AGRICULTURE (CODE NO - 408)

JOB ROLE: Solanaceous Crop Cultivator

QUALIFICATION PACK: Ref. Id. AGR/Q0402

SESSION 2019-2020

Classes IX & X

1. Introduction

Agriculture has been the prime enterprise for the National Economy of this country for centuries and that is why India is called Agrarian country. This sector also provides maximum employment to the people of this country. Agriculture is the production of food and fiber, ever since its advent. It has undergone several paradigm changes. The major landmark in Agriculture happened during 1960s when the country witnessed Green Revolution. Which boosted the crop production. Use of short duration crop varieties, fertilizers, pesticides and agricultural tools and expansion of area under irrigation were important interventions brought in Agriculture. Livestock is an integral part of Agriculture in India. Their by-products are used to build and maintain soil fertility along with plant protection. The animal products such as meat, milk and eggs are the source of nutrients in human diet as well.

Several emerging dimensions of contemporary Agriculture such as organic agriculture and animal husbandry practices are now getting attention. Food processing, value addition and preservation have been the focus of policies formation in recent times which are helpful in minimizing the wastage in Agriculture. This is helping in better income realizing through marketing of value added products. The income from Agriculture can also be increased by associating in subsidiary enterprises such as mushroom production, bio-pesticides, bee-keeping, vermi-culture etc.

2. Course Objectives

The board objectives of teaching Agriculture at Senior Secondary level are:

1. To help the students to comprehended the facts and importance of Agriculture.
2. To expose the students to crop production, animal husbandry, horticulture etc.
3. To familiarize the students with waste management and physical environment in Agriculture.
4. To expose the students to find better income and avenue generating avenue of agriculture and its associated activities.

3. Curriculum

This course is a planned sequence of instructions consisting of Units meant for developing employability and Skills competencies of students of Class IX and X opting for Skill subject along with general education subjects.

Theory	50 marks
Practical	50 marks
Total Marks	**100 marks**

The unit-wise distribution of periods and marks for Class IX is as follows:

CLASS IX (SESSION 2019-2020)				
	Units	**No. of Periods for Theory and Practical 200**		**Max. Marks for Theory and Practical 100**
PART A	**Employability Skills**			
	Unit 1: Communication Skills-I	10		10
	Unit 2: Self-management Skills-I	10		
	Unit 3: Information and Communication Technology Skills-I	10		
	Unit 4: Entrepreneurial Skills-I	15		
	Unit 5: Green Skills-I	05		
	TOTAL	**50**		**10**
PART B	**Skills**	**Theory**	**Practical**	
	Unit 1:Introduction to Horticulture	20	10	40
	Unit 2:Seed selection and seedling production	30	15	
	Unit 3:Soil preparation and transplanting	25	15	
	Unit 4:Nutrient management in vegetable crops	20	15	
	Total	**95**	**55**	**40**
PART C	**Practical Work**			
	Practical Examination			15
	Written Test			10
	Viva Voce			10
	Total			**35**
PART D	**Project Work/Field Visit**			
	Practical File/Student Portfolio			10
	Viva Voce			05
	Total			**15**
	GRAND TOTAL			**100**

The unit-wise distribution of periods and marks for Class X is as follows:

CLASS X (SESSION 2019-2020)				
Units		**No. of Periods for Theory and Practical 200**		**Max. Marks for Theory and Practical 100**
PART A	**Employability Skills**			
	Unit 1: Communication Skills-II	10		10
	Unit 2: Self-management Skills-II	10		
	Unit 3: Information and Communication Technology Skills-II	10		
	Unit 4: Entrepreneurial Skills-II	15		
	Unit 5: Green Skills-II	05		
	Total	**50**		**10**
PART B	**Skills**	**Theory Periods**	**Practical Periods**	
	Unit 1: Agricultural production and management	30	10	07
	Unit 2:Production and management of horticultural crops	25	08	07
	Unit 3:Animal husbandry and dairying	10	08	05
	Unit 4:Post production handling, packaging and processing of animal products	15	08	07
	Unit 5:Seed production and nursery management	10	08	07
	Unit 6:Entrepreneurial skill development	10	08	07
	Total	**100**	**50**	**40**
PART C	**Practical Work**			
	Practical Examination			15
	Written Test			10
	Viva Voce			10
PART D	**Project Work/Field Visit**			
	Practical File/Student Portfolio			10
	Viva Voce			05
	GRAND TOTAL			**100**

4. CONTENTS

CLASS IX (SESSION 2019-2020)

Part A: Employability Skills

	UNITS
1.	Communication Skills – I
2.	Self-management Skills – I
3.	Information and Communication Technology Skills-I
4.	Entrepreneurial Skills – I
5.	Green Skills – I
	Detailed curriculum of Employability Skills is available separately

Part B: Skills

	UNITS
1	Introduction to Horticulture
2	Seed Selection and Seedling Production
3	Soil Preparation and Transplanting
4	Nutrient Management in Vegetable Crops

Unit 1: INTRODUCTION TO HORTICULTURE		
Learning Outcome	**Theory**	**Practical**
1. Describe the present status and prospects of Horticulture in India	1. Define Horticulture 2. Importance of horticulture in daily life 3. Prospects of Horticulture in India	1. Enlist the major horticultural crops in India and your locality
2. Classify and categorize horticulture crops	1. Branches of horticulture 2. Different horticultural crops and their major growing regions in India	1. Draw a diagram depicting the classification of horticultural crops
3. Carry out important horticultural operations	1. Horticultural operations viz. training, pruning and transplanting	1. Visit to a nursery/ Horticulture farm for Demonstration of pruning, Training and transplanting of seedlings 2. Practice of pruning

4. Describe olericulture and importance of vegetable in human diet	1. Olericulture 2. Importance of vegetable in human Diet	1. Demonstrate the availability of nutrients through vegetables using charts/pictures

UNIT: SEED SELECTION AND SEEDLING PRODUCTION		
Learning Outcome	**Theory**	**Practical**
1. Select the seed & procurement of seed	1. Various characteristics of seed with their suitability to the location 2. Characteristics of healthy varieties 3. Demand of various varieties in the market	1. Identify various and appropriate variety (including hybrid) of Solanaceous crops 2. Identify various vendors / suppliers (including government nurseries /department) of the seed that are certified 3. Procure seeds in appropriate quantity 4. Identify market rates for Solanaceous crop seeds (such as tomato, capsicum,)
2. Prepare seed bed	1. Preparing the site for seed bed 2. Soil sterilization – solarisation and chemical treatment 3. Seed treatment techniques with chemicals	1. Demonstration of the procedure of preparation of various types of seed beds – raised, sunken, level
3. Plant seeds on a seed bed or containers	1. Factors affecting seed germination – seed viability, seed pests and diseases, etc. 2. Factors to be considered while planting seeds on seed bed and polybags/ trays – time, depth, etc.	1. Estimating how much seed is required to grow a given number of area for each crop 2. Planting seeds in the poly bags/trays to aid in the cultivation of Solanaceous crops 3. Counting the number of seeds that have germinated so as to assess mortality rate
4. Manage nursery for Solanaceous crops cultivation	1. Advantages and disadvantages of soil nursery or tray method 2. Depth and spacing of planting seedlings in case of soil nursery	1. Identify soil nursery or tray method for growing seedlings 2. Plant the seed at correct depth and appropriate spacing

	&tray for Solanaceous crops	3.Water the seedling at appropriate time with appropriate method

UNIT 3: SOIL PREPARATION AND TRANSPLANTING		
Learning Outcome	**Theory**	**Practical**
1. Prepare Soil for transplanting	1. Importance of Soil testing 2. Various authorized centers of soil testing 3. Level of soil tillage including depth of ploughing and appropriate equipments for plugging 4. Distance between ridges and furrows 5. Requirement of farm yard manure and fertilizer in appropriate quantity	1. Enlist the authorised soil testing centres in your state. 2. Prepare the land with ridges and furrows 3. Application of farm yard manure and fertilizers
2. Apply transplanting of the seedlings	1. Appropriate time for planting by taking in to account of soil, climatic conditions 2. Planting equipments (shovel or trowel) 3. Spacing between rows and plants 4. Advantages and disadvantages of intercropping and types of plant to be intercropped 5. Advantages of crop rotation	1. Demonstration Transplanting of seedling at appropriate stage and spacing

UNIT 4: NUTRIENT MANAGEMENT IN VEGETABLE CROPS		
Learning Outcome	**Theory**	**Practical**
1. Describe the Macro & micronutrients in soil and its testing	1. Elements/components under macro & micro nutrients 2. Function of each macro & micro nutrient 3. Advantages & disadvantages of particular macro & micro nutrients	1. Understand the basic macro & micro nutrients with their functions 2. Undertake testing of soil to determine its nutrient and fertilizer needs from authorized laboratory 3. Collect soil testing report
2. Apply manures, fertilizers and biofertilizers	1. Types of organic manures (farm yard manure, compost, green manure, vermicompost), fertilizers and biofertilizers 2. Methods of application of manures, fertilizers and biofertilizers 3. Time of application of manures, fertilizers and biofertilizers	1. Visit to a Vegetable farm for applying manures and fertilizers as per the recommended dose to various vegetables

CLASS X (SESSION 2019-2020)

Part A - Employability Skills

	UNITS
1.	Communication Skills – II
2.	Self-management Skills – II
3.	Information and Communication Technology Skills – II
4.	Entrepreneurial Skills – II
5.	Green Skills – II
	Detailed curriculum of Employability Skills is available separately

Part B–Skills

Units
Unit 1: **Agricultural Production and Management**
Unit 2: **Production and management of horticultural crops**
Unit 3: **Animal Husbandry & Dairying**
Unit 4: **Post production handling, packaging and processing of animal products**
Unit 5: **Seed Production and Nursery management**
Unit 6: **Entrepreneurial skill development**

	UNIT 1: AGRICULTURAL PRODUCTION AND MANAGEMENT
1.	Brief Crop Production practices:
2.	Cereals- rice, wheat and maize.
3.	Pulses- chick pea, pigeon pea, pea, lentil, urd, moong and soybean.
4.	Oilseed- mustard, groundnut and sunflower.
5.	fodder &fibre crops- berseem, cotton, jute and mesta.
6.	Commercial crop- Sugarcane, tea, coffee.)

	UNITS 2 : PRODUCTION AND MANAGEMENT OF HORTICULTURAL CROPS
1.	Fruits-mango, banana, guava, citrus, grapes, pomegranate, apple, cashew, coconut and areca nut.
2.	Vegetable- potato, cauliflower, cabbage, tomato, brinjal, chilli, bhindi, cucurbits, pea,.
3.	Flower-Rose, tube rose, marigold.
4.	Spices- turmeric, coriander, cumin, black pepper.
5.	Note: Selected crops may be taken Crop Protection i). Common Pests, disease and management practices ii). Pesticides
6.	Post-Harvest handling of important agricultural produce.

	UNITS 3 : ANIMAL HUSBANDRY & DAIRYING
1.	Nutrition and maintenance of livestock. Breeding and care of farm animals.
2.	Uses of livestock products and by-products.
3.	Vaccination schedule of common farm animals and poultry
4.	Important diseases of farm animals and their control

	UNITS 4 : POST PRODUCTION HANDLING, PACKAGING AND PROCESSING OF ANIMAL PRODUCTS
1.	Handling of raw milk, pasteurization and packaging of heat processed milk.
2.	Common milk products : Paneer, Dahi, cheese, khoya, srikhand, butter, ghee, ice cream, milk powder, Chnna and Khoya based products,
3.	Meat & meat products: chicken and mutton

	UNITS 5 : SEED PRODUCTION AND NURSERY MANAGEMENT
1.	Common principles of pollination and fertilization in crops. Self and cross pollinated crops, Definition of pure lines, inbred, hybrids, composites and synthetics.
2.	Nursery bed preparation, treatment of nursery soil, seed treatment, seed sowing, care of seedlings in nursery, common nursery structures.

	UNITS 6 : ENTREPRENEURIAL SKILL DEVELOPMENT
1.	Apiculture
2.	Lac culture
3.	Sericulture
4.	Pisciculture
5.	Mushroom culture
6.	Biogas, fertilizers and sanitation
7.	Processing of Horticultural Produce
8.	Terrarium preparation
9.	Ornamental fish culture

5. TEACHING ACTIVITIES

The teaching and training activities have to be conducted in classroom, laboratory/ workshops and field visits. Students should be taken to field visits for interaction with experts and to expose them to the various tools, equipment, materials, procedures and operations in the workplace. Special emphasis should be laid on the occupational safety, health and hygiene during the training and field visits.

CLASSROOM ACTIVITIES

Classroom activities are an integral part of this course and interactive lecture sessions, followed by discussions should be conducted by trained teachers. Teachers should make effective use of a variety of instructional or teaching aids, such as audio-video materials, colour slides, charts, diagrams, models, exhibits, hand-outs, online teaching materials, etc. to transmit knowledge and impart training to the students.

PRACTICAL WORK IN LABORATORY/WORKSHOP

Practical work may include but not limited to hands-on-training, simulated training, role play, case based studies, exercises, etc. Equipment and supplies should be provided to enhance hands-on learning experience of students. Only trained personnel should teach specialized techniques. A training plan that reflects tools, equipment, materials, skills and activities to be performed by the students should be submitted by the teacher to the Head of the Institution.

SKILL ASSESSMENT (PRACTICAL)

Assessment of skills by the students should be done by the assessors/examiners on the basis of practical demonstration of skills by the candidate, Practical examination allows candidates to demonstrate that they have the knowledge and understanding of performing a task. This will include

hands-on practical exam and viva voce. For practical, there should be a team of two evaluators. The same team of examiners will conduct the viva voce.

Project Work (individual or group project) is a great way to assess the practical skills on a certain time period or timeline. Project work should be given on the basis of the capability of the individual to perform the tasks or activities involved in the project. Projects should be discussed in the class and the teacher should periodically monitor the progress of the project and provide feedback for improvement and innovation. Field visits should be organised as part of the project work. Field visits can be followed by a small-group work/project work. When the class returns from the field visit, each group might be asked to use the information that they have gathered to prepare presentations or reports of their observations. Project work should be assessed on the basis of practical file or student portfolio.

Student Portfolio is a compilation of documents that supports the candidate's claim of competence. Documents may include reports, articles, photos of products prepared by students in relation to the unit of competency.

Viva voce allows candidates to demonstrate communication skills and content knowledge. Audio or video recording can be done at the time of viva voce. The number of external examiners would be decided as per the existing norms of the Board and these norms should be suitably adopted/adapted as per the specific requirements of the subject. Viva voce should also be conducted to obtain feedback on the student's experiences and learning during the project work/field visits.

6. ORGANISATION OF FIELD VISITS

In a year, at least 3 field visits/educational tours should be organised for the students to expose them to the activities in the workplace.

Visit a Vegetable Farm and observe the following: Location, Site, Office building, Store, Pot yard, Packing Yard, Seed bed, Nursery bed, Water tank/Tube well, Gate and fencing. During the visit, students should obtain the following information from the owner or the supervisor of the Vegetable Farm:

1. Area under Cultivation and its layout
2. Types of vegetable raised
3. Name of varieties grown
4. Number of crops raised annually
5. Total production of particular vegetable grown annually
6. Sale procedure
7. Manpower engaged
8. Total expenditure of growing vegetables
9. Total annual income
10. Profit/Loss (Annual)
11. Any other information

7. LIST OF EQUIPMENT AND MATERIAL

The list given below is suggestive and an exhaustive list should be prepared by the Skills teacher. Only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

1. Farmyard Manure
2. Fertilizers
3. Garden Hand Tools
4. Garden Hoes
5. Garden Knife
6. Garden Rake
7. Garden/Digging Fork
8. Garden/Digging Spade
9. Hand Screens/Sieves
10. Hoe
11. Hori Hori Knife
12. Knapsack Sprayer
13. Leaf Rake
14. Long Handle Hoes
15. Loppers or Pruning Saw
16. Plastics Baskets
17. Poly bags (different sizes)
18. Plug trays
19. Pruners
20. Rabbiting Spade
21. Sanitizers
22. Secateurs
23. Seed Cleaner
24. Seed Treating Equipment
25. Shovels and Specialty Spades
26. Soil Scoop
27. Sprinkler Irrigation Unit
28. Drip Irrigation Unit
29. Dutch Hand Hoe
30. Trowels
31. Vermicompost
32. Water Hose
33. Watering Can
34. Wheelbarrow or Garden Car