Week (4 hours/ Week)	Topic	Content
8	**Animal reproduction** **Male and female reproductive systems**	Reproductive organs of cattle • The (primary and secondary) male reproductive organs (structure) • The functions and structures of the following organs: - Testes; - epididymis; - Scrotum; - The accessory sex glands (vesicular glands; prostate; cowpers gland • The process of sperm formation (spermatogenesis) and the schematic representation of spermatogenesis • The factors causing sterility and infertility in bulls • The primary and secondary female reproductive organs (structure) • The functions and structures of the following organs: - Ovaries; - Fallopian tubes; - Uterus; and - Vagina. • The process of ovigenesis/oogenesis and the schematic representation of ovigenesis/oogenesis Oestrus and oestrus cycle • *The concept*: oestrus/heat period • The female sex hormones and their respective functions • The periods/stages/phases of the oestrus cycle in cows • The noticeable signs/characteristics of oestrus in cows • The practical methods dairy farmers can adopt to assist in identifying cows on heat

Week (4 hours/ Week)	Topic	Content
9	**Synchronization of oestrus and mating**	Synchronization of oestrus • *The concept*: synchronization of oestrus/heat • Various techniques/methods of synchronization of oestrus/heat • The advantages and disadvantages of synchronization of oestrus • The factors causing sterility and infertility in females (cow) Mating • *Terminology*: mating/copulation, ejaculation, etc. • The different methods of mating farm animals: - **Natural mating** o The male sexual display/courtship behaviour/pattern o The factors that regulate mating behaviour among bulls o The five main stages of mating/copulation
	Artificial mating (Artificial insemination, embryo transplantation and cloning)	- **Artificial insemination (AI)** o *The concept*: artificial insemination o The main requirements for successful AI o The advantages and disadvantages of AI o The methods of collecting semen: v Artificial vagina; and v Electrical stimulation/electro-ejaculator. o The basic requirements for semen collection o The characteristics of good quality semen (semen evaluation) o *Types of semen*: dilutants and functions of such dilutants o The basic requirements for storage of collected semen o The correct time for artificial insemination (timing for AI) o The correct technique for carrying out AI

Week (4 hours/ Week)	Topic	Content
10	**Embryo transplantation/transfer (ET)** **Nuclear transfer (Cloning)**	- **Embryo transplantation/transfer (ET)** o *Terminology*: embryo transplantation/transfer (ET), superovulation, embryo flushing/harvesting, donor cows, recipient cows o *The aims/purposes of ET*: description of embryo flushing/harvesting o The advantages and disadvantages of ET - **Nuclear Transfer (cloning)** o *The concept*: nuclear transfer/cloning o The aims/purposes of animal cloning o Types of cloning processes such as reproductive cloning and therapeutic cloning o The advantages and disadvantages of cloning Fertilization and pregnancy • *The following reproduction terminology*: fertilization, pregnancy/gestation, freemartins, placenta, etc • Fertilization process • The formation of multiple births (twins) and freemartins • The phases/stages of pregnancy • The reasons for abortions

Formal assessment for Term 1 Formal assessment task 1: 25% Control test 1: 75%	**A formal assessment task 1: Term 1** 1. Choose a one of two practical investigations or an assignment 2. Choose an appropriate formal assessment task that covers the topics covered in the first term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.

3.10 Grade 12 Term 2

Week (4 hours/ Week)	Topic	Content
1	**Animal reproduction** **Birth/parturition and dystocia** **Milk Production/lactation**	Birth/parturition and dystocia • *The concept*: parturition/birth, dystocia • The signs/characteristics of a cow approaching parturition • The functions of the layers covering the foetus • The stages/phases of parturition • The correct birth positions of a calf in the uterus just before birth • the conditions which interfere with normal parturition process; and • the principal factors causing the retention of the placenta/afterbirth in cows. Milk production/lactation • *The concept*: lactation, dry period, milk ejection • The structure of the udder of a cow (functions) • The milk ejection/milk let down process and hormones involved • The importance and functions of colostrums to the new born calf • The interpretation of the lactation curve and lactation cycle (period)

2	**Animal diseases and protection**
	
	Viral and bacterial diseases
	
	Protozoan and fungal diseases
		Animal health
		• The signs of poor health/sick animals (cattle, pigs and chickens)
		• The methods of testing animal health
		• The various methods of administering medicine to animals (cattle, pigs and chickens)
		• Sustainable use of medication
		• Infectious, non infectious and metabolic animal diseases
		• Level of seriousness of animal disease(chronic, per-acute and acute)
		Animal diseases
		• The main micro-organisms causing diseases in animals
		• The most important diseases found in South Africa based on the mode of transmission, animal host, symptoms and treatment:
		  - **Viral diseases**
		    o Foot-and-mouth disease (FMD), rabies, Rift valley fever (RVF), avian/ bird flu, swine fever/flu and Newcastle disease (NCD)
		  - **Bacterial diseases**
		    o Anthrax, mastitis and tuberculosis (TB)
		  - **Protozoan diseases**
		    o Anaplasmosis, redwater, heartwater and coccidosis
		  - **Fungal diseases**
		    o Lumpy wool and ringworm
		• The economic implications of animal diseases
		• The preventative/control measures for animal diseases

Week (4 hours/ Week)	Topic	Content
3	**Internal parasites/ endoparasites**	Internal parasites/endoparasites • *The concept*: internal parasite • The main groups of internal parasites • The most important internal parasites (based on their life cycles, animal hosts, symptoms and treatment): - Tapeworms; - Liver fluke; and - Roundworms. • The financial implications and detrimental effect of internal parasites • The preventative/control measures of internal parasites
	External Parasites/ectoparasites	External parasites/ectoparasites • *The concept*: external parasite • The types of external parasites • The most important external parasites: - Ticks (the life cycle of single/two/three host ticks); - Nasal worm (sheep); and - Blowflies, lice and mites (sheep). • The financial implications and detrimental effect of external parasites • The preventative/control measures of external parasites
4	**Plant and metallic salt poisoning**	Plant and metallic salt poisoning • *The most important plant poisoning*: maize fungus, poison bulb, thorn apple, etc. • The treatment of animals suffering from plant poisoning • The preventative/control measures of plant poisoning Poisoning by metallic salts: • *Common salt poisoning (the symptoms and treatment):* salt poisoning and urea poisoning • The preventative/control measures of salt poisoning
	The role of government in Animal Health	The basic principles of good health to control animal diseases and parasites/pests The role of the state in animal protection

Week (4 hours/ Week)	Topic	Content
5	**Basic Agricultural Genetics** **Monohybrid inheritance** **Dihybrid inheritance**	Genetic concepts • *Genetic terminology:* genetics/heredity, genes, chromosomes and alleles (homozygous and heterozygous) • The distinction between genotype and phenotype, dominant and recessive genes • *The monohybrid inheritance/crosses:* Mendel's First Law: Law of Segregation • *The Dihybrid inheritance/dihybrid crosses:* Mendel's Second Law: Law of Independent Assortment • The use of various methods such as Punnet square, genetic diagrams and schematic representations to illustrate the crosses • Mendel's Laws of segregation and independent recombination of characteristics • Qualitative and quantitative characteristics
6	**The pattern of inheritance** **Variation and mutation**	• *The pattern of inheritance that leads to different phenotypes*: incomplete dominance, co-dominance, multiple alleles, polygenic inheritance and epistasis • *The concept*: prepotency and atavism with relevant examples • The sex chromosomes and sex-linked characteristics (examples) • The following genetic terminology: - Variation; - Mutation; and - Selection. • The importance of variation and selection • The external (environmental) and internal (genetic) causes of variation • The types of mutagenic agents and their effects • Changes in chromosome structures.
7	**Selection**	• *The general principles of selection*: Heritability and biometrics • Natural vs. artificial selection • The selection methods used by plants and animal breeders (mass, pedigree, family and progeny selection) and breeding values • The following breeding systems and terminology: - Inbreeding; - Line-breeding with relevant examples. - Cross breeding; - Upgrading - Species-crossing; - Out crossing; and • The advantages and disadvantages of different breeding systems
8-10		Mid-year examination

Formal assessment for Term 2 Formal assessment task 2: 25% Mid-year examination: 75%	**A formal assessment task 2: Term 2** 1. Choose a one of two practical investigations or an assignment (not similar to that completed in term 1) 2. Choose an appropriate formal assessment task that covers the topics covered in the second term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.

3.11 Grade12 Term 3

Week (4 hours/ Week)	Topic	Content
1	**Basic Agricultural Genetics** **Genetic modification/ genetic engineering**	Genetic modification/genetic engineering • The concept genetic modification/genetic engineering in plants and animals (with relevant examples) • The aims of genetic modification of plants and animals • The advantages of genetic engineering over traditional methods • The current uses/application of genetically modified plants • The techniques used to genetically modify plants/animals • The potential benefits of genetically modified crops • The characteristics of GMO's • The potential risks of GMO's
2	**Agric-production factors** **Land and labour**	Production factors Land • The functions of land (in economic terms); • The economic characteristics of land as a production factor; and • The techniques/methods of increasing land productivity. Labour • The term labour; • The different types of labour in agriculture (with relevant examples); • The problems associated with labour in agriculture; • The methods of increasing labour productivity; • Labour legislation Acts affecting farm workers in South Africa; and • The standard format and layout (components) of a labour/farm worker contract.
3	**Capital and management**	Capital • *Terminology*: capital, assets, cash flow, budgets • The types of capital (with relevant examples) • The methods of creating capital • The sources of finance/credit (long-term, medium-term and short-term credit) • The problems associated with capital as a production factor • *The capital/financial management systems:* financial records, farm asset records and farm budgets • The differences between an enterprise budget and a whole farm budget (example of farm budget) • The components of a cash flow statement • The main aspects which are included in a cash flow budget statement **Management** • *The concept:* farm management/management, strategic farm risk management • The principles/components of management • The general management skills needed to manage a farm business • The internal and external forces which affect/influence farming businesses • The primary sources of risk in farming business • The main risk management strategies/techniques (diversification strategies, risk sharing strategies)

Week (4 hours/ Week)	Topic	Content
4	**Agricultural marketing**	Agricultural marketing • *The concept:* market/marketing • The difference between marketing and selling • *The main functions of agricultural marketing:* transport, storage, packaging (guidelines for packaging fresh produce) and processing/value adding (definition, advantages and relevant examples) Price determination and demand/supply • *Terminology*: demand and supply, • The law of demand and supply (the interpretation of the demand and supply curve/graph) • The factors influencing the demand and supply of a product • price elasticity of demand/supply and price inelasticity of demand/supply
5	**Market equilibrium**	Market equilibrium • *The concept*: market equilibrium • A hypothetical demand and supply curve together to indicate market equilibrium • Interpretation of the market equilibrium graph The development of a market • The importance of a market with regards to fixed prices, type of buyers and methods used to promote products Approaches to marketing • The various approaches to agricultural marketing such as niche marketing, mass marketing and multi-segment marketing • Sustainable agricultural marketing (green markets, eco-labeling)

Week (4 hours/ Week)	Topic	Content
6	**Agricultural marketing systems**	Agricultural marketing systems • The main types of marketing in agriculture: Free-market: • *The concept:* free-marketing • The general advantages and disadvantages of free market system • The main channels/options of a free-market system (their advantages and disadvantages): - Farm gate market; - Fresh produce markets; - Stock sales; - Direct marketing; and - Internet marketing. Co-operative marketing • *The concept:* agricultural co-operatives • The agricultural co-operative principles • The types of agricultural co-operatives • The benefits/advantages of agri-co-operatives Controlled Marketing • *The concept:* controlled marketing Agricultural marketing chain or supply/demand chain • The marketing chain/supply/demand chain • The factors that hamper the marketing chain of agricultural products • Ways to streamline and improve the agri-business chain • The role of legislation in the effective marketing of agricultural products
7	**Agricultural entrepreneurship and business planning**	Agricultural entrepreneurship • *The concept:* entrepreneur and entrepreneurship • The important aspects of the entrepreneur and entrepreneurship • The entrepreneurial success factors or personal characteristics • The main distinct phases of the entrepreneurial process Agri-business plan • *The concept*: business plan • The reasons for drawing up a business plan in the agricultural sector • The standard format and layout (components) of an agricultural business plan • Problems encountered when drawing up an agri-business plan • Using electronic resources as a tool for drawing up a business plan • SWOT analysis
8-10		Trial examination

Formal assessment for Term 3 Formal assessment task 3: 25% September examination: 75%	**September examination**	**A formal assessment task 3: Term 3** 1. Choose a one of two practical investigation s or an assignment (not similar to that completed in term 1 or term 2) 2. Choose an appropriate formal assessment tasks that covers the topics covered in the third term	It is recommended to cover the given topics in the term indicated. The sequence of the topics within the term is however, not fixed.
	Paper 1: 150 marks Paper 2: 150 marks		
	Total: 300 marks		

3.12 Grade 12 Term 4

Week (4 hours/ week)	Topic	Content
1		Revision
2		Revision
3		Revision
4		Revision
5		Revision
6 - 10		End-of-year examinations

SBA (25%)	END-OF-YEAR EXAMINATION (75%)	FORMAL ASSESSMENT: TERM 4
Task based assessment: Practical investigation 1: 20 marks Practical investigation 2: 20 marks Assignment: 20 marks **Test based assessment:** Control test 1: 5 marks Control test 2: 5 marks June examination: 10 marks September examination: 20 marks	Paper 1: 150 marks Paper 2: 150 marks	SBA*: 25*% (100 marks) End-of-year examination: 75% (300 marks) **Total: 400 marks**
TOTAL: 100 MARKS	**TOTAL: 300 MARKS**	

SECTION 4

4.1 Introduction

Assessment is a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment. It involves four steps:

- Generating and collecting evidence of achievement;
- Evaluating this evidence;
- Recording the findings and using this information to understand and thereby assist the learner's development in order to improve the process of learning;
- And teaching.

Assessment should be both informal (Assessment for Learning) and formal (Assessment of Learning). In both cases regular feedback should be provided to learners to enhance the learning experience.

4.2 Informal or daily Assessment

Assessment for learning has the purpose of continuously collecting information on a learner's achievement that can be used to improve their learning.

Informal assessment is a daily monitoring of the learners' progress. This is done through observations, discussions, practical demonstrations, learner-teacher conferences, informal classroom interactions, etc. Informal assessment may be as simple as stopping during the lesson to observe learners or to discuss with learners how learning is progressing. Informal assessment should be used to provide feedback to the learners and to inform planning for teaching, but need not be recorded. It should not be seen as separate from learning activities taking place in the classroom. Learners or teachers can mark these assessment tasks.

Self assessment and peer assessment actively involves learners in assessment. This is important as it allows learners to learn from and reflect on their own performance. The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. The results of daily assessment tasks are not taken into account for promotion and certification purposes.

4.3 Formal Assessment

All assessment tasks that make up a formal programme of assessment for the year are regarded as formal assessment. Formal assessment tasks are marked and formally recorded by the teacher for progression and certification purposes. All formal assessment tasks are subject to moderation for the purpose of quality assurance and to ensure that appropriate standards are maintained.

Formal assessment provides teachers with a systematic way of evaluating how well learners are progressing in a grade and in a particular subject. Examples of formal assessments include tests, examinations, practical tasks, projects, oral presentations, demonstrations, performances, etc. Formal assessment tasks form part of a year-long formal programme of assessment in each grade and subject.

In Grades 10 and 11 all assessment tasks are assessed internally. Of the seven tasks, the six tasks which are completed during the school year constitute 25% of the total mark for Agricultural Sciences. The remaining 75% of the final mark for promotion is the end-of-year examination (which comprises of two papers totaling 300 marks), which is set and marked internally and moderated externally.

In Grade 12 the formal assessment constitutes 25%, and is set and marked internally and moderated externally. The remaining 75% of the final mark for certification in Grade 12 is set, marked and moderated externally.

In Grade 12 seven tasks are completed during the school year and make up 25% of the total marks for Agricultural Sciences.

In Grade 12 there are two external examination papers totaling 300 marks. Together these two papers make up the remaining 75%.

4.3.1 Formal Assessment tasks

Practical investigation (Grades 10 - 12)

The purpose and focus of a practical investigation is to develop and assess a learner's science investigative skills. Practical investigations can take the form of hands-on activities or hypothesis testing. To be able to assess and develop these different skills, learners must be given multiple opportunities to execute all the possible practical investigations in groups, individually or as a teacher / learner demonstration. At least one practical investigation must be assessed formally and recorded in Grades 10 and 11 but two in Grade 12.

In a practical investigation Agricultural Sciences learners will be assessed on their ability to cope with the following skills:

Skills relevant to a Practical investigation:

Skills	Elaboration
Follow instructions	
Making accurate observations	• Matching of objects or processes or items which are similar and identifying differences • Describing objects • Describing processes • Identifying differences and similarities in diagrams, objects, words and data • Identifying problems • Classifying an object or process from given information • Observing features and differences in given situations with minimal information
Work safely	• Taking precautions
Manipulate and use apparatus effectively	• Assembling common apparatus • Handling equipment, apparatus and chemicals
Measure accurately	• Reading linear and two-dimensional scales • Scaling • Measuring out quantities • Making valid measurements of variables, repeating measurements to obtain an average where necessary in all quantitative work • Recognizing, or supply the correct units for common measurements • Counting systematically
Handling materials appropriately	• Preparing materials and staining slides • Handling materials
Gather data.	• Collecting data
Record data appropriately - drawings, graphs, etc	• Collecting and organising data in: - Diagrams; - Tables; and - Graphs. • Constructing a pie chart, line graph, histogram or bar chart as suited to the data, choosing suitable axes and scales

Learners should be given enough contact time to conduct a practical investigation and obtain results. Learners should use non-contact time to prepare for the practical investigation and also to write it up.

Research project / task (Grades 10 and 11)

A maximum of three weeks of non-contact time should be spent on a research project or task. Contact time should be built in for guidance, tracking progress and support and such time will be determined by the situation at hand. A total of 80 marks should be awarded for a research project. This mark will be reduced to a total mark of 20 for recording purposes.

For assessment the following tools are appropriate and should be used:

The assessment instrument should be a task that is appropriate to the content covered in the term. The assessment tools should be a holistically weighted rubric or checklist that is designed for each item in the write up for the research project or task.

The research project or task may be given to learners individually, in pairs or in groups not larger than four. Tasks may include a model and/or display or a practical investigation, but must be accompanied by a written presentation.

When designing a research task Agricultural Sciences teachers must ensure that:

- It is an investigative task;
- It addresses all the relevant content;
- It is a long-term task;
- Detailed guidelines are provided and where appropriate relevant resources should be made known and/or provided to learners; and
- It focuses on the accessing of knowledge through literature research and primary sources such as people, texts, etc.

Assignments (Grade 10 - 12)

An assignment is a short task of 1 to 1½ hours and includes activities such as translation activities, analysis and interpretations of data, and drawing and justifying of conclusions. It could further include an activity that the learners do that simulates an agricultural activity or action.

This could include the building of models, computer simulations, planning documents, data gathered from experiments, etc. That are based on a specific agricultural activity.

The forms of assessment used should be age and developmental level appropriate. The design of these tasks should cover the content of the subject and include a variety of tasks designed to achieve the objectives of the subject.

Formal assessments must cater for a range of cognitive levels and abilities of learners as shown below:

Cognitive levels	Percentage
Knowledge	40
Comprehension and Application	40
Analysis, evaluation and synthesis	20

4.4 Programme of Assessment

The programme of assessment is designed to spread formal assessment tasks in all subjects in a school throughout a term

4.4.1 Grades 10 and 11

Formal assessment: Grades 10 and 11 (6 tasks)			
Term 1	**Term 2**	**Term 3**	**Term 4: Promotion mark**
Task based assessment 1: 25% Control test 1: 75%	Task based assessment 2: 25% Mid-year examination: 75%	Task based assessment 3: 25% Control test 2: 75%	**SBA:** **Task Based assessment**: Practical investigation: 20 marks Assignment: 20 marks Research project: 20 marks **Test based assessment:** Control test 1: 10 marks Control test 2: 10 marks June examination: 20 marks **Total: 100** **Final Examination:** **Total 300**
100	**100**	**100**	**Total progression mark: 400**

Programme of Assessment								
Assessment tasks								
	Cass						End-of-year Assessment	
Percentage allocated	25%						75%	
Forms of assessment	Practical investigation	Research project	Assignment	Controlled tests		Mid-year examinations	November examinations	
Number of pieces	1	1	1	2		1	1 (Paper 1 + 2)	
Marks	20	20	20	10	10	20	150	150
Sub totals	100						300	
Grand Total	400							

4.4.2 Grade 12

Formal assessment: Grade 12 (7 tasks)			
Term 1	**Term 2**	**Term 3**	**Certification mark**
Task based assessment 1: 25% Control test 1: 75%	Task based assessment 2: 25% Mid-year examination: 75%	Task based assessment 3: 25% Control test 2: 25% September examination: 50%	**SBA:** Internal **Task Based assessment**: Practical investigation 1: 20 marks Practical investigation 2: 20 marks Assignment: 20 marks **Test based assessment:** Control test 1: 5 marks Control test 2: 5 marks June examination: 10 marks September examination: 20 **Total: 100** **Examination: External** **Total: 300**
100	**100**	**100**	**Total certification mark: 400**

Programme of assessment							External assessment	
Assessment Tasks (Cass)							End-of-year assessment	
Percentage allocated	25%						75%	
Forms of assessment	Assignment	Practical investigation	Controlled tests		Mid-year and trial examinations		November examinations	
Number of pieces	1	2	2		2		1 (Paper 1+2)	
Marks	20	2 x 20	10	10	10	10	150	150
Sub totals	100						300	
Grand total	400							

Certification mark for Grade 12	
SBA (25%)	End-of-year assessment (75%)
100	300
Internally set Internally marked Externally moderated Written on computerized SBA mark sheet provided by the provincial assessment body	Externally set Externally marked Externally moderated Externally captured
Total mark: 100 + 300 = 400	

Tests/Quarter-ending tests

1. A test in the programme of assessment should not be made up of several smaller tests. Each test should cover a substantial amount of content and should be set for 45-60 minutes each.

2. The marks for tests is not prescribed but should be determined by the teacher taking into account the volume of the content covered and the time available.

3. Each task, test and examination must cater for a range of cognitive levels and abilities of learners. The following is used as a guide to compile tasks and examination questions encompassing the different cognitive levels:

Cognitive Levels	Percentage
Knowledge	40
Comprehension and Application	40
Analysis, evaluation and synthesis	20

4.4.3 Examinations

End-of-year examination (format/structure)

Grade 10

Paper: 1			
Duration: 2.5 Hours			
Content	Section: A	Section: B	Total Marks
Agro-ecology Agri-industry Animal Studies	Question 1 45	Questions 2-4 105 (35 marks/question)	150

Paper: 2			
Duration: 2.5 Hours			
Content	Section: A	Section: B	Total Marks
Soil Science Plant Studies Optimal Resource Utilization Biological concepts	Question 1 45	Questions 2-4 105 (35 marks/question)	150

Grade 11

Paper: 1			
Duration: 2.5 Hours			
Content	Section: A	Section: B	Total Marks
Basic Agricultural Chemistry Soil Science	Question 1 45	Questions 2-4 105 (35 marks/question)	150

Paper: 2			
Duration: 2.5 Hours			
Content	Section: A	Section: B	Total Marks
Plant Studies Optimal Resource Utilization	Question 1 45	Questions 2-4 105 (35 marks/question)	150

Grade 12

Paper: 1			
Duration: 2.5 Hours			
Content	Section: A	Section: B	Total Marks
• Animal Nutrition • Animal Production, Protection and Control • Reproduction	Question 1 45	Questions 2-4 105 (35 marks/question)	150

Paper: 2			
duration: 2.5 Hours			
Content	Section: A	Section: B	Total Marks
• Agricultural Management and Marketing • Production factors • Basic Agricultural Genetics	Question 1 45	Questions 2-4 105 (35 marks/question)	150

4.5 Recording and reporting

Recording is a process in which the teacher documents the level of a learner's performance in a specific assessment task. It indicates learner progress towards the achievement of the knowledge as prescribed in the Curriculum and Assessment Policy Statements. Records of learner performance should provide evidence of the learner's conceptual progression within a grade and his or her readiness to progress or being promoted to the next grade. Records of learner performance should also be used to verify the progress made by teachers and learners in the teaching and learning process.

Reporting is a process of communicating learner performance to learners, parents, schools, and other stakeholders. Learner performance can be reported in a number of ways. These include report cards, parents' meetings, school visitation days, parent-teacher conferences, phone calls, letters, class or school newsletters, etc. Teachers in all grades report in percentages against the subject. The various achievement levels and their corresponding percentage bands are as shown in the Table below.

Codes and Percentages for Recording and Reporting

Rating code	Description of Competence	Percentage
7	Outstanding Achievement	80 - 100
6	Meritorious Achievement	70 - 79
5	Substantial Achievement	60 - 69
4	Adequate Achievement	50 - 59
3	Moderate Achievement	40 - 49
2	Elementary Achievement	30 - 39
1	Not Achieved	0 - 29

Teachers will record actual marks against the task by using a record sheet; and report percentages against the subject on the learners' report cards.

4.6 Moderation of assessment

Moderation refers to the process that ensures that the assessment tasks are fair, valid and reliable. Moderation should be implemented at school, district, provincial and national levels. Comprehensive and appropriate moderation practices must be in place for the quality assurance of all subject assessments.

4.7 General

This document should be read in conjunction with:

4.7.1 *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12*; and

4.7.2 The policy document, *National Protocol for Assessment Grades R-12.*

4.8 Annexure

4.8.1 Exemplar assignments

A possible assignment:

Grade 10	Grade 11	Grade 12
A comprehensive worksheet on the impact of global warming or climate change on agriculture in South Africa and appropriate adaptive measures to overcome climate change	Learners build model of chemical compounds from materials that were collected from a dumping site or rubbish bin. Assessment will be done on the information provided with the model and the complexity of the model.	Find out more about the outbreak of swine flu/fever (H1N1) diseases affecting animals especially pigs in South Africa (2009): symptoms, mode of transmission, control/preventative measures, treatment, etc. Data is provided to the learner and a set of questions based on the reading is set up.

4.8.2 Exemplar practical task

Possible practical tasks:

Grade 10	Grade 11	Grade 12
1. Collecting, mounting and describing various grass and other pasture plants 2 Determining soil air, organic matter and moisture in a soil sample	1. Description and identification of soil horizons (soil profile pit) 2. Make own compost on a small scale	1. Dissecting a chicken and identifying various organs/ structures and functions 2. Extracting DNA from wheat/onion/ banana, etc.