General Certificate of Education (A/L)

(Grade 12 - 13)

Agricultural Science

Syllabus

(To be implemented from 2017)

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1.0 Introduction

Agriculture plays a substancial role in food security of Sri Lanka. In term of direct and indirect employment, Agriculture sector provides employment to nearly 40% of the nation. Agriculture sector's importance in nutrition and health of the nation is the basis for employment in non-agricultural sector. To achieve these multiple objectives, the efficiency and productivity of agriculture need to be in continuous improvement.

The purpose of the Advanced Level Agricultural Science syllabus is to provide the scientific context of agriculture at the upper-secondary level. This context improves knowledge, attributes and skills keeps touch with current practices of agriculture in Sri Lanka. This revised syllabus has included several changes in terms of updating the contents and application in both technical and management aspects of Agriculture. In particular, new competencies on sustainability, health and safety, challenges related to agriculture have been included.

Learning and teaching techniques included here should be implemented in the classroom as well as in the field. The teacher should pay attention to build up a good learning environment where students can gain successful learning experience. It will help to build a generation of competent students involved in Agriculture.

2.0 Common National Goals

The national system of education should assist individuals and groups to achieve major national goals that are relevant to the individual and society.

Over the years major education reports and documents in Sri Lanka have set goals that sought to meet individual and national needs. In the light of the weaknesses manifest in contemporary educational structures and processes, the National Education Commission has identified the following set of goals to be achieved through education within the conceptual framework of sustainable human development.

I. Nation building and the establishment of a Sri Lankan identity through the promotion of national cohesion, national integrity, national unity, harmony and peace, and recognizing cultural diversity in Sri Lanka's plural society within a concept of respect for human dignity.

II. Recognizing and conserving the best elements of the nation's heritage while responding to the challenges of a changing world.

III. Creating and supporting an environment imbued with the norms of social justice and a democratic way of life that promotes respect for human rights, awareness of duties and obligations, and a deep and abiding concern for one another.

IV. Promoting the mental and physical well-being of individuals and a sustainable life style based on respect for human values.

V. Developing creativity, initiative, critical thinking, responsibility, accountability and other positive elements of a well-integrated and balance personality.

VI. Human resource development by educating for productive work that enhances the quality of life of the individual and the nation and contributes to the economic development of Sri Lanka.

VII. Preparing individuals to adapt to and manage change, and to develop capacity to cope with complex and unforeseen situations in a rapidly changing world.

VIII. Fostering attitudes and skills that will contribute to securing an honourable place in the international community, based on justice, equality and mutual respect.

3.0 Common National Competencies

The following Basic Competencies developed through education will contribute to achieving the above National Goals.

(I) Competencies in Communication

Competencies in Communication are based on four subsets; Literacy, Numeracy, Graphics and IT proficiency.

Literacy	:	Listen attentively, speak clearly, read for meaning, write accurately and lucidly and communicate ideas effectively.
Numeracy	:	Use numbers for things, space and time, count, calculate and measure systematically.
Graphics	:	Make sense of line and form, express and record details, instructions and ideas with line form and colour.
IT proficienc	:	Computer literacy and the use of information and communication technologies (ICT) in learning, in the work environment and in personal life.

(II) Competencies relating to Personality Development

- Generic skills such as creativity, divergent thinking, initiative, decision making, problem solving, critical and analytical thinking, team work, inter-personal relations, discovering and exploring;
- Values such as integrity, tolerance and respect for human dignity;
- Emotional intelligence.

(III) Competencies relating to the Environment

These competencies relate to the environment: social, biological and physical.

Social Environment	:	Awareness of the national heritage, sensitivity and skills linked to being members of a plural society, concern for distributive justice, social relationships, personal conduct, general and legal conventions, rights, responsibilities, duties and obligations.
Biological Environment	:	Awareness, sensitivity and skills linked to the living world, people and the ecosystem, the trees, forests, seas, water, air and life-plant, animal and human life.
Physical Environment	:	Awareness, sensitivity and skills linked to space, energy, fuels, matter, materials and their links with human living, food, clothing, shelter, health, comfort, respiration, sleep, relaxation, rest, wastes and excretion.

Included here are skills in using tools and technologies for learning working and living.

(IV) Competencies relating to Preparation for the World of Work

Employment related skills to maximize their potential and to enhance their capacity

- To contribute to economic development,
- To discover their vocational interests and aptitudes,
- To choose a job that suits their abilities, and
- To engage in a rewarding and sustainable livelihood.

(V) Competencies relating to Religion and Ethics

Assimilating and internalizing values, so that individuals may function in a manner consistent with the ethical, moral and religious modes of conduct in everyday living, selecting that which is most appropriate.

(VI) Competencies in Play and the Use of Leisure

Pleasure, joy, emotions and such human experiences as expressed through aesthetics, literature, play, sports and athletics, leisure pursuits and other creative modes of living.

(VII) Competencies relating to "learning to learn"

Empowering individuals to learn independently and to be sensitive and successful in responding to and managing change through a transformative process, in a rapidly changing, complex and interdependent world.

Suggestions for a national policy framework for general education in Sri Lanka - National Education Commission (December, 2003)

4.0 Objectives of the syllabus

- To explore thepotential for available resources sustainably in Agriculture.
- To identify and create entrepreneurship opportunities in Agriculture.
- To plan eco-friendly Agricultural activities.
- To identify and use new advancements of Agro technology.
- To adapt to the changes successfully which occur in locally and export oriented Agriculture.
- To develop the confidence needed to face challenging agricultural problems.
- To create desire to do a self-employment or an employment related to Agricultural field.
- To use the knowledge and skills of Agriculture for a healthy and environmentally sustainable life style.
- To develop enthusiasm on Agricultural activities for spending leisure time productively.
- To focus on the conservation of environment and bio-diversity in Sri Lanka.
- To explore for new technological and business opportunities in Agriculture.

5.0 Evaluation and Assessment

Assessment and Evaluation has been introduced as two interrelated programmes that can be easily implemented in the classroom to identify the efficiency/ levels students have achieved in order to confirm their actualization of the expected learning outcomes through the learning-teaching process. If assessment is carried out properly it is not difficult for students learning competence. On the other hand evaluation proposes to identify what the competency the student has achieved is.

Teacher involved assessing can provide the students with guidance of two types. This guidance is called Feedback and Feed forward. The teacher's task is to provide the student with Feedback i order to overcome their learning difficulties once their weaknesses and inabilities are discovered and to give them Feed forward when student abilities and strengths are discovered to enable them to improve abilities.

There is need that the students themselves identify the extent to which a particular competency in the cource had been actualized for the success of the learning-teaching process. While, according to this, the teacher is expected to determine the competency level the student has achieved, in the cource of the programme of evaluation, the teacher has to take the initiative to communicate student progress to students and parents including other relevant parties. It is necessary that achievement levels in Grade 12-13 are measured two occations, at school level and at national level.

School level

Assessment at school level needs to be done following the instructions given in the teachers's guide and School Based programme of assessment. Provincial Education Department and the Ministry of Education take action to the streamline this.

National Level

This assessment is conducted at the end of grade 13 at the G.C.E. (A/L) examination held by the Department of Examinations. In the examination, a five hour question paper shall be given. The paper I consists of 50 multiple choice questions carrying 50 marks. The paper II consists of 4 structured essay questions, carrying out 20 marks and 6 essay questions. Any four from the essay questions need to be answered and each such question is awarded 7.5 marks.

Suggested number of periods for each competency

Grade 12

Competency	No. of periods
1. Investigates the contribution of agriculture sector to the development of Sri lanka considering objectives of agriculture practically.	17
2. Investigates the importance of climtic factors on crop production.	16
3. Prepares plan to obtain high yield through the management of the quality of soil.	39
4. Plans strategies for the management of nutrients to obtain an optimum yeild.	27
5. Exhibits the readiness for establishment of crops in a suitable soil enviornment.	24
6. Plans suitable irrigation and drainage methods for success full crop cultivation.	27
7. Exhibits readiness to obtain a high yield by optimizing plant physiological processes.	20
8. Engages in plant propogation using suitable technologies.	48
9. Investigates the methodologies of plant breeding for crop improvement and conservation of genetic resources.	12
10. Plans controled enviornmental conditions to obtain successful crop cultivation.	08
11. Plans soiless cultures for quantitative and qualitative yield.	12
Total	250

Grade 13

Competency	No. of periods
12. Plans the effective pest management practices to ensure successful crop production.	53
13. Plans quality food consumption patterns for the healthy life.	24
14. Innvestigates pre and postharvest techniques for the high quality harvest.	22
15. Plans methologies of animal husbandry to ensure high qualitative and quantitative yield.	69
16. Exhibits readinets to apply principles of economics to improve the productivity in agricultural enterprises.	48
17. Exhibits readiness to engage in the sustainable agriculture.	19
18. Investigates stratergies to minimize health problems and exhibits readiness of engage in sustainable agriculture.	06
19. Exhibits readiness to plan to overcome challenges faced in agriculture.	09
	250

Competencies and competency levels for Grades 12 and 13

Grade	Term	Competency and competency level
Grade 12	First Term	From first competency to fourth competency (28 competency levels)
	Second Term	From fifth competency to seventh competency (17 competency levels)
	Third Term	From eighth competency to eleventh competency (20 competency levels)
Grade 13	First Term	From twelceth competency to fourteenth competency (21 competency levels)
	Second Term	From fifteenth competency to sixteenth competency (30 competency levels)
	Third Term	From seventeenth competency to nineteenth competency (07 competency levels)

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

1. Investigates the contribution of agriculture sector to the development of Sri lanka considering objectives of agriculture practically.	1.1 Inquires into how agriculture becomes a combination of technology and management.	• Scientific backround of Agriculture
		  • Introduction
		  • Scientific applications
		  • Plant breeding
		  • Food technology
		  • Post harvest technology
		  • Agriculture engineering
		• Scientific backround of Management
		  • Agricultural resources management
		  • Introduction
		  • Necessity
		• Economic and marketing problems
		  • Fluctuation of the price
		  • Agricultural extension service
		  • Storage facilities
		• Optimum usage of Agricultural resources
		  • Duty of the technology
		  • Price and quality conditions
		  • Data management
		  • Application of economic principles
			• Explains scientific backround of agriculture with examples.
			• Deseribes relationships of development barriers of the country to the Agriculture sector.
			• Shows that the many development barriers in the country are related to thechnology and management
			• Explains the role of the technology for Agricultal resource management
				03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	1.2 Inquires into the expansion and development process of Agriculture sector in Sri lanka	• Agriculture in Sri Lanka
		  • Ancient agrarian system in Sri Lanka
		  • Agricultural prosperity in ancient Sri Lanka
		  • Self sufficiency
		  • Indiginous agricultural technology
		  • Government support
		  • Irrigation technology and water man agement
		  • Cultural and religious background
		• Green revolution
		• Modern commercial agriculture
		  • Introduction
		  • Export oriented agriculture
		  • Agriculture based on private entrepre-neurs
			• Explains ancient agrarian system in Sri Lanka.
			• Deseribe factors that contribuite to ancient agricultural prosperity in Sri Lanka.
			• Explains establishment of plantation sector according to European commercial necessity.
			• Explains positive and nega-tive impact of plantation agriculture.
			• Explains contribution of green revolution for the de-velopment of agriculture.
			• Explain the necessity of commercial agriculture which is based on the present world market re-quirements with examples.
				03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	1.3 Investigates the role of the agricultural polices in the case of restructering the agricultural development process.	• Restructuring of Agricultural development process • Introduction and necessity • Restructing process • Legal backgound • Policies and acts • Objectives and goals • National agricultural policy • Implementation of policies • Targeting fields • Related to resources • Related to inputs • Related to foods • Related to market • Institutional backgound • Legal acts • Development schemes • Multi purpose development scheme • Mahaweli • Udawalawa • Galoya • Objectives • Contribution to socio economic development	• Defines restructing process of Agricultural development and explains the importance. • Explains the importance of policies and acts in case of restructing of Agricultural development process. • Describes the necessity of National Agriculture policy. • Lists out objectives and goals of National Agricultural policy. • Identifies the most important fields in implimentation of policies. • Identifies the most imporetent policies, relevant institutions and and acts. • Explains the role of multi purpose development schems in the process of restructing the development process.	03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	1.4 Investigates the contribution of Agriculture sector to gross domestic production and activities that taken to improve the Agriculture sector.	• Agriculture in present Sri Lanka
		  • Contribution to the gross domestic production
		  • Fields
		  • Crop
		  • Animal husbanday
		  • Fisheries
		  • Forestry
		  • Employment
		  • Direct
		  • Indirect
		  • Activities taken to improve Agricultral sector
			• Compares amount of contribution by crops, animal husbandary, fisheries and forestry to gross domestric production.
			• States the importance of improvement of the above fields.
			• Lists out the information about job opportunities in Agricultural sector.
				02

	1.5 Investigates about industries and services releted to Agriculture sector.	• Industries related to agriculture.
		  • Production
		  • Main
		  • By-product
		• Services related to Agriculture.
		  • Consultation and Extension
		  • Research
		  • Training
		  • Marketing
		  • Financial and insurance
			• Classifies main industries related to Agriculture.
			• Prepares a leaflet inculding products and inputs related to Agriculture.
			• Presents information on the services related to Agriculture.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	1.6 Inquires into insitutional structure that provides services in the present Agriculture	• Different institutions that important for the development of agriculture and their role • Government institutions • Non-government institutions • Private institutions • International institutes • Community organizations • Farmers organizations	• Names different institutions that contribute to agricultural development. • Summerizes services provided by different institutions to develop agricultral sector. • Presents suggestions to get services effectively from agricultural instititions.	02
	1.7 Inquires into potentials which have to be developed Agricultural activities in the country.	• Agricultural potential • Introduction • Fields • Crop production • Animal husbandary • Fisheries • Forestry	• Defines Agricultural potentials. • Explains potentials in different fields for the development of agriculturre in Sri Lanka.	02
2. Investigates the importance of climatic factors on crop production.	2.1 Inquires into main agro-climatic factors affected on crop cultivation.	• Main agro-climatic factors • Rainfall • Water cycle • Rainfall mechanisms • Monsoon rain • Inter-monsoon rain • Weather systems • Rainfall patterns and cropping seasons • Light • Temperature • Relative Humidity • Wind • Evapo-transpiration	• States agro-.climatic factors. • Explains the rainfall mechanisms. • Describes water cycle. • Names elements of water cycle. • Describes relationships between the rainfall patterns and cropping seasons.	03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	2.2 Inquires into the impact of climatic factors on crop cultivation.	• Impact of climatic factors on crop cultivation
		  • Impact of rainfall
		  • Impact of light
		  • Impact of temperature
		  • Aerial
		  • Soil
		  • Impact of relative humidity
		  • Impact of wind
		• Impact of evapo-transpiration
		• Minimisation of adverse effects
			• Explains effect of climatic factors on cultivation of crops cultivation according to climatic factors.
			• Selects suitabile crops according to prevailing climatic factors.
			• Plans crop cultivation to obtain optimum use of climatic factors.
				04

	2.3 Involves in collecting meteriological data using instruments in an agro-meteriological unit.	• Agro metrological unit
		  • Introduction
		  • Necessity
		  • Selection of location
		  • Installing instruments
		  • Data collection
		  • Rainfall
		  • Duration
		  • Intensity
		  • Atmospheric temperature
		  • Soil temperature
		  • W ind speed and direction
		  • Relative humidity
		  • Evaporation
			• Defines an Agro meteorological unit.
			• Explains the necessity of establishing an Agro meteorologica lunit.
			• Describes the factors to be considered in the establishment of an Agro meteorological unit .
			• Describes the way of maintaining an Agro meteorological unit.
			• Interprets meteorological data, recording and analysis.
				06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	2.4 Classifies climatic zones further more in order to facilitate agricultural activities.	• Climatic zones
		  • Introduction
		  • Classification
		• Agro climatic zones
		  • Introduction
		  • Classification
		• Agro ecological zones
		  • Introduction
		  • Classification
		  • Importance of classification
			• States the base of determining the climatic zones of Sri Lanka.
			• Locates the main climatic zones in a map.
			• Classifies agro climatic zones and Agro ecological zones.
			• Describes the importance of agro ecological map.
				03

3. Prepares plan to obtain high yield through the management of the soil quality.	3.1 Inquires into the effect of soil formation and soil profile development on crop cultivation.	• Soil
		  • Introduction
		  • Agricultural importance
		• Soil formation
		  • weathering of rocks
		  • Introduction
		  • Affecting factors
		  • Physical
		  • Chemical
		  • Biological
		  • Soil genesis
		  • Introduction
		  • Affecting Factors
		  • Soil profile
		  • Introduction
		  • Horizons
		  • Profile development
		  • Importance of studying the soil profile
			• Explains the importance of soil in agriculture.
			• Describes the factors affecting on weathering of rock.
			• Explains factors affecting on soil genesis.
			• Creates a model for a typical soil profile .
			• Describes the importance of studying a soil profile.
				05

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	3.2 Inquires into the soil components requied for crop cultivation.	• Soil components
		  • Solid soil particles
		  • Soil minerals
		  • Soil organic matter
		  • Soil organisms
		  • Soil water
		  • Soil air
		• Impact on crop cultivation
			• Illustrates the composition of soil components by using a pie chart.
			• Illustrates how soil components are being arranged in a typical soil.
			• Determines the percentage of soil moisture in a soil.
			• Explains the effects of soil components for crop cultivation.
			• Determines the field capacity of a soil.
			• Determines the permanent willing point in a soil.
				06

	3.3 Determines the factors affecting soil health.	• Soil health
		  • Introduction
		  • Importance
		  • Classification of factors
		  • Physical properties
		  • Chemical properties
		  • Biological properties and organic matter.
			• Defines soil health.
			• Classifies the factors affecting on soil health.
			• Explaines the importance of soil health.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	3.4 Determines the physical properties of soil affecting on soil health and quality.	• Physical properties of soil
		  • Soil texture
		  • Introduction
		  • Importance
		  • Management
		  • Soil structure
		  • Introduction
		  • Importance
		  • Management
		  • Soil consistency
		  • Introduction
		  • Determination
		  • Impact of consistence
		  • Soil density
		  • True density
		  • Introduction
		  • Importance
		  • Bulk density
		  • Introduction
		  • Importance
		  • Management
		  • Porosity
		  • Introduction
		  • Importance
		  • Soil colour
		  • Introduction
		  • Importance
			• Determines soil texture in soil using different methods.
			• Determines soil structure in soil.
			• Determines soil colour in soil
			• Determines bulk density and soil true density in soil.
			• Calculates porosity of different soil samples.
			• Explains how soil physical characteristics of soil affect on crop cultivation.
				08

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	3.5 Inquires into the soil chemical properties which affect on soil health.	• Chemical properties of soil
		  • Soil reaction
		  • Introduction
		  • Acidity
		  • Alkalinity
		  • Salinity
		  • Management
		  • Ion – exchange
		  • Introduction
		  • Importance
		  • Management
		  • Base saturation
		  • Introduction
		  • Importance
		  • Management
			• Names soil chemical properties that affect on crop cultivation.
			• Describes the impact of chemical characteristics of soil on crop cultivation.
			• Determines pH value and salinity of different soil samples.
			• Calculates base saturation in soil.
			• Describes how chemical properties are managed to ensure soil health..
				05

	3.6 Inquires into biological factors of soil which affect on soil health.	• Biological factors of soil
		  • Introduction
		  • Classification
		  • Macro
		  • Meso
		  • Micro
			• Names biological factors of soil which affect crop cultivation.
			• Describes how biological factors of soil affect soil health.
				03

	3.7 Inquires into reasons for degradation of soil health.and quality.	• Degradation of soil health
		  • Introduction
		  • Factors affecting
		  • Adverse effects.
			• Explains the reasons for degradation of soil health.
			• Calculates amount of soil erosion.
			• Explains adverse effects due to the degradation affects of soil health.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	3.8 Inquires into methods of improving soil health and quality.	• Soil Health and quality improvement • Necessity • Methods • Soil conservation • Introduction • Methods • Mechanical • Agronomical • Biological • Soil rehabilitation	• Explains methods of soil health and quality improvement. • Marks contour lines using "A" frame in a land • Selects appropriate soil conservation methods according to the land. • Determines soil health.	05
	3.9 Investigates characteristics of the major soil groups in Sri Lanka.	• Classification of soil groups • USDA classification • Common soil groups in Sri Lanka • Reddish brown earth • Red yellow podsolic soil • Non calcic brown soil • Latosolic soil • Alluvial soil • Low Humid Glay soil • Agricultural usage of each soil group	• States the base of classification of soil groups. • Names common soil groups in Sri Lanka. • Describes characteristics of the major soil groups. • Explains the Agricultural potential of various soil groups. • Selects suitable crops according to the prevailing soil group of the area.	03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

4. Plans strategies for the management of nutrients to obtain an optimum yeild.	4.1 Classifies nutrients required for plant growth and development.	• Plant nutrients
		  • Introduction
		  • Classification
		  • According to necessity
		  • Essential nutrients
		  • According to quantity of nutrients absorbed by plants
		  • Macro nutrients
		  • Primary nutrients
		  • Secondary nutrients
		  • Micro nutrients
		  • Beneficial elements
		  • According to mobility of nutrients in plants
		  • Mobile nutrients
		  • Immobile nutrients
			• Defines plant nutrients and plant nutrition.
			• Classifies plant nutritients with examples.
				02

	4.2 Inquires into the impact of soil nutrients on plant growth and development.	• Nutrient absorption
		  • Methods
		  • Active absorption
		  • Passive absorption
		• Plant nutrition and growth
		• Impact of nutritients on plants
		  • When in deficient
		  • When in – excess
		• Liebig's Law of minimum
			• Explains the methods of absorption of nutritients by plants.
			• Explains the relationship between plant nutritients and the growth by using graphs.
			• Describes visible characteristics of plants due to deficiency of nutrients .
			• Identifies sypmptoms of plant nutrient deficiencies.
			• Describes symptoms of plants when the nutrients are in excess.
			• Describes the supply of nutritients using Liebig's Law.
				05

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	4.3 Inquires into different types of fertilizer used for the crop cultivation.	• Fertilizer • Introduction • Needs for applying fertilizers • Classification • Chemical fertilizer • Direct • Mix • Organic manure • Bio fertilizer	• Defines the term "fertilizer" • Classifies fertilizer. • Describes the necessity of fertilizer application. • Defines organic manure and inorganic fertilizer and bio-fertilizer. • Defines direct and mixed fertilizer.	02
	4.4 Inquires into the various methods of making inorganic fertilizer mixtures.	• Chemical fertilizer • Importance of usage • Classification • Direct fertilizer • Physical and chemical properties • Mixed fertilizer • Preparation of fertilizer mixures • Factors to be considered • Calculations	• Classifies chemical fertilizer. • Identifies physical and chemical properties of direct fertilizer.. • Performs calculations to prepares fertilizer mixtures. • Lists out the factors to be considered in the preparation of a fertilizer mixture.	06
	4.5 Inquires into the preparation methods of different types of organic manure.	• Organic manure. • Importance of application • Types • Compost manure • Green leaf manure • Farm yard manure • Organic liquid fertilizer	• Gives examples for organic manure. • Explains the importance of the use of organic manure. • Explains the preparation of organic manure. • Prepares compost manure.	04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	4.6 Inquires into different types of bio fertilizer.	• Bio fertilizer
		  • Introduction
		  • Importance
		  • Type of bio-fertilizer
		  • Nitrogen Fixing Biofertilizer
		  • Phosphate Biofertilizer
		  • Phosphate solubilizing
		  • Phosphate mobilizing
			• Gives examples for the types of bio fertilizer.
			• Explains the preparation of bio fertilizer.
			• Prepares bio fertilizer.
				04

	4.7 Plans different methodologies for the effective use of fertilizer.	• Fertilizer use
		• Method sof fertilizer application
		• Possitive and Negative impacts on
		  • Soil
		  • Organism
		• Strategies to ensure efficiency of fertilizer usage
			• Emphasizes the necessity of applying fertilizer productively for the maximum profit.
			• Differentiates positive and negative impacts on fertilizer usage.
			• Explains how fertilizer are used effectively and efficiently
			• Evaluates the methods of applying fertilizer.
				04

5. Exhibits the readiness for establishment of crops in a suitable soil enviornment.	5.1 Inquires into the need for land preparation.	• Land preparation
		  • Introduction
		  • Objectives
		  • Changes in soil
		  • Physical
		  • Biological
		  • Chemical
			• Describes objectives of land preparation.
			• Describes physical, biological and chemical changes of the physical properties of the soil due to the land preparation.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	5.2 Inquires into appropriate steps and methods of land preparation.	• Steps
		  • Basic land preparation
		  • Primary
		  • Secondary
		  • Intercultivation
		• Methods
		  • Conventional
		  • Minumum tillage
		  • Zero tillage
		• Land preparation for paddy cultivation
			• Defines the terms 'basic land preparation' and 'intercultivation'.
			• Describes the steps land preparation.
			• Explains with examples that the land preparation techniques are according to the various requirements.
			• Selects the appropriate methods of land preparation to suite the situation and the crop.
			• Describes the method of land preparation for paddy cultivation.
				04

	5.3 Inquires into the equipment used in land preparation.	• Land preparation equipment
		  • Classification
		  • According to stage of land preparation
		  • Primary tillage equipment
		  • Secondary tillage equipment
		  • Intercultivation equipment
		  • According to power source
		  • Manual power
		  • Animal power
		  • Mechanical power
			• Classifies land preparation equipment according to the various determinants.
			• Selects equipment according to soil and crop.
				05

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	5.4 Inquires into different methods of crop establishment and equipment.	• Establishment of crops • Introduction • Methods of establishment • Sowing • Regular • Irregular • Transplanting • Regular • Irregular • Crop establishment equipment • Seeders • Transplanters	• Describes the methods of crop establishment. • Names the equipment used in crop establishment • Describes the operation of crop establishment equipment. • Engages in crop establishment using different methods.	05
	5.5 Engages in production of seedlings using different types of nurseries.	• Plant Nursery • Introduction • Importance • Classification • According to agro climatic zone • Raised beds • Sunken beds • According to containers • Pot nurseries • Tray nurseries • Sponge nurseries • According to potting medium • Noridoko nurseries • Sand nurseries • Mud nurseries • Dapog nurseries • Maintenance	• Names the different types of plant nurseries • Selects suitable nursery according to type of seeds. • Prepares various types of nurseries • Establishes seeds in the nursery beds and maintains them.	08

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
6. Plans suitable irrigation and drainage methods for success full crop cultivation.	6.1 Inquires into various water sources.	• Water sources • Introduction • Classification • According to nature • Natural • Artificial • According to location • Surface • Underground • Methods of improving ground water recharge	• Defines water sources. • Clasifies water sources. • States the importance of re-charge of ground water and explains the strategies to im-prove it.	04
	6.2 Inquires into suitable water lifting methods to increase water potential.	• Water lifting • Introduction • Methods • Traditional methods • Pulleys • Andi wells • Water wheel • Yoththa • Non traditional methods • Water pumps • Centrifugal pumps • Opration & maintanance • Displacement pumps • Operation & maintanance	• Lists various water-lifting methods. • Describes the principles used for water-lifting. • Explains the mechanisms of water pumps. • Describes the methods of installation and maintenance of water pumps.	06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	6.3 Carries out necessary calculations for ensuring effectiveness of irrigation	• Irrigation
		  • Introduction
		  • Objectives
		• Irrigation requirement
		  • Net irrigation requirement
		  • Gross irrigation requirement
		  • Irrigation interval
		• Determination of irrigation interval
		• Determination of evapo-transpiration
		• Calculating irrigation efficiencies
		• Strategies of increasing efficiency of irrigation systems
			• Defines irrigation.
			• Describes objectives of irrigation.
			• Defines irrigation requirement.
			• Calculates irrigation requirement.
			• Describes factors affecting on the irrigation interval.
			• Calculates irrigation interval.
			• Calculates evapo-transpiration of plants.
			• Defines irrigation efficiency.
			• Explains strategies of increasing irrigation efficiency.
				05

	6.4 Inquires into different methods of irrigation.	• Methods of irrigation
		  • Surface irrigation
		  • Furrow
		  • Basin
		  • Strip
		  • Ring
		  • Sub Surface irrigation
		  • Porous pipes and drains
		  • Pitcher irrigation
		  • Drip
		  • Sprinkler
			• Explains various methods of to irrigation.
			• Draws diagrams of various methods of irrigation.
			• Names the components of sprinkler and the drip irrigation systems.
			• Performs experiments on different methods of irrigation.
			• Lists out the advantages and disadvantages of irrigation methods.
			• Selects appropriate method for irrigation according to the situation.
				06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	6.5 Prepares plans to minimize problems arising in improper irrigation.	• Problems due to improper irrigation
		  • Enviornmental pollution
		  • Soil degradation
		  • Depletion of aquifers
		  • Sinking
		  • Incidence of pest desease
		  • Soil errosion
		• Minimizing problems.
			• Explains problems due over- irrigation .
			• Describes stratergies used for the reduction of problems in imprpoper irrigation.
				02

	6.6 Plans suitable drainage methods.	• Drainage
		  • Introduction
		  • Adverse effects of ill drainage
		  • Reasons for poor drainage
		  • Drainage methods
		  • Surface drainage methods
		  • Open drains
		  • Sub surface drainage methods
		  • Porous tubes
		  • Pumping
		  • Usage of plants
		  • Drainage systems
		  • Random
		  • Paralled grid method
		  • Herring bone
			• Defines the term drainage
			• Explains the adverse effects of poor drainage.
			• Describes the reasons for poor drainage.
			• Describes strategies which can be used to improve drainage.
			• Draws drainage systems.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
7. Exhibits readiness to obtain a high yield by optimizing plant physiological processes.	7.1 Plans to optimize the process of photosynthesis.	• Photosynthesis • Introduction • process • Factors affecting on photosynthesis • Internal factors • External factors • Strategies to improve efficiency	• Defines the process of photosynthesis. • States the steps of the photosynthesis process. • Explains the factors affecting on photosynthesis. • Describes stratergies used to improve efficiency of photosynthesis.	02
	7.2 Plans to optimize respiration in plants.	• Respiration • Introduction • Process • Glycolysis • Krebs cycle • Electron transportation • Factors affecting • Internal factors • External factors	• Defines plant respiration. • Names steps of the process of respiration. • Names the factors that effect on respiration.	03
	7.3 Plans strategies to maintain optimized transpiration in plants.	• Transpiration • Introduction • Process • Controlling transpiration process • Necessity • Strategies • Factors effecting on transpiration • Internal factors • External factors	• Defines the process of transpiration. • Explains the factors affecting on transpiration. • Describes stratergies used to control the process of transpiration. • Evaluates the rate of transpiration. • Determines transpiration that occurs mainly through stomatas.	04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	7.4 Plans strategies to regulate the absorption and translocation of materials in plants.	• Absorption of materials in plants
		  • Passive absorption
		  • Active absorption
		• Translocation
		  • Ascent of sap or translocation of water
		  • Pholem translocation
		• Material absorption and regulation of translocation
			• Describes absorption of materials into plants.
			• Describes translocation of materials in plants.
			• Points out food translocation occurs through pholem.
			• Explains the way of obtaining maximum yield by through efficient absorption and translocation.
				03

	7.5 Plans to improve crop production by using growth regulators.	• Plant hormones
		  • Introduction
		  • Plant hormone groups
		  • Auxin
		  • Cytokinine
		  • Gibberelline
		  • Abscisic acid
		  • Ethylene
		  • Impact on plant physiology
		• Growth regulators
		  • Introduction
		  • Agricultural usage
			• Defines plant hormones.
			• Describes the functions of plant hormones.
			• Describes the ways of improving productivity of agricultural crops using plant regulators.
				04

	7.6 Determines the plant development using growth parameters.	• Plant growth & development
		  • Introduction
		  • Growth parameters
		  • Growth curve
		  • Growth indices
		  • Crop Growth Rate (CGR)
		  • Leaf Area Index (LAI)
			• Names plant growth parameters.
			• Obtains measurements required to measure plant growth.
			• Draws plant growth curves.
			• Calculates LAI.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

8. Engages in plant propogation using suitable technologies.	8.1 Investigates methods of plant propagation.	• Plant propagation
		  • Introduction
		  • Methods
		  • Sexual
		  • Using seeds
		  • Asexual
		  • Separation
		  • Cutting
		  • Grafting and budding
		  • Layering
		  • Tissue culture
			• Defines plant propagation.
			• Classifies different plants propagation methods with examples.
				02

	8.2 Inquires into seed development and germination.	• Seed formation process
		  • Pollination
		  • Fertilization & seed formation
		• Structure of a typical seed
		  • Monocotyledon
		  • Dicotyledon
		• Seed germination
		  • Introduction
		  • Factors necessary for seed germination
		  • Germination types
		  • Epigeal germination
		  • Hypogeal germination
		  • Seed germination process
			• Labels the parts of a typical flower.
			• Labels the parts of a typical seed.
			• Explains the process of seed formation.
			• Describes seed germination types by observing the seedlings.
			• Determines the factors necessary for seed germination.
			• Compares features of monocotyledonous and dicotyledonous seeds.
			• Describes the process of seed germination.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	8.3 Inquires into the methodologies to safeguard the viability of seeds.	• Seed viability • Introduction • Importance • Factors affecting • External factors • Internal factors • Methods of Determination • Measuring the percentage of germination • Tetrasolium test • Measuring the CO_2 concentration	• Defines seed viability. • Describes factors affecting on seed viability. • Explains the method of determining seed viability	02
	8.4 Inquires into the qualities persistant in the seeds enabling for successful cultivation.	• Seed testing • Importance • Methods • Determination of seed germination percentage • Testing physical purity • Determination of moisture percentage • Determination of seed viability • Testing of seed health • Testing of seed vigour	• Explains necessities of seed testing. • Describes the methods of seed testing • Calculates the germination percentage of seeds by using different methods. • Calculates the moisture percentage of seeds • Selects suitable seeds for cultivation.	06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	8.5 Inquires into the methods of removing seed dormancy.	• Seed dormancy
		  • Introduction
		  • Importance
		  • Types of dormancy
		  • External dormancy
		  • Physical dormancy
		  • Chemical dormancy
		  • Internal dormancy
		  • Morphological
		  • Physiological
		  • Methods used to remove seed dormancy
			• Explains the importance of seed dormancy.
			• Describes the factors affecting on seed dormancy.
			• Explains the various types of seed dormancy.
			• Processes seeds for germination after removing seed dormancy.
				04

	8.6 Inquires into the methods of selecting healthy seeds for planting.	• Seed health
		  • Introduction
		  • Importance
		  • Methods of determination
		  • For fungi
		  • For bacteria
		  • For virus
			• Defines seed health.
			• Describes the importance of selecting healthy seeds for seed planting
			• Tests for the pest and disease casual agents of seeds.
				06

	8.7 Inquires into methodology of producing certified seeds.	• Steps of producing certified seeds
		  • Breeder seeds
		  • Foundation seeds
		  • Registered seeds
		  • Certified seeds
		• Quality standards of the seeds enabling them to be used as planting materials
			• Describes the process of production of certified seeds.
			• State sthe importance of planting certified seeds.
			• States the quality standards of seed paddy.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	8.8 Engages in asexual plant propagation by seperating plant propagative structures.	• Separation • Structures used • Underground stems • Rhyzome • Corm • Tuber • Bulb • Runner • Sucker • Bulbil • Preparation for planting	• Selects plant propagative structures for asexual re-production. • Prepares plant propagative structures for planting.	04
	8.9 Engages in asexual plant propagation using cuttings.	• Plant cuttings • Leaves • Branches • Roots • Preparation for planting	• Selects suitable cuttings for planting • Prepares cuttings for planting	02
	8.10 Engages in plant propagation using layering.	• Methods of layering • Air layering • Ground layering • Simple • Compound • Tip • Mound	• Selects suitable plant types for layering. • Tests on different methods of layering.	06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	8.11 Engages in plant propagation using budding and grafting.	• Methods of grafting
		  • Cleft
		  • Crown
		  • Inarch
		  • Stone
		  • Tongue
		• Methods of budding
		  • T-budding
		  • H-budding
		  • Patch budding
		  • Chip budding
			• Selects suitable plants for budding and grafting.
			• Performs experiments on different methods of budding and grafting.
				06

	8.12 Inquires into the techniques of micro propagation.	• Sections of the tissue culture laboratory
		  • Cleaning room
		  • Media preparation room
		  • Innoculation room
		  • Culture room
		• Micro propagation
		  • Introduction
		  • Steps
		  • Mother plant selection
		  • Explant establishment
		  • Multiplication stage
		  • Rooting
		  • Acclimatisation
			• Defines micro-propagation.
			• Describes the process of micro propagation.
			• Describes the functions of each section of a tissue culture laboratory and the conditions to be maintained in these sections.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

9. Investigates the methodologies of plant breeding for crop improvement and conservation of genetic resources.	9.1 Explores into scientific information on transmission on characteristics of living organisms related to basic genetic information.	• Basic concepts of genetics
		  • Heredity
		  • Inheritance
		• Terminology related to genetics
		• Control of characteristics of living organisms
		  • Factors affecting
		  • Enviornment
		  • Genotype
		  • Mendel's laws
		  • Law of gene segregation
		  • Law of independant assortment
			• Describes the basic concepts of genetics.
			• Explains transmission of characteristics inherited in living organisms from generation to generation.
			• Describes the factors which control the characteristics of living organisms.
			• Explains Mendal's law.
			• Solves simple problems using Mendal's law.
				04

	9.2 Investigates the scientific knowledge of inheritance for crop improvement.	• Plant breeding
		  • Introduction
		  • Objectives
		  • Methods
		  • Introduction
		  • Selection
		  • Hybridization
		  • Hybrid vigour
		  • Mutation breeding
		  • Polyploids
		  • Biotechnology
		  • Recombinent DNA technology
		  • Genetically modified crops
			• Defines plant breeding.
			• Describes the objectives of plant breeding.
			• Explains how inheritences is used for plant breeding.
			• Describes the process of improving plants by using breeding.
			• Explains the use of bio technology for the improvement of crops.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	9.3 Explores information on conservation of genetic resources.	• Genetic resources
		  • Introduction
		  • Importance
		  • Degradation of genetic resources
		  • Introduction
		  • Reasons
		  • Adverse effects
		  • Conservation of genetic resources
		  • Introduction
		  • Importance
		  • Methods
		  • In-situ conservation
		  • Ex-situ conservaiton
			• Defines genetic resources.
			• Describes the importance of conservation of genetic resources.
			• Explains the reasons for degradation of genetic resources.
			• Presents how genetic resources are conserved with examples.
				04

10. Plans controlled enviornmental conditions to obtain successful crop cultivation.	10.1 Investigates the importance of controlling the aerial and soil conditions on crop cultivation.	• Controlling the enviornmental condition in crop cultivation
		  • Introduction
		  • Importance
		  • Enviornmental conditions that should be controlled
		  • Soil
		  • Aerial
		  • Suitable crops
			• States importance of controlling enviornmental conditions in crop cultivation.
			• Explains soil and enviornmental conditions that should be controlled for successful cultivation.
			• States suitable crops for cultivating under controlled enviornmental conditions.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	10.2 Selects suitable protected structures for controlling different enviornmental conditions in crop cultivation.	• The protective structures used for controlling enviornmental conditions. • Fruit cover • Row cover • Single plant • Rows • Beds • Propagative structures • Simple solar propagator • Solar propagator • Lath houses • Shade houses • net houses • Water conservative shelters • Poly tunnels • Green houses • Minimizing the problems that arise in the crop cultivation within the protected houses	• Classifies the protective structures used in the control of enviornmental conditions • Describes procedures for praparing various protective structures. • Selects suitable protective structures according to the area and crop. • Prepares solar propagative structures. • Present proposals to minimise the problems that arise in the crop cultivation within the protective structures.	06
11. Plans soiless culture for quantitative and qualitative yield.	11.1 Classifies the methods of soiless culture.	• Soiless culture • Introduction • Importance • Methods of cultivation • Hydroponics • Solid media culture • Aeroponics • Cultivation media and their characteristics • Nutrient media and preparation	• Describes the importance of soiless culture. • Names the methods of soiless culture. • Explains the nutrient media and cultivation media used in soiless culture.	04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	11.2 Inquires into hydroponic methods.	• Hydroponics methods
		  • Circulating solutions
		  • Nutrient Film Technique (NFT)
		  • Deep Flow Technique (DFT)
		  • Non – circulating solutions
		  • Root dipping technique
		  • Floating technique
		  • Capillary technique
			• Explains procedures of cultivation in various soilless media.
			• Explains advantages of hydroponics techniques.
			• Performs experiments on hydroponics methods.
				04

	11.3 Inquires into soilless culture in solid media.	• Cultivaiton in the solid media
		  • Vertical and horizontal grow bags
		  • Pots
		  • Trenches
		• Problems related to soilless culture and Stratergies to minimize the problems
			• Describes the methods of soilless culture in solid media.
			• Prepares hanging bags and cultivates suitable crops.
			• States problems related to soilless culture.
			• Suggests strategies to minimise the above problems.
				04

12. Plans the effective pest management practices to ensure successful crop production.	12.1 Investigates the impact of pest on crop cultivation through classifying them.	• Pests
		  • Introduction
		  • Classification
		  • Animal pests
		  • Weeds
		  • Pathogenic micro-organisms
		  • Impact on crop cultivation
			• Defines pests.
			• Classifies pests with examples.
			• Explains the impacts of pests on crops.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	12.2 Classifies animal pests and inquires into their damages.	• Animal pests
		  • Invertebrates
		  • Insects
		  • Mouth parts
		  • Biting and chewing
		  • Punching and sucking
		  • Rasping and sucking
		  • Mites
		  • Molluscus
		  • Vertebrates
		  • Birds
		  • Rodents
		  • Mammals
		• Damages done to crops
			• Identifies and labels the typical mouthparts of insects.
			• Classifies pests with examples.
			• Identifies the mouth parts of the insect according to the nature of damage done to crops.
			• Differentiates between mites and insects.
			• States damages done by animal pests with examples.
				06

	12.3 Inquires into damages done to crops by insect pests in various orders.	• Insect orders which harmful to agriculture
		  • Orthoptera
		  • Isoptera
		  • Hemiptera
		  • Homoptera
		  • Thysanoptera
		  • Coleoptera
		  • Diptera
		  • Lepidoptera
		• Impact on crops
			• Lists insect orders belonging to pests that predominantly damage to crops.
			• Identifies specific characteristics of insect orders using insects specimens.
			• Describes the damages done by various insects orders
			• Prepares a collection of insects or a pest box after identifing various insect pest orders.
				06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	12.4 Investigates the weed found in cultivated fields.	• Weed
		  • Introduction
		  • Classification
		  • According to life span
		  • According to morphological features
		  • According to habitat
		• Impact on agricultural activities
		• Invasive species
		  • Introduction
		  • Adaptation for survival
		  • Impact on agricultural activities
			• Classifies according to different criteria.
			• Describes special adaptations of invasive weeds.
			• Describes impact of weed on the agricultural activities.
			• Prepares a weed album according to various criteria.
				04

	12.5 Classifies causal agents of plant diseases and inquires into plant diseases caused by them.	• Plant diseases
		  • Introduction
		• Casual agents
		  • Classification
		  • Bacteria
		  • Fungi
		  • Virus
		  • Phytoplasma
		  • Nematodes
		• Common plant diseases
		• Pathways of disease transmission
		  • by vectors
		  • by soil
		  • by water
		  • by air
		  • by equipment
		  • by planting materials
			• Classifies causal agents of plant diseases.
			• States plant diseases caused by different casual agents with examples.
			• Describes the common symptoms of the plant diseases caused by the various casual agents.
			• Identifies the plant diseases by observing infected plant parts.
			• Identifies plant parasitic bacteria, fungi and nematodes.
				08

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	12.6 Makes arrangements for the successful pest management by investigating pest population level.	• Pest population density
		  • Introduction
		  • Factors affecting
		  • Determination of pest population density
		• Pest population levels
		  • Economic Damage (ED)
		  • Economic Injury Level (EIL)
		  • Economic Threshold Level (ETL)
		  • Epidemic Level
			• Defines pest population density.
			• Explains the facter affecting for pest population density.
			• Determines pest population density in the field.
			• Describes pest population levels by using graphs.
				03

	12.7 Plans appropriate methods for pest management.	• Pest management
		  • Introduction
		  • Principles
		  • Prevention
		  • Control
		• Pest management methods
		  • Mechanical and Physical
		  • Agronomic
		  • Biological
		  • Legislative
		  • Chemical
		• Integrated Pest Management (IPM)
		  • Introduction
		  • Importance
		  • Methodology
			• States the principles of pest management.
			• Classifies the methods of pest management using examples.
			• Controls pests in the field by using various methods.
			• Describes importance of integrated pest management.
			• Explaines the methodology of pest management.
				05

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	12.8 Selects suitable pesticides for pest management.	• Pesticides
		  • Introduction
		  • Classification
		  • Insecticides
		  • Classification
		  • According to the physical nature
		  • According to mode of action
		  • Based on chemical nature
		  • Organic
		  • Inorganic
		  • According to origin
		  • Natural
		  • Synthetic
		  • Weedicides
		  • Classification
		  • According to selectivity
		  • According to mode of action
		  • According to stage of application
		  • Fungicides
		  • Based on chemical nature
		  • Nematodicides
		• Toxicity of pesticides (LD 50)
		  • Introduction
		  • Toxicity levels
		• Problems that arise when using pesticides and minimizing these problems
			• Classifies pesticides according to various criteria with examples.
			• Classifies insecticides according to their physical characteristics with examples.
			• Defines the toxicity level of pesticide.
			• States toxicty levels of according to toxicity.
			• Describes the problems related to pesticides use and explains the strategies to minimise these problems.
				08

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	12.9 Plans the methods of applying pesticides with safety measures.	• Application of pesticides
		  • Methods of application
		  • Foliar application
		  • Mixing with soil
		  • Baits
		  • Injecting
		  • Dipping and coating
		  • Safety measures to be followed
		  • Before application
		  • During application
		  • After application
			• Describes the methods of applying pesticides with examples.
			• States the safety measures needed to be followed in the application of the pesticides.
				03

	12.10 Inquires into equipment used in application pesticides.	• Equipment used in pesticide application
		  • Classification
		  • Based on the nature of chemicals
		  • Liquid chemical sprayers
		  • Dust / granule sprayers
		  • Fumigators
		  • Based on the amount of liquid applying
		  • High volume sprayers
		  • Low volume sprayers
		  • Micro volume sprayers
		  • Based on the internal mode of action
		  • Piston type
		  • Centrifugal type
		  • Operation and maintenance
			• States the criteria relavant to the classification of equipment used in pesticides application.
			• Assembles the parts of liquid sprayers.
			• Draws and labels the parts of liquid sprayers
			• Describes the action of piston type sprayers.
			• Identifies problems in the equipment used for pesticides application and applies remedial measures.
				08

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
13. Plans quality food consumption strategies for the healthy life.	13.1 Investigates into the constituents required in a food in order to minimise nutrition complications.	• Human nutrition • Introduction • Nutrient constituents and their importance • Macro nutrients • Micro nutrients • Other important constituents • Water • Fiber • Food pyramid • Body Mass Index (BMI)	• Names the nutrient constituents of food. • Describes the importance of various nutrients related to human nutrition. • Provides examples for macro and micro nutrients. • States the functions of non-nutrient components related to human nutrition • Describes the way of selecting appropriate food items for a balanced diet using the food pyramid. • Explains how nutrition complications are minimized, based on Body Mass Index (BMI).	02
	13.2 Inquires into the solutions of preventing nutritional problems.	• Nutritional problems in Sri Lanka and related remedial measures • Malnutrition • Under nourishment • Protein – calorie mal-nutrition • Vitamin & mineral deficiencies • Vitamin A • Iron • Iodine • Zinc • Over nutrition	• Explains the problematic situations that arise due to the improper nutrition. • Names the common nutritional deficiencies in Sri Lanka. • Submits proposals to minimize the nutritional problems. • Selects foods to minimize nutritional problems.	02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	13.3 Inquires into the factors affecting on food spoilage	• Food spoilage
		  • Introduction
		  • Factors affecting
		  • Physical
		  • Biological
		  • Chemical
			• Names factors affecting on food spoilage.
			• Describes the effect of each factor on food spoilage.
				03

	13.4 Plans the methods of preserving food by following the principles of food preservation.	• Food preservation
		  • Introduction
		  • Importance
		  • Principles
		  • Inhibition
		  • Inactivation
		  • Methods
		  • Physical methods
		  • Low temperature
		  • Refrigeration
		  • Freezing
		  • Thermal preservation
		  • Sterilization
		  • Pasteurization
		  • Blanching
		  • Dehydration
		  • Concentration
		  • Irradiation
		  • Chemical methods
		  • Smoking
		  • Adding preservatives
		  • Bio-chemical methods
		  • Fermentation
		  • combined methods
			• States the importance of food preservation.
			• States the principles of food preservation.
			• Suggests the appropriate food preservation method based on the type of food.
			• Performs experiments on food preservation methods.
				06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	13.5 Inquires into new trends in food processing.	• New trends
		  • Food diversification
		  • Value addition
		  • Enrichment
		  • Fortification
		  • Minimal processing
			• Describes food diversification with examples.
			• Explains value addition and enrichment with examples.
			• Performs experiments on the minimal processing.
			• Prepares diversified foods suitable for domestic consumption.
				04

	13.6 Inquires into the standards important in food hygiene and quality control.	• Food hygieniene and quality control
		  • Importance
		  • Standards
		  • System standards
		  • Goods standards
			• Describes the importance of maintaining food hygiene.
			• Explains the importance of quality control of food.
			• Presents information on standards which are important in the food industry.
				03

	13.7 Plans appropriate methodologies for food packaging and labelling.	• Food packaging
		  • Introduction
		  • Importance
		  • Materials used
		• Food labeling
		  • Introduction
		  • Importance
		  • Factors to be considered
			• Defines food packaging.
			• States the importance of food packaging.
			• Names the materials used in food packaging.
			• Selects suitable packaging material for food.
			• Describes the importance of food labeling.
			• Designs a suitable label for the food item.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

14. Investigates pre and postharvest techniques for the high quality harvest.	14.1 Investigates on information on maturity for crop harvest.	• Maturity of crop harvest
		  • Introduction
		  • Factors determined
		  • Physical
		  • Chemical
		  • Time
		• Maturity index
		  • Introduction
		  • Methods of determining
		  • Visual inspection
		  • According to calendar dates
		  • By measuring acidity
			• Describes the determining factors of the maturity of the crop harvest.
			• Defines maturity index of crop harvest.
			• Determines maturity index of crops using various techniques
				06

	14.2 Investigates the information on ripening of fruits.	• Ripening of fruits
		  • Introduction
		• Classification of fruits according to ripening process
		  • Climacteric
		  • Non – climacteric
		• Artificial ripening
		  • Importance
		  • Ripening agents
		  • Methods
		  • Traditional
		  • Modern
			• Classifies fruits according to the ripening process.
			• States importance of artificial fruit ripening.
			• Names the substances used for atificial ripening.
			• Performs experiments on fruit ripening using various methods.
				06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	14.3 Inquires into the reasons for post harvest losses.	• Post harvest losses
		  • Introduction
		  • Different instances of post harvest losses
		  • Harvesting
		  • Collecting
		  • Cleaning
		  • Grading
		  • Storage
		  • Transporting
		  • Packaging
		  • Marketing
		• Reasons
		  • Pre-harvesting factors
		  • Physiological/ Bioligical
		  • Ethylene production
		  • Growth & Development
		  • Transpiration
		  • Environmental factors
		  • Temperature
		  • Relative humidity
		  • Composition of air
		  • Physical factors
		  • Injuries
		• Problems arising
			• Describes pre-harvest factors that contribute to post harvest losses.
			• Describes various stages that occured on the post harvest losses.
			• Describes the reasons for occuring post harvest losses.
			• Describes the problems that occur due to post harvest losses.
			• Takes necessary measures to minimise post harvest losses.
				06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	14.4 Identifies the stages of post havest losses and make plans to minimise them	• Post harvest technology
		  • Introduction
		  • Importance
		• Minimising post harvest losses
		  • Instances
		  • Harvesting
		  • Collecting
		  • Ceaning
		  • Grading
		  • Storage
		  • Transporting
		  • Packaging
		  • Marketing
			• Defines post havest technology.
			• Describes the importance of post havest technology.
			• Explains how each post harvest losses are minimized at the different stages
			• Takes necessary measures to minimize post havest losses
				04

15. Plans methologies of animal husbandry to ensure high qualitative and quantitative yield.	15.1 Inquires into the potential to develop animal husbandry in Sri lanka.	• Farm animals
		  • Introduction
		  • Importance
		  • Potential for the development
		• Zones of animal husbandry
		  • Classification
		  • Importance
			• Describe the importance of animal husbandry.
			• Marks animal husbandry zones on the map of Sri Lanka.
			• States poential to develop animal husbandry in Sri Lanka.
				02

	15.2 Investigates the ways of minimising impact of adverse climatic factors on animal husbandry.	• Impact of adverse climatic factors
		  • Temperature
		  • Temperature zones
		  • Rainfall
		  • Wind
		• Minimisation of adverse impact
			• Describes the impact of adverse climatic factors on animal husbandry.
			• Illustrates the temperature zones that important in animal husbandry by using diagrams,
			• Describe responses of animals for adverse climatic factors.
			• States the remedial actions to increase animal production by minimising adverse climatic factors.
				02

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	15.3 Inquires into the importance of constituents in various animal feed.	• Animal nutrition
		  • Importance
		  • Main feed components and their importance
		  • Protein
		  • Carbohydrates
		  • Lipid
		  • Vitamins
		  • Minerals
		  • Other constituents
		  • Water
		  • Additives
			• States the importance of animal nutrition.
			• States the nutrients in animal feed.
			• Describes the importance of each component in an animal feed.
				02

	15.4 Inquires into the animal feed for proper animal nutrition.	• Farm animal feed
		  • Introductions
		  • Classification
		  • Roughage
		  • Wet
		  • Dry
		  • Concentrates
		  • Plant based
		  • Animal based
			• Classifies animal feed with examples.
			• Compare roughage and concentrates.
			• States main features of roughage and concentrations.
				02

	15.5 Plans the methodologies of roughage conservation for animal nutrition.	• Roughage conservation
		  • Introduction
		  • Importance
		  • Methods
		  • Hay production
		  • Silage production
			• Describes the importance of roughage conservation.
			• Explains principles of hay and silage production.
			• Performs experiments on preparation of roughage.
				03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	15.6 Inquires into the anatomy and the physiology of the digestive systems of farm animals.	• Digestive system • Introduction • Structure and physiology • Ruminant • Non-ruminant	• Draws diagrams of the digestive system of cattle and poultry. • Describe the physiology of digestive systems of cattle and poultry : Identifies the parts of digestive systems of cattle and poultry by using live specimens.	06
	15.7 Plans appropriate methodologies of animal husbandry by selecting suitable cattle breeds.	• Cattle breeds • External features • Suitable breeds for different agro-eco logical zones. • Cattle rearing methods • Extensive • Semi-intensive • Intensive • Cattle sheds • Importance • Types	• Compares external features of different cattle breeds. • Selects suitable breeds for different agro ecological zones in Sri lanka. • Explains cattle rearing methods. • Describes the different types of cattle barns. • Describes the importance of cattle sheds.	04
	15.8 Exhibits the readiness to follow the appropriate practices of handling calves.	• Management practices of calves • Growth stages and husbandry practices. • Until first 2 weeks • Until weaning • Special management practices	• States the different growth stages of a calf. • Explains the practices to be followed after the birth of new born calf. • Describes the process of weaning calves. • Explain the special management practices followed for calves.	03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	15.9 Investigates how to get a sucessfull pregnancy of a cow.	• The reproductive system of a cow
		  • Structure
		  • Function
		  • Heat cycle
		  • Introduction
		  • Stages
		  • Affecting hormones
		  • Getting a cow pregnant
		  • Insemination
			• Draws and labels a diagram of the reproductive system of the cow.
			• Describes the functions of the reproductive system of a cow.
			• Explains the heat cycle of a cow.
			• Identifies heat detection of a cow.
			• Explains how to get a cow pregnant.
				04

	15.10 Inquires into management of pregnant cow.	• Management practices of pregnant cows
		  • Feeding
		  • Paturition of a cow.
			• Describes the feeding practices of a pregnant cow.
			• Lists out the paturition signs.
			• Explains how to arrange the place and the cow for parturition.
				02

	15.11 Plans the methods of upgrading animals to increase production.	• Breeding of farm animals
		  • Introduction
		  • Importance
		  • Methods
		  • Natural
		  • Controlled
		  • Selection
		  • Inbreeding
		  • Cross breeding
			• Describes the importance of breeding farm animals.
			• States the methods of breeding farm animals.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	15.12 Plans necessary conditions to maintain qualitative milk production.	• Milk
		  • Introduction
		  • Gross composition
		  • Factors affecting on the composition of milk
			• Describes the composition of milk.
			• States the factors affecting on the composition of milk.
				02

	15.13 Investigates the structure and the function of the mammary system of a cow.	• Mammary system of a cow
		  • Introduction
		  • Structure
		  • Function
		  • Secretion
		  • Milk let down
		• Factors affecting on milk yield
			• Illustrates the structure of the mammary system of the cow.
			• Explains the function of mammary system of the cow
			• Explains the processes of milk secreation and milk let down.
			• Describes the factors affecting on milk yield.
				04

	15.14 Inquires into the procedure of high quality milking.	• Hygienic milking
		  • Importance
		  • Procedure
		  • Methods
		  • By hands
		  • By machines
		• Production of quality milk
		  • Introduction
		  • Importance
		  • Identification
			• States the importance of hygienic milking.
			• Describes the methodology to be followed in hygiene milking
			• Describes the procedures of milking.
			• Selects high quality milk by following different methods.
				05

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	15.15 Identifies cattle diseases and plans management process to control them.	• Farm animal diseases
		  • Introduction
		  • Importance
		  • Cattle diseases
		  • Classification
		  • Iinfectious diseases
		  • Bacterial diseases
		  • Mastitis
		  • Hemorrhagic septicemia
		  • Brucellosis
		  • Viral diseases
		  • Foot & mouth disease
		  • Protozoa diseases
		  • Tick fever
		  • Non infectious diseases
		  • Milk fever
		  • Bloating
		  • Animal health management
			• Classifies cattle diseases.
			• Presents information on common cattle diseases.
			• Identifies cattle diseases acccording to symptoms.
			• Describes the practices involed in the control of cattle diseases.
			• Describes the non – infectious diseases that affect on cattle.
			• States the importance of the animal health management.
				04

	15.16 Inquires into poultry management systems and shelters.	• Poultry management
		  • Breeds and strains
		  • Rearing methods
		  • Extensive
		  • Semi intensive
		  • Intensive
		  • Super intensive
			• States the suitable poultry breeds for rearing.
			• Describes the methods of poultry rearing.
			• Presents information on types of poultry houses.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	15.17 Inquires into methods of producing healthy chicks for rearing.	• Rearing of chicks
		  • Management of day-old chicks
		  • Brooding
		  • Natural method
		  • Artificial method
		  • Immunization schedule
			• Explains day-old chick management.
			• Compares natural and artificial brooding methods.
				02

	15.18 Inquires into the suitable management methods for growers.	• Grower management
		  • Providing shelters
		  • Providing feed and water
		  • Other management practices
			• Explains the way of rearing growers	02

	15.19 Inquires into the proper management practices for layer poultry farming.	• Management of layers
		  • Providing shelters
		  • Providing water and feed
		  • Other management practices
		  • Light control
			• Lists the body characteristics of layers.
			• Explains the way of building houses for layers.
			• Presents the information on nutritional requirements of the layers.
				02

	15.20 Inquires into the quality of poultry eggs and hatching.	• Eggs
		  • Structure
		  • Gross composition and nutritional value
		  • Determination of the quality of eggs
		  • External
		  • Internal
		  • Hatching
		  • Introduction
		  • Methods
		  • Natural
		  • Artificial
			• Illustrates the structure of the chicken egg.
			• States the composition and nutritional value of an egg.
			• Determines the quality of eggs.
			• Compares the hatching methods of eggs.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	15.21 Exhibits the readiness for broiler management.	• Broiler management
		  • Types of shelters
		  • Provision of feed and water
		  • Other management practices
			• States the suitable types of shelters for broliers.
			• Explains the practices of feeding and watering for broilers.
				02

	15.22 Plans methoblogies in controlling poultry diseases.	• Poultry diseases
		  • Bacterial diseases
		  • Salmonellosis
		  • Viral diseases
		  • Raniket
		  • Gambora
		  • Bird flue
		  • Protozoa
		  • Coccidiosis
		  • Management of diseases
			• Names the common poultry diseases.
			• Identifies poultry diseases according to symptoms.
			• Describes the practices involved in the control of diseases.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

16. Exhibits readiness to apply principles of economics to improve the productivity in agricultural enterprises.	16.1 Inquires into the efficient management of the factors of production.	• Agricultural economics
		  • Introduction
		  • Importance
		  • Factors of production
		  • Land
		  • Labour
		  • Capital
		  • Entrepreneurship
			• Defines agricultural economics.
			• States the characteristics of the factors of production.
			• Describes the efficient handling of each production factor in the production process.
				03

	16.2 Plans to take decisions according to nature of demand in the Agricultural enterprises	• Utility
		  • Introduction
		• Consumer demand
		  • Introduction
		  • Theory of demand
		  • Demand table
		  • Demand curves
		  • Factors affecting on demand
		  • Shifting of demand curves
		• Nature of demand for agricultural products & services
			• Defines: utility.
			• Defines consumer demand.
			• Names the major factors affecting the demand for a good or services.
			• Explains the relationship between price and demand of goods or services.
			• Illustrates how demand curve shifts as the factors affecting on demand change.
			• Explains the nature of demand for agricultural goods and services.
				06

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	16.3 Plans to take decision according to the nature of supply in the agricultural enterprises.	• Market supply
		  • Introduction
		  • Theory of supply
		  • Supply table
		  • Supply curves
		  • Factors affecting on supply
		  • Shifting of supply curves
		  • Nature of supply for agricultural goods
			• Defines market supply.
			• Names the main factors affecting the supply of goods.
			• Describes the relationship between price & supply of good.
			• Describes the reasons for shifting of the supply curve.
			• Draws shifting of the demand curve as a result of changing factors affecting supply.
			• Describes the nature of supply of agricultural goods.
				08

	16.4 Plans to make decisions in agribusiness by taking account the market condition.	• Determination of the price based on the demand and supply
		  • Market equilibrium
		  • Nature of agricultural market
		  • Factors affecting the market equilibrium
		  • State intervention
		  • Subsidies
		  • Taxes
		  • Price controls
		  • Structure of market
		  • Perfectly competition
		  • Monopoly
		  • Oligopoly
			• Defines market equilibrium.
			• States the characteristics of a perfectly competitive market.
			• Explains how market equilibrium can change based on subsidies, taxes and price control.
			• Classifies the market structures based on market characteristics.
				08

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

	16.5 Displays readiness for minimizing cost in the agricultural enterprises.	• Types of cost of production
		  • Fixed cost
		  • Variable cost
		  • Total cost
		  • Average cost
		  • Marginal cost
			• Defines: cost of production.
			• Draws cost curves.
			• Illustrates the minimum cost of production based on cost curves.
				04

	16.6 Investigates the involvement in production so as to maximize the profit in agricultural activities.	• Production relationships of the agricultural goods
		  • Factor – Product relationship
		  • production curves
		  • Total production
		  • Average production
		  • Marginal production
		  • Production zones
		  • Factor – Factor relationship
		  • Isoquant curve
		  • Product – Product relationship
		  • Production possibility curve
			• Estimates the average and the marginal production in the factor – product relationship.
			• Demarcates the efficient production zone by production zone.
			• Uses iso-quant curves to determine efficient production combinations.
			• Uses production possibility curves to determine the efficient production combinations.
				08

	16.7 Inquires into business opportunities for a small scale agribusiness.	• Opportunities for Agribusiness
		  • Business enviornment
		  • Business ethics
		  • Preparing a business plan for an agri business
		  • Importance
		  • Components of a business plan
		  • Preparing agri business plan
		  • Organization
		  • Direction
		  • Control
			• Explains the nature of business enviornment in small scale agri business.
			• Lists the business resources required to run an agri business effectively.
			• Describes the importance of external and internal ethics related to business.
			• Prepares a project plan for an agribusiness.
				04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	16.8 Investigates the contribution of the supply chain in planning and assessing in agribusiness.	• Value chain analysis • Introduction • Importance • Organisation structure • Actor chain • Activity chain • Marketing • Supportive services • Assessing the efficiency of stage in value chain analysis	• Defines value chain analysis and states the importance of it. • Differentiats the supply chain from value chain. • Explains the process of value chain through flow charts. • Describes the role of supporting services in value chain analysis proces. • Explains the assessing of stages in value chain follow up process.	07
17. Exhibits readiness to engage in the sustainable Agriculture.	17.1 Investigates the necessity and the objectives of the sustainable agriculture.	• Sustainable agriculture • Introduction • Necessity • Objectives • Features • Environmental principles • Process • Benefits	• Defines "Sustainablity " • Explains the necessity and main objecctives of sustainable agriculture. • Lists out the enviornmental principles which are important for sustainable agricultue. • Describes the techniques to be followed for sustainable agriculture. • Describes the benefits of the sustainable agriculture.	04

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
	17.2 Inquires into the methodologies to be followed in sustainable Agriculture through optimal resource management.	• Sustainable resources management • Introduction • Resources • Methodologies • Cropping systems • Rainfed cultivation • Conservative agriculture • Kandyan Forest garden • Agroforestry • Organic farming • Bio-dynamic farming • Cropping patterns • Multiple cropping • Mix cropping • Inter cropping. • Relay cropping. • Crop rotation	• Defines sustainable resources management. • Presents environmental friendly cropping systems and cropping patterns by using layouts. • Lists out advantages and disadvantages of various cropping patterns. • Describes engaging in the sustainable agriculture by minimizing the adverse effects of the enviornmental factors.	15

Competency	Competency Level	Subject Content	Learning Outcomes	Duration

18. Prepares readiness to minimise hazards and health problems in Agriculture sector .	18.1 Inquires into probable hazards in Agriculture.	• Hazards
		  • Physical
		  • Dehydration
		  • Noices and vibrations
		  • Dust
		  • Accidents
		  • Due to agricultural equipment
		  • Serpant Bite
		  • Insect Bite
		  • Poison ingestion
		  • Agro chemicals
		• Minimisation of hazzards
			• Describes the probable physical hazzards in Agriculture.
			• Identifies probable accidents in agriculture.
			• Proposes stratergies to minimise probable hazards in Agriculture.
				03

	18.2 Investigates the information on physical and mental health problems occur in agriculture.	• Health problems
		  • Zoonotic diseases
		  • Brucellosis
		  • Tuberculosis
		  • Leptospirosis
		  • Mental problems
		  • Stress
		  • Undesirable environmental conditions
		  • Legal problems
		  • Financial problems
		• Minimizing health problems
			• Collects information on zoonotic diseases occure in agriculture.
			• Describe mental problems in agriculture sector .
			• Describes stratergies to minimize health problems in agriculture sector .
				03

Competency	Competency Level	Subject Content	Learning Outcomes	Duration
19. Exhibits readiness to plan to overcome challenges faced in agriculture.	19.1 Plans to minimise the negative impact on agricultural activities due to climate changes.	• Climate change • Introduction • Reasons for occurance • Impact on Agriculture • Temperature fluctuation • Rainfall fluctuation • Mitigation the impact	• Explains the reasons for climate change. • Describes the impact of climate change on Agriculture. • Suggests methodologies to minimise the negative impact of climate change .	05
	19.2 Plans to protect pollinating agents important in Agriculture.	• Pollinating agents • Introduction • Importance • Reasons for shortage • Ways to protect pollinating agents	• Describes the importance of pollinating agents in agriculture. • Describes the reasons for shortage of pollinating agents. • Suggests proposals to protect pollinating agents.	02
	19.3 Plans to avoid technology related challanges faced in agriculture.	• Technology related challenges • Introduction • Seed monopoly • Genetically modofied food • Shortage of resources • Minimisation of negative impact	• Describes technology related challenges in agriculture. • Submits suggestions in minimizing the influence of challanges related to technology.	02