

SEC (2017)

AGRIBUSINESS

SEC 35

SYLLABUS / LEARNING AND ASSESSMENT PROGRAMME

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Introduction

The aim of this learning and assessment programme is to assist secondary schools to manage vocational programmes, specifically in the planning and implementation of the programme delivery. This learning and assessment programme is structured into two parts, namely

Part A: General Policies

Part B: Unit Specifications

In Part A, the overall aim and objectives of the programme are explained. Important terms that will be used in the LAP (Learning and Assessment Programme) will be defined. Additionally, policies, guidelines and strategies related to assessment practices are documented in this section. Quality Assurance processes and procedures are also documented in Part A of this document.

In Part B, the detailed specification of the three units that are to be implemented are provided for each unit. The learning outcomes, together with a brief description of the unit are also stipulated. The associated knowledge, skills and competences together with the unit content are specified for each learning outcome. The assessment criteria for each unit, together with assessment methods that are to be applied, are presented in this part of the document.

In order to ensure effective implementation of the programme, important standards and quality assurance processes and procedures have to be adopted. Standard templates will be provided in a separate document and will be structured as presented in the table provided overleaf.

Reference	Template
A	Assessment Template
A	Feedback Template
A	Unit Tracking Sheet Template
A	Programme Tracking Sheet Template
A	Assessment Schedule Template
QA	Internal Verification Report Templates
QA	External Verification Report Templates
QA	Learner Questionnaire
PM	Programme Team
PM	Programme – Cohort Plan
PM	Agenda /Minutes Meeting Template

Legend:

A: Assessment

QA: Quality Assurance

PM: Programme Management

Part A: General Policies

A.1. Programme Aim and Objectives

The aim of the vocational programme in Agribusiness is to provide learners with the underpinning knowledge related to Agribusiness, in line with the Malta Qualification Framework specified at MQF Level 3. By the end of the programme, candidates are expected to have gained sufficient skills and should be able to apply knowledge and skills under supervision. Upon completing this programme, learners should be able to:

1. Become familiar with the most common horticultural plants grown on the Maltese Islands.
2. Develop the required skills to perform simple techniques in land cultivation, plant care and plant propagation
3. Become familiar with the appropriate methods used for basic pruning, disbudding and grafting techniques
4. Be familiar with the health and safety regulations when using standard tools and equipment related to the Horticultural sector.
5. Promote best practices related to animal care whilst safeguarding both the animal and the carer.
6. Provide learners with the basics of rabbit care and breeding
7. Enable learners to develop an understanding of legal, ethical and sanitary regulations governing animal welfare in Malta.
8. Show the importance of pet rabbits and rabbit breeding for the society and economy

A.2. Definitions/ Terminology

Term	Definition
Assessor	The person responsible to grade the candidates' work, issue a mark and determine the candidates' final grade.
Assessment (Continuous)	A number of tasks given to the candidate during the course; these could be an individual task or as group work.
Controlled Assessment	As assessment which can take several forms such as examination, written report and many others. However, it has to be conducted within a school environment. The minimum time for this assessment is 1 hour.
Learning Outcome	Learning Outcomes are statements which describe what a qualification represents in terms of knowledge, skills and competences. The Malta Qualification Frameworks (MQF) defines a learning outcome as what a learner understands and is capable of doing at the end of the learning process.
Knowledge	Knowledge refers to the understanding of basic, factual and theoretical information which is traditionally associated with formal learning but can also be acquired from informal and non-formal learning.

Skills	Skills imply the application of acquired knowledge and understanding in different contexts. A skill may be the result of formal learning or of repetitive work in an informal setting.
Competences	Each competence is defined as a combination of knowledge and skills and is associated with the level of autonomy and responsibility that the person is expected to have at that level.
Unit Content	The unit content is the content required to be communicated and given to the candidate per learning outcome. Each learning outcome must have content related to it and this content must be delivered to give the candidates the tools to achieve that outcome.
Assessment Grading Criteria	Descriptions of what a candidate is expected to do in order to demonstrate that a learning outcome has been achieved.
Sample of Work	A sample of work is a percentage of candidates' work gathered as a representative sample for the internal or external verifier.
Quality Assurance	To assure the standards and quality of the learning assessment programme.
Malta Qualification Framework	The Malta Qualifications Framework (MQF) provides an indication of the level of difficulty as a benchmark for a qualification which needs to be assigned a level and mapped to the framework. The MQF has level descriptors from Level 1 to 8. The level descriptors are useful for education and training providers as they describe the Knowledge, Skills and Competences and a set of Learning Outcomes which indicate to the learner the end of a learning process.
Synoptic Assessment	A Synoptic Assessment can be defined as an assessment which is designed to cover all the assessment grading criteria for a given unit.

A.3. Assessment

A.3.1 Scope

Assessment is an important element in any learning process. In order to ensure that assessment forms candidates and at the same time meet important conditions of reliability, validity and fairness, important rules and procedures must be adhered to. In particular, the assessment regulations and procedures that are explained in this section will ensure that assessments are:

- Of the required standard, quality and level
- Fair for all learners
- Valid and reliable

Each unit will be assessed by means of three assignments, one of which must be an assessment conducted within a controlled school environment. The assessment mode/type, criteria to be assessed and marks distribution are explained in Part B of the programme as part of the unit specifications.

A.3.2 Programme Grade

A cumulative percentage mark, calculated on the basis of a sum total of all the 3 units, determines the final grade of candidates/ learners. Candidates/ Learners may qualify for Grades 1, 2, 3, 4, 5, 6 and 7. The results of candidates/learners who do not obtain at least a Grade 7 shall remain unclassified.

A.3.3 Important Conditions

Candidates must obtain a minimum of 50 marks in each unit in order to obtain a grade classification. If a candidate obtains a minimum of 50 in two units, but fails to satisfy the examiner in the remaining unit, s/he may be eligible to obtain Grade 6 or Grade 7.

If a candidate obtains less than 120 marks, his grade will be Unclassified. The same applies if a candidate does not obtain at least 50 marks in two units by the end of the programme.

A.3.4 Re-Sits

If for a given unit, the total mark gained by a candidate is less than 50 marks, s/he will be eligible to re-sit. The re-sit assessment must consist of a synoptic assessment conducted within a school controlled environment during the same academic year. The highest possible mark that may be obtained in this case is 60 marks.

Candidates who obtained an average of 50 marks or more on completion of the three tasks for a given unit will not be eligible for a re-sit to better their original mark.

Candidates who miss the controlled assessment for a justifiable reason will be eligible to sit for the synoptic assessment and may obtain full marks. The mark obtained in this assessment will replace the controlled assessment mark. The controlled assessment must not be more than 2 hours long.

A.4 Quality Assurance

An important aspect of this programme is the quality assurance processes that must be conducted throughout the implementation of the programme. Three main processes are to be conducted as stipulated in the table below.

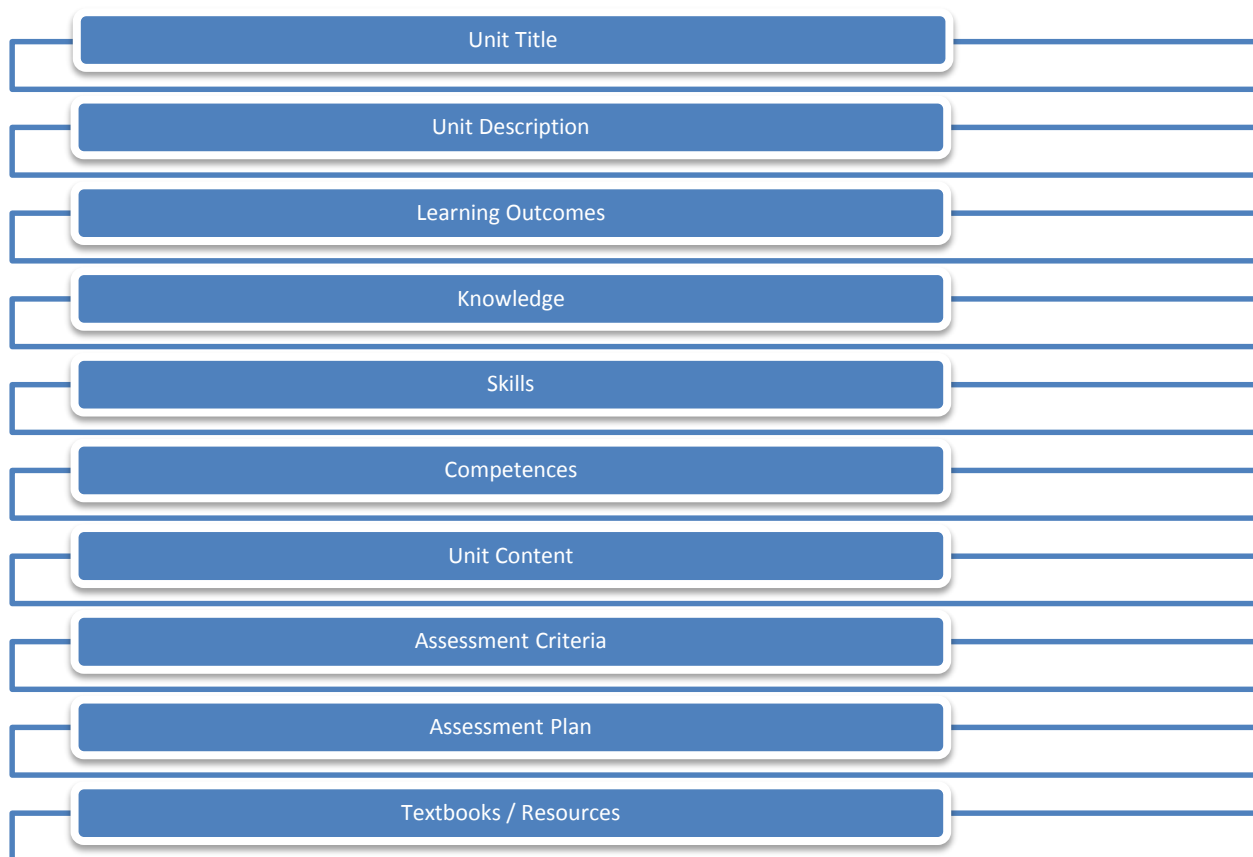
Internal Verification of Assessment Briefs	All assessment briefs are to be internally verified before being issued to the candidates. Within this process important checks relating to learning outcomes, criteria to be assessed, validated and reliability are to be performed.
Internal Verification of Assessment Decisions	Once learners complete their work, and assessments have been corrected, a representative sample of learners work is to be internally verified.
External Verification	The process of external verification will ensure that programme quality and standards criteria are met.

Part B: Unit Specifications

B.1 Introduction

This part of the programme guide provides detailed specification for each of the 3 units that are to be implemented for successful completion of the programme. The curriculum design adopted for the development of the units of study is based on the learning outcomes approach. The latter can be defined as “written statements of what a learner should be able to do/know/apply by the end of the learning process.”

The structure of the unit specifications is presented below:



B.2 Unit 1: Plant and Soil Science

Unit 1		Plant and Soil Science
Unit Title	Plant and Soil Science	
Unit Description	<p>Horticulture is the science, technology and business involved in the cultivation of fruit, vegetables, grapevines, olives, and other similar varieties.</p> <p>Horticulture is one of the most popular sectors of Agribusiness in the Mediterranean. In fact in some countries, this sector makes up a relatively high share of a country's GDP, and in some cases, the products are even recognised as national brands. Among these are olive oils, citrus and wine.</p> <p>In this unit the learners' will enhance their knowledge on plant taxonomy and the division of the Plant Kingdom. In addition learners will also be able to name the important plants, in t Maltese, English and Latin. .</p> <p>Learners will be introduced to plant morphology, anatomy basic plant genetics and palynology. In this unit learners will also understand the basics of plant physiology and the basic properties of plant production. In addition learners will become familiar with the common soil types, the basics of soil sampling and simple soil analysis techniques.</p> <p>Therefore with the knowledge gained in this unit learners will be able to understand, the different needs of plants, plant behaviour and the reactions of plants to given care</p>	

Learning Outcomes

Upon completing the unit, the learner will be able to:

- L01. Describe the main morphological and anatomical traits of the most common horticultural plants;
- L02. Understand the basic concepts of genetics and how these are applied to plant science;
- L03. Describe the main processes of plant physiology;
- L04. Understand the purpose and methods used for soil analysis;
- L05. Understand the soil factors which contribute to healthy plant growth;

Competence, Knowledge and Skills

Competences	At the end of the unit the learner will have acquired the responsibility and autonomy to :
	Distinguish among the most common plant families according to morphological, and anatomical features {1} Determine how dominant and recessive variations of plant traits can be used in order to obtain desired plant characteristics {2} Represent the physiological process of plants in relation to plant morphology {1,3} Interpret the results obtained from soil samples to determine the components and characteristics of the soil in terms of plant requirements {4,5} Follow the appropriate procedure to collect and analyse soil samples using the correct tools and equipment {4} Observe plants for problems related to the soil {1,3,4,5}
Skills	At the end of the learners will have mastered the following skills:
Applying knowledge and understanding	Apply basic genetics concepts to practical examples in crop production {2} Use the appropriate biological terms when referring to plant generics and their selection {1,2} Follow the appropriate procedure when collecting soil samples for analysis {4} Prepare soil samples for analysis {4} Apply the correct environmental conditions to induce favourable production outcomes in plants {3,4,5}
Communication skills	State the process of photosynthesis {3} Explain how Mendel's law of inheritance gave birth to the origin of genetics {2} Discuss the importance of giving plants the adequate medium factors to grow healthy {4,5} Report the results achieved from soil analysis {4} Present the anatomy of different horticultural plants {1}
Judgmental skills:	Identify the plant species from its morphological features and anatomical traits {1} Identify the plant nutrients required to make soil fertile {5} Categorise different plant species according to their morphology and physiology {3} Assess the suitability of soil for a specific crop production {4} Select the proper tools and equipment for soil sampling and analysis {2} Choose plants for a specific soil composition {4} Propose simple water drainage solutions for a specific soil drainage problem {3,4,5}

Learning skills:	Undertake further studies by conducting independent research on plant genetics to keep abreast of emerging information {2} Proceed by researching on-line videos to enhance own knowledge on different horticultural processes {1}
Knowledge	At the end of the unit the learner will:
	Be acquainted with a wide range of common horticultural plants grown on the Maltese Islands. {1} Know the main morphological and anatomic traits of a wide range of horticultural plants important to the local scene. {1,2,3} Be familiar with the classification of the different plant species {1,2,3} Know the names of the most important plants for Maltese Agribusiness in Maltese, English and Latin {1} Be conversant with the main biological terms used to refer to plant genetics {2} Know the origins and basic principles of genetics with particular reference to Mendel's law of inheritance. {2} Be familiar with simple methods used to prepare, collect and analyse soil samples to determine its suitability for different plant production {4,5} Be familiar with plant propagation and the way plant genetics and breeding principles are used to obtain desired characteristics {2} Be familiar with the plant organs, main plant cell components, tissues and their respective function. {1,3} Be familiar with the main basic physiological principles of a plant's organism and its requirements for nutrients, water and climate conditions {3} Be acquainted with the composition and characteristics of soil and its quality {4,5} Be familiar with the tools and equipment used to gather and analyse soil samples {4,5}

Unit Content

LO 1. Describe the main morphological and anatomic traits of the most common horticultural plants;

- Classification: classification by taxonomy (characteristics of the major divisions and sub-phyla), classification by use (fruit, vegetables, herbs, nuts, ornamentals, etc.)
- Plant nomenclature
- Morphology: structures and functions of root, stem, leaf, fruit, seed, plant cells and tissues (parenchyma, collenchyma, sclerenchyma)
- Growth: primary and secondary growth, germination, flowering

LO 2. Understand the basic concepts of genetics and how these are applied to plant science

- Genetic composition: DNA, genes, alleles, chromosomes
- Cell division: mitosis vs. meiosis
- Genetics: Mendel's Laws, dominant vs. recessive traits, F1 and F2 generations, hybrid varieties
- Plant reproduction: flowering, pollination and seed formation

LO 3. Describe the main processes of plant physiology

- Physiological processes: details on the organs involved, the processes and the factors affecting transpiration, water movement and absorption, translocation, photosynthesis, respiration, tropisms
- Controlling physiology in horticulture: temperature and light modifications in horticulture

LO 4. Understand the purpose and methods used for soil analysis

- Soil properties: chemical (CEC, AEC, buffering capacity), physical (texture, structure, porosity, bulk density, drainage), biological (microbial activity, nitrifiers, de-nitrifiers, mycorrhizae)
- Soil analysis: sampling, parameters analysed, interpretation of report

LO 5. Understand the soil factors which contribute to healthy plant growth.

- Soil fertility: factors affecting fertility, preserving fertility, pH, soil water, organic matter
- Suitability of soil for plant growth: suitability criteria, nutrient status and porosity, wetness
- Soil improvement: water holding and drainage improvements, pH and soil structure improvements

Assessment Criteria

Assessment criteria provide guidance on how the learners will be assessed in order to ensure that the learning outcome has been achieved.

To achieve each outcome a learner must satisfy the following assessment criteria grid.

LO	Knowledge	Comprehension	Application
LO1	K-1: Relate different organs with plant root and shoot systems. K-2: Describe different plant body tissues and plant cell components.	C-1: Distinguish between the leaf and flower morphologies to compare different plant species.	
LO2	K-3: Define the terms allele, gamete, gene / DNA. K-4: Outline Mendel's first law and second law	C-2: Explain the basic concepts of mitosis and meiosis	A-1: Predict the distribution of traits in F1 and F2 generations using the Mendel's laws.
LO3	K-5: Describe plant organs that are crucial for the intake and internal transfer of water and nutrients K-6: Describe 8 different plant physiological processes	C-3: Explain how light and/or temperature can be used to control flowering in horticulture	
LO4	K-7: Identify the tools and equipment necessary to take soil samples and conduct soil analysis. K-8: Define the parameters that are commonly determined in soil sample analysis.	C-4: Interpret the results from the soil analysis	A-2: Choose plants that are the most suitable for specific soil parameters.
LO5	K-9: State the biotic and abiotic soil factors that contribute to a range of plant problems K-10: Explain how soil structure and texture can effect plant growth	C-5: Indicate activities which can improve the soil fertility.	A-3: Propose a basic soil water drainage solutions for a given situation

Assessment criteria – Marking scheme

4 marks are to be allocated for each knowledge assessment criteria (K1 to K10), for a total of 40 marks.

6 marks are to be allocated for each comprehension assessment criteria (C1 to C5), for a total of 30 marks.

10 marks are to be allocated for each application assessment criteria (A1 to A3), for a total of 30 marks.

Ass. No.	Assessment Mode	Percentage distribution
1	Take-home	30%
2	Practical	30%
3	Controlled	40%

References

Textbooks

- Hopkins, W., Huner, N. (2008). Introduction to Plant Physiology.
- Plaster, E. (2008). Soil Science and Management.

Websites

- URL: <http://www.life.illinois.edu/ib/102/Levetin/4.%20Plant%20Physiology.pdf>
- URL: http://pubs.ext.vt.edu/430/430-350/430-350_pdf.pdf
- URL: http://www.pedosphere.ca/volume01/pdf/Section_01.pdf

Resources

- Whiteboard, beamer and computer for the teacher
- Computer lab for learners
- Plant posters and plant body maps
- A suitable range of plant and soil samples
- A laboratory with equipment for basic plant and soil analysis
- Comfortable and safe clothes, footwear, or equipment
- Links with a working plant science or botany laboratory for the display of research analysis or practice research

B.3 Unit 2: Vegetable Production

Unit 2 Vegetable Production	
Unit Title	Vegetable Production
Unit Description	<p>The main aim of this unit is to enhance the knowledge learners have attained in the units Plant Science, General Horticulture and Basics of Horticultural Technology.</p> <p>In this unit learners will become familiar with the most common vegetable crops and their production, namely, leafy vegetables such as lettuce, cabbages, and spinach, fruit vegetables such as tomatoes, peppers, aubergines, and courgettes legumes such as beans and peas, flower vegetables such as cauliflower, broccoli and globe artichoke as well as underground crops such as potatoes and carrots.</p> <p>For each of the above kind of crops, learners will be introduced to their origin and history, the economic and nutritional value of the plant and its requirements for different nutritional elements such as water and appropriate climate conditions.</p> <p>In addition learners will understand the plant's specific morphology, physiology and genetics. Plant-specific pathology, prevention and treatment of different diseases will also be tackled in this unit.</p> <p>Learners will also enhance their knowledge of plant propagation, standard plant care procedures, and harvesting, storing and quality standards.</p>

Learning Outcomes

Upon completion the unit, the learner will be able to:

- L01. Describe the origin, economic significance and nutritional value of the main vegetable crops in Malta;
- L02. Describe the morphological features and main organs of different vegetables;
- L03. Understand the specific nutrients, water and climate requirements for different group of vegetables;
- L04. Understand the basic plant pathology and treatment for different groups of vegetables;
- L05. Explain the propagation, care and harvesting requirements for different group of vegetables;

Competences, Knowledge and Skills

Competences	At the end of the unit the learner will have acquired the responsibility and autonomy to:
	<p>Distinguish among the different vegetable crops according to their origin, nutritional value and usage. {1}</p> <p>Distinguish amongst the different species and varieties of different vegetables according to their morphological features, main organs and classification {2}</p> <p>Carry out the proper fertilisation and irrigation for a particular group of vegetables {3}</p> <p>Observe crops for any diseases or pests and take the appropriate protection measures to ensure the plants' wellbeing. {4}</p> <p>Be responsible for a range of crops from seeding to harvesting .{2,3,4,5}</p> <p>Perform plant propagation techniques for the main variety of vegetables {5}</p>
Skills	At the end of the unit the learner will have mastered the following skills:
Applying knowledge and understanding	<p>Apply the appropriate plant care and nutrient management to vegetable crops in an environmentally safe manner {3,4,5}</p> <p>Prepare harvested plants for marketing {5}</p> <p>Prepare the land for the planting and seeding of a range of vegetable crops {3,5}</p> <p>Use the correct propagation technique for a given crop vegetable {5}</p>
Communication skills	<p>State the origin, significance and nutritional values and usage of a range of crops {1}</p> <p>Discuss the quantities of water, nutrients and fertiliser required by different vegetable crops. with colleagues and tutors {3}</p> <p>State the climate factors which are necessary for the growth and development of different vegetables {3}</p> <p>Explain why certain vegetables crops need to be harvested within a short period from consumption {5}</p>
Judgmental skills:	<p>Identify the appropriate soil characteristics for a range of vegetables crops {2,3,4,5}</p> <p>Categorise crop vegetables according to the part of the plant that is eaten {2}</p> <p>Select plant variety according to seeding, planting, harvesting time and market needs {1,2,5}</p> <p>Determine the correct amount of seed and seedlings for a given space and market needs {5}</p> <p>Select suitable fertilising and plant protection agents for a particular crop of vegetables {4}</p> <p>Identify the symptoms of different pests, diseases and disorders in different crop vegetables {2,4}</p>

	Propose basic treatments and preventive measures for a range of pests and diseases related to vegetable crops {4}
Learning skills:	Undertake further studies by conducting independent research to comprehend the importance of sustainable vegetable production {1,4}
Knowledge	At the end of the unit the learner will:
	<p>Be acquainted with the main vegetable crop varieties and species produced for Maltese Agribusiness {1}</p> <p>Know the names of the main vegetables grown locally in Maltese, English and Latin {1}</p> <p>Be familiar with the origin, domestication, nutritional value and economic significance of a range of local crops {1}</p> <p>Understand the, physiology and growing cycle of the most popular vegetable varieties in Malta {2}</p> <p>Be acquainted with the morphology and morphological features of a range of vegetables grown locally {2}</p> <p>Be familiar with the main plant organs and their significant role in the production of certain vegetables{2}</p> <p>Know the classification of different crop vegetables which are important for Maltese Agribusiness {2}</p> <p>Know the quantities of water, nutrients and fertiliser required by different vegetable crops {3}</p> <p>Understand the climate factors necessary for the growth and development of different vegetable crops {3}</p> <p>Be familiar with the most common plant pathology and environmentally friendly treatment for different groups of vegetables {4}</p> <p>Be conversant with different plant propagation techniques for different vegetable groups and species {5}</p> <p>Be familiar with the cultivation requirements of different vegetable crops {3,5}</p> <p>Be familiar with the methods used to prepare land, seeds and seedlings for seeding and planting {5}</p> <p>Understand the best time and method to harvest different crop vegetables {5}</p>

Unit Content

LO 1. Describe the origin, economic significance and nutritional value of the main vegetable crops in Malta;

- **Vegetable production:** importance of sector, economical significance, nutritional value of vegetables
- **Taxonomy:** origin of common vegetables, most importance vegetables, taxonomical classification of vegetables

LO 2. Describe the morphological features and main organs of different vegetables;

- **Morphology (all organs including root, leaf, stem, flowers and fruit) and phenology of examples of:** leafy vegetables, fruit vegetables, legumes, flower vegetables, underground vegetables
-

LO 3. Understand the specific nutrients, water and climate requirements for different group of vegetables

- **Soil fertility & vegetable needs (of a range of vegetables):** nutritional requirements, symptoms of nutrient deficiencies, interaction of nutrients in the soil
- **Fertilizers:** determining fertilizer needs, calculating fertilizer amounts, record-keeping
- **Water:** water needs of vegetables, quality of irrigation water, methods of irrigation, determining water needs, irrigation efficiency
- **Climatic factors:** air temperature, humidity, weather conditions
- **Soil factors:** physical, chemical and biological properties of soil and how these affect vegetable production
-

LO 4. Understand the basic plant pathology and treatment for different groups of vegetables

- **Pests (a wide range of pests for a range of crops) and protection methods:** common vegetable pests, pests ecology, pest protection methods, record-keeping
- **Diseases (a wide range of diseases for a range of crops) and protection methods:** common vegetable diseases, diseases ecology, disease protection methods, record-keeping
- **Weeds (a wide range of weeds) and protection methods:** common weeds, weeds ecology, weeds protection methods, record-keeping
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LO 5. Explain the propagation, care and harvesting requirements for different group of vegetables.

- **Sowing of vegetables:** vegetables grown from seed, seed quality parameters, sowing methods, calculating seeds per area of land
- **Vegetable seedlings:** vegetables grown from seedlings, seedling production methods, quality of seedlings, calculating seedlings per area of land, pricking and planting
- **Grafting:** advantages, methods and conditions for grafting
- **Care and harvesting:** overview of plant care, harvesting methods and storage conditions of leafy vegetables, fruit vegetables, flower vegetables, underground vegetables

Assessment Criteria

Assessment criteria provide guidance on how the learners will be assessed in order to ensure that the learning outcome has been achieved.

To achieve each outcome a learner must satisfy the following assessment criteria grid.

LO	Knowledge	Comprehension	Application
L01	K-1: Describe the production of the most commonly grown vegetables in the Maltese Islands. K-2: Outline vegetables' nutritional features	C-1: Predict possible future trends in the consumption of vegetables.	
L02	K-3: State the specificities of plant morphologies for different vegetable species and varieties. K-4: Describe briefly the stages of the growing cycle of different crop species	C-2: Select plant organs for which different crops are grown.	
L03	K-5: Name the most important nutrients for the production of a range of vegetables. K-6: Describe the pedoclimatic conditions needed for the cultivation of different species	C-3: Identify advantages and disadvantages of manure use in vegetable production.	A-1: Choose a proper fertiliser and application method to reduce a given deficiency in a vegetable plant.
L04	K-7: Describe the importance and type of records that are to be maintained for proper crop pest control and fertilizer application. K-8: Describe the different symptoms of various plant diseases, nutritional deficiencies and pests for a given vegetable species.	C-4: Select the appropriate measures to fight against diseases, nutritional deficiencies and pests in vegetable production.	A-2: Prepare harvest for market
L05	K-9: List the different propagation techniques used for a specific vegetable species.	C-5: Predict the proper timing for the harvest of different vegetables.	A-3: Produce a range of vegetable plants from sowing/transplanting to harvesting

	K-10: State the main factors influencing the proper harvesting time of different vegetables.		
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Assessment criteria – Marking scheme

4 marks are to be allocated for each knowledge assessment criteria (K1 to K10), for a total of 40 marks.

6 marks are to be allocated for each comprehension assessment criteria (C1 to C5), for a total of 30 marks.

10 marks are to be allocated for each application assessment criteria (A1 to A3), for a total of 30 marks.

Ass. No.	Assessment Mode	Percentage distribution
1	Take-home	30%
2	Practical	30%
3	Controlled	40%

References**Textbooks**

- Hessayon, D.G. (1999). The New Vegetable and Herb Expert.
- Heriteau, J. (1997). Ortho's Complete Guide to Vegetables.
- Gopalakrishnan, T.R. (2007). Vegetable Crops.

Websites

- URL: <http://www2.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- URL: <http://productionguide.agrifoodbc.ca/guides/17#>
- URL: http://nfrec.ifas.ufl.edu/vegetable_handbook.shtml

Resources

- Whiteboard, beamer and a computer for the teacher
- A computer lab for the learners
- Plant posters and plant body maps
- Posters or multimedia sources showing common operations in land cultivation and plant care
- Experimental field and greenhouses with a suitable range of different plants
- Tools and equipment for work on land cultivation and plant care activities
- A laboratory with equipment for basic plant analysis
- Comfortable and safe clothes, footwear, or equipment
- Links with farmers and growers to enable access to a range of plant types and growing regimes which are not available at the Institution

B.4 Unit 3: Breeding of Rabbits

Unit 3 Breeding of Rabbits	
Unit Title	Breeding of Rabbits
Unit Description	<p>The breeding of rabbits is considered as a key agribusiness sector in Malta, both in terms of commercial meat production, due to rabbit being a Maltese traditional dish, and also for rabbit shows.</p> <p>This unit will familiarise learners with the particular care required in the breeding of rabbits. This unit will look at the origin, history and process of domestication of rabbits.</p> <p>Learners will also look at the requirements of breeding rabbits in terms of feed, water and climate conditions. Learners will also be exposed to specific housing requirements, machinery and equipment. Learners will also consider the economic significance and production features of different breeds and hybrids of rabbits. In this unit learners will also look at the specific morphology, reproduction, physiology, genetics, specific diseases, disorders and their treatments. In fact besides emphasising the breeding of rabbits, the aim of this unit is to build on the knowledge gained in the units Animal Science, General Animal Husbandry and Basics of Animal Care Technology.</p>

Learning Outcomes

Upon completion of this unit the learner will be able to:

- L01. Outline the history and phenotypic particularities of common rabbit breeds and hybrids;
- L02. Explain adequate feed, water and housing conditions for rabbits at different growth stages
- L03. Apply adequate preventive and curative measures against diseases, parasites and disorders common in rabbits
- L04. Explain the reproductive system and the reproduction phases of rabbits
- L05. Describe the rabbit meat market conditions and the importance of humanely slaughtering rabbits for meat production.

Competences, Knowledge, Skills

Competences	At the end of the unit the learner will have acquired the responsibility and autonomy to:
	Prepare suitable meals and housing for common rabbit breeds according to their particular life stages and purpose {1,2,4} Conduct periodic health checks and take the appropriate measures to prevent diseases in rabbits {3,4} Create a basic reproductive scheme for rabbits {4} Maintain adequate animal housings for rabbits in different life stages {2} Comply with the established standards set for different breeds when selecting rabbits for show {1} Observe animal welfare regulations for meat production {5}
Skills	At the end of the unit the learner will have mastered the following skills:
Applying knowledge and understanding	Prepare food and water for rabbits in accordance with their gender, growth stage and reproductive phase {2} Apply appropriate measures to ensure the health and well being of rabbits {2,3} Plan breeding activities for rabbits {4} Carry out the cleaning of rabbit housing and dispose of waste appropriately {2}
Communication skills	Report about the behaviour and health status of particular rabbits {3} Present a rabbit's reproductive scheme {4} Describe a rabbit's phenotype in relation to established breeding standards {1} Discuss the basic principles and conditions to humanely slaughter rabbits for meat production {5} Explain the different phases of a rabbit's reproduction cycle {4}
Judgmental skills:	Identify health issues, disorders and reproductive problems of rabbits {3,4} Select the proper feedstuffs and/or food supplements for a specific category of rabbit {2} Select rabbits for breeding according to genetic makeup and purpose {1,4} Suggest proper rabbit housings according to animal welfare regulations and the specific needs and requirements of a particular rabbit. {2}
Learning skills:	Proceed by reading and discussing about the contemporary issues and theories related to the slaughtering of rabbits for meat {5} Undertake basic independent research on different aspects of rabbit breeding on own initiative {1,2,3,4,5}

Knowledge	At the end of the unit the learner will :
	<p>Know the history and importance of rabbit breeding in the Maltese agricultural sector {1}</p> <p>Be familiar with the main feature and characteristics of the different rabbit breeds {1,2,3,4}</p> <p>Be familiar with a rabbit's requirements for food, water, appropriate environmental conditions and housing in relation to its different stages of growth, gender and breeding {2,3,4}</p> <p>Know the common feedstuffs and food supplements required for rabbits {2}</p> <p>Know a range of rabbit diseases, parasites and disorders and the corresponding symptoms pertaining to these ailments {3}</p> <p>Be familiar with the rabbit's reproduction system and process of reproduction {4}</p> <p>Know the primary care required by different breeds and species of rabbit as well as common health issues in rabbits {3}</p> <p>Understand the established standards and specific requirements for show rabbits {1}</p> <p>Understand the process for the humane slaughtering of rabbits {5}</p> <p>Know the regulations and standards established by the animal welfare in relation to rabbit slaughtering and meat processing {5}</p>

Unit Content

LO 1. Outline the history and phenotypic particularities of common rabbit breeds and hybrids

- **History:** the wild rabbit, domestication of the rabbit, economic importance
- **Breeds:** overview of general characteristics of common rabbit breeds used for shows and for meat consumption, standards of show rabbits

LO 2 Explain adequate feed, water and housing conditions for rabbits at different growth stages

- **Rabbit nutrition (for production and pet rabbits):** consideration of digestive system, required nutrients (consideration of age and reproductive phases), feedstuff used, equipment used for feeding and watering
- **Sex and behavior:** natural and unnatural rabbit behavior, aggression
- **Accommodation (for production and pet rabbits):** considerations for temperature, ventilation, humidity and lighting
- **Rabbit farming methods:** intensive, semi-intensive, extensive, organic
- **Farming for fur**

LO 3. Apply adequate preventive and curative measures against diseases, parasites and disorders common in rabbits

- **Rabbit anatomy:** overview of skeletal, muscular, respiratory, circulatory, digestive and nervous systems of the rabbit, skin, external appearance
- **Health status of rabbits:** signs of a healthy rabbit, signs of an unhealthy rabbit,
- **Diseases and disorders:** viral, bacterial and parasitic diseases, disorders, prevention and cure, zoonoses
- **Monitoring rabbits:** health checks, vaccinations, nutrition, neutering

LO 4. Explain the reproductive system and the reproduction phases of rabbits

- **Reproductive system:** overview of anatomy and physiology of male and female reproductive systems
- **Reproductive phases:** different phases, recognition of different phases, changes in behaviour, phases as affected by surrounding environment (lighting, temperature, season)
- **Planning breeding activities:** seasonal breeding, breeding schedule,

LO 5. Describe the rabbit meat market conditions and the importance of humanely slaughtering rabbits for meat production.

- **Slaughtering:** overview of different methods used, importance of humane slaughtering
- **Meat market:** characteristics, meat composition and quality

Assessment criteria

The Assessment criteria will provide guidance on how the learner will be assessed in order to ensure that the learning outcomes have been achieved.

To achieve each outcome a learner must satisfy the following assessment criteria

LO	Knowledge	Comprehension	Application
L01	K-1: Identify the most common rabbit breeds and hybrids in relation to the breeding purpose K-2: State the most important features required in rabbits for show	C-1: Distinguish between important features which lead to the selection of the right animals for future breeding	
L02	K-3: Describe the feed, water and housing requirements of rabbits in different stages of their lives K-4: Describe favourable microclimatic conditions for growing rabbits	C-2: Select the proper diet and housing conditions for rabbits bred for pets in comparison to ones bred for meat	A-1 Demonstrate correct practice for feeding, watering and cleaning tasks in rabbit production
L03	K-5: Define probable causes of the most common rabbit diseases and disorders K-6: Identify correct health and disease prevention measures for rabbits	C-3: Select proper treatments for different diseases, disorders and pests	A-2: Monitor a rabbit's health condition to assess current status
L04	K-7: Describe the structure and function of a rabbit's reproductive organs K-8: Describe a rabbit's behaviour as related to its reproductive stage	C-4: Identify female animals which are on heat	A-3: Plan and administer a basic reproductive scheme for commercial rabbits
L05	K-9: Outline the main characteristics and trends of the rabbit meat market K-10: Explain the importance of slaughtering rabbits using a humane technique	C-5: Contrast the different methods of rabbit slaughtering	

Assessment criteria – Marking scheme

4 marks are to be allocated for each knowledge assessment criteria (K1 to K10), for a total of 40 marks.

6 marks are to be allocated for each comprehension assessment criteria (C1 to C5), for a total of 30 marks.

10 marks are to be allocated for each application assessment criteria (A1 to A3), for a total of 30 marks.

Ass. No.	Assessment Mode	Percentage distribution
1	Take-home	30%
2	Practical	30%
3	Controlled	40%

References**Textbooks**

- Bob Bennett (2009): Storey's Guide to Raising Rabbits, 4th Edition. Storey Publishing.
- Phull, R.K. (2003): Rabbit Farming And Its Economics. 2Nd Revised & Enlarged Ed. Textbook Student Edition. International Book Distributing Company.
- C. de Blas and Julian Wiseman (1998): The nutrition of the rabbits. CABI Publishing.

Websites

- <http://www.thefamilyhomestead.com/meatrabbits.htm>
- <http://www.fao.org/docrep/t1690e/t1690e0b.htm>
- <http://www.homegrown.org/forum/topics/intro-to-raising-rabbits-101>

Resources

- whiteboard, multimedia computer, beamer
- animal body map
- rabbit and rabbit organ models
- live rabbits of different breeds in an experimental farm or rabbit housing
- food and water for animals
- necessary hand tools and equipment used for rabbit breeding
- protective clothing suitable for work
- Recommended: links with animal care facilities available for learner visits.