

13. AGRICULTURE (Code No. 068)

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 marketin 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.

Objectives:

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

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

CLASS XI (2017-18)
(THEORY)

One Theory Paper

70 Marks

Unit wise Weightage

Time: 3 Hours

Section	Units	No. of periods	Marks
I.	Agriculture and Crop Production		
Part A	<ul style="list-style-type: none"> • Unit: I: Scope and Importance • Unit: II: Physical Environment • Unit: III: Agriculture Economics and Crop Production 	5 40 40	30
Part B	Genetics and Plant Breeding <ul style="list-style-type: none"> • Unit: IV Genetics and Plant Breeding 	30	15
II	Livestock Production <ul style="list-style-type: none"> • Unit V: Scope and Importance • Unit VI: Care and Management • Unit VII: Bio-waste Management and Government Schemes 	10 40 05	25
III	Practical	50	30
	Total	220	100

SECTION - I

PART A - AGRICULTURE AND CROP PRODUCTION:

Total Periods -85

Unit I: Scope and Importance:

05 Periods

- Definition of Agriculture, its branches
- Scope in the national economy and employment

Unit II: Physical Environment:

40 Periods

1. Climate and Weather, elements of Weather: Rainfall, Temperature, Humidity, Wind, Sunshine, Climate Change and Global warming. Introduction to various meteorological equipments.
2. Soil, Soil texture and structure and its types, distribution and area.
3. Soil erosion and Soil conservation. Reclamation of problematic soils acidic and alkali.
4. Tillage definition and types. Concept of conservation and tillage.

Unit III: Agriculture Economics and Crop Production

40 Periods

1. Agricultural Economics, Cooperative system in Agriculture, Crop insurance. Kisan Credit Cards. Marketing of Agricultural products (supply chain, retailing, wholesale), haats.
2. Package of practices in field crops like important varieties, seed rate, sowing time, intercropping operations, yield and marketing for Rice, Wheat, Maize, Mustard, Sunflower, Soyabean, Groundnut, Black gram, Red gram, Pea, Jute, Sugarcane, Sorghum, Pearl millet and Finger millet.

3. Package of practices of fruits: Mango, Banana, Guava, Lime, Grape, Apple, Pomegranate. Vegetables: Potato, Tomato, Cauliflower, Cabbage, Spinach, Brinjal, Bottle gourd, Pumpkin, Cucumber. Flower- Rose, Gladiolus, Marigold.
4. Types of seed-foundation and certified and methods of plant propagation - Layering and Cutting, and Tissue culture.
5. Important farm implements and their general maintenance.

PART B - GENETICS AND PLANT BREEDING

30 Periods

Unit IV: Genetics and Plant Breeding

1. Cell and its structure, cell division-Mitosis and Meiosis and their significance in plant growth and development.
2. Introduction to -DNA, RNA, and their differences.
3. Role of Genetics in Plant breeding, self and cross-pollinated crops, methods of breeding in field crops-introduction, Selection, Hybridization, Mutation.
4. Mendel's laws of Inheritance. Illustrative depiction of the Mendel's experiments, their importance in plant breeding.

SECTION - II: Livestock Production

Total Periods: 55

Unit V: Scope and Importance

10 Periods

- (a) Importance of livestock in Agriculture, National Economy and Nutritional security
- (b) Important animal based food products and their role in our diet.
- (c) Important indigenous and exotic breeds of cattle, buffalo and poultry, and quantitative and qualitative production details of produces (milk, meat and eggs)
- (d) Concept of Anand pattern of cooperative system of milk procurement and pricing of milk. Marketing of milk in India.

Unit VI: Care and Management

40 Periods

- (a) Animal body structure and functions.
- (b) Concept of grazing and stall feeding including poultry feeding.
- (c) Principles of feeding, feeding practices; Important fodder crops; Silage and Hay preparation; Balanced ratio-definition and ingredients.
- (d) Housing of dairy animals and poultry animals.
- (e) Management of calves, bullocks, pregnant and milch animals as well as chicks and layers.
- (f) Production of milk and eggs.
- (g) Systems of milking by hand and by machine. Important considerations in both these methods.
- (h) Concept of clean milk production processing, pasteurization and packaging and milk. Value added products from milk.
- (i) Principles of disease management and vaccination.
- (i) Signs of sick animals, symptoms of common diseases in cattle and poultry-Rinderpest, Black quarter, Foot and Mouth, Mastitis, Haemorrhagic Septicaemia, Solmonellosis, bird flu, Fowl Pox and Ranikhet disease, their prevention and control.

Unit VII: Bio-Waste Management and Government Schemes**05 Periods**

- (a) Utilization of animals in Bio-wastes and Biogas plant
- (b) Important government schemes for development of livestock dairy and poultry in India. Their important features and eligibility criteria.

**AGRICULTURE (Code No. 068)
CLASS XI (PRACTICAL) 2017-18**

One Paper**30 marks****Unit wise weightage****Time: 3 hours**

Section	Units	No. of periods	Marks
I	Part A-Agriculture and Crop Production	30	12
	Part B- Genetics, Plant Breeding and Microbiology	--	--
II	Livestock practical	20	08
	Reports of the visit		05
	Viva voce		05
	Total	50	30

SECTION - I**Part A - Agriculture and Crop Production****1. Agriculture and Crop Production - Practical**

- (a) Visit to a crop field. Identify different crops growing in the field and make a report.
- (b) Identification of farm implements used for different operations, draw a design of atleast 5 implements and make a report.
- (c) Identification of seeds of different crops.
- (d) Seed germination test. (two cereals , two pulses, two vegetables, two flowers)
- (e) Calculation of cost of production of wheat crop in one hectare of land area & prepare a report.
- (f) Visit to an orchard and identify different fruit crops and make a report.
- (g) Identification of important vegetable crops, prepare a report.
- (h) Identification of important flower crops.
- (i) Orchard layout, digging of pits and planting of sapling of any one fruit crop.
- (j) Land preparation and sowing of wheat crop seed in the bed.

SECTION - II

2. Livestock - Practical

- (a) Identification of body parts of dairy animals and Poultry.
- (b) Identification of common breeds of cows, buffaloes and poultry birds.
- (c) Handling and restraining of animals.
- (d) Testing of milk fat and SNF.
- (e) Visit to a local veterinary hospital and observe the condition of a sick animal and prepare a report.
- (f) Compute ration for an animal and poultry and prepare a report.
- (g) Visit to milk processing plant and on outlet a milk & milk products centre. Record the processing & sale of variety in milk based products.
- (h) Identification of feeds, fodder crops and grasses.
- (i) Visit to Biogas plant.

3. Report on the Visits

1. The student have to prepare a report of their visit to different organizations and submit to the subject teacher for the evaluation. The report must contain the student's original work and observations.
2. Prepare Herbarium of different crops and weed species. The leaves of the crops and weeds are pressed dried and mounted on the Herbarium sheet.

4. Viva Voce

Students can be asked questions based on:

- (i) Identification of objects
- (ii) Visit Report analysis.
- (iii) Experiences in their field visits, etc.

A range of 5 to 10 questions can be asked depending on the response of the student. Evaluation 5x1=5
Or should be based on number of questions answered. Evaluator should stick to the time and $\frac{1}{2}$ x10=5 number of questions.

AGRICULTURE (Code No. 068) CLASS XII (THEORY) 2017-18

One Theory Paper

70+30=100 Marks

Unit Wise Weightage

Time: 3 hours

SECTION		Periods	Marks
I	Advanced Crop Production and Organic Farming Unit - I Advanced Crop Production Unit - II Organic Farming	42 24	25

II	Post-Harvest Management , Food Processing and Value Addition		
	Unit III: Post-Harvest Management	12	25
	Unit IV: Food Processing and Value Addition	52	
III	Subsidiary Enterprises of Agriculture		
	Unit V: Subsidiary Enterprises in Agriculture	40	20
	Practical	50	30
	Total	220	100

SECTION - I

Total periods - 66

Unit- I: Advance Crop Production

42 Periods

- Food production including horticultural crops and its importance in the economy and nutritional security.
- Soil fertility, productivity and concept of essential plant nutrients. Classification of essential plant nutrients.
- Roles and functions of essential plant nutrients, their important deficiency symptoms.
- Soil samplings and its processing. Introduction to soil pH and Organic Carbon.
- Introduction to manure, fertilizers, Bio-fertilizers, their methods of application. Concept of Integrated Nutrient Management (INM).
- Concept of soil moisture availability various irrigation methods. Concept of precision and pressure irrigation - Drip and sprinkler irrigation.
- Methods of insect pest and disease management - Chemical, Biological and Mechanical. Concept of Integrated Pest Management (IPM).

Unit - II: Organic Farming

24 Periods

- Concept, history and importance of Organic farming.
- Present status and contribution in the National economy.
- Important food products grown organically. Important Government Schemes for the promotion of organic farming in our country. Kitchen gardening.

SECTION-II

Total periods -64

Unit III: Post Harvest Management

12 Periods

- Post harvesting management of fruits, vegetables and flowers, cereals, pulses and oilseeds. Status of food processing in our country.
- Important Government schemes for food sector.

Unit IV: Food Processing and Value Addition

52 Periods

- Principles and methods of food processing and preservation. Benefits of food processing.
- Important value added products from fruits, vegetables, cereals, pulses and oil seeds. Preparation of jam, jelly, ketchup, morabba, pickles, marmalade.

- Packaging, quality standards and their marketing including export.
- Flowers and their harvesting: important processed flower products, packaging, storage and their marketing.
- Concept of safe food and important food regulations.

SECTION-III

Total Periods - 40

Unit V: Subsidiary Enterprises in Agriculture

- Important subsidiary enterprises based on Agriculture including Horticulture and their importance in the socio-economic status of an individual.
- Mushroom, their nutritional status and methods of production
- Beekeeping and its important usage and importance of Honey, Wax and Royal jelly.
- Landscaping, development and maintenance of lawns and avenue gardens.
- Preparation of Bio-pesticides (plant based), Organic manures (composts) and Vermicomposting.
- Setting up nurseries and marketing of plant sapling and important Govt. Schemes for the support of these enterprises.

AGRICULTURE (Code No. 068) CLASS XII (PRACTICAL) 2017-18

One Practical Paper

30 Marks
Time: 3 Hours

Unit Wise Weightage

(Periods 50)

Section		Periods	Marks
I	Advance Crop Production and Organic Farming	22	08
II	Post-Harvest Management, Food Processing and Value Addition	14	06
III	Subsidiary Enterprises in Agriculture	14	06
IV	Collection and Visit Report		05
V	Viva Voce		05
	Total	50	30

SECTION: I

Unit I: Advance Crop Production and Organic Farming

22 Periods

- Soil sampling and determination of Soil pH.
- Determination of soil organic carbon content.
- Preparation of nursery and seed beds.
- Seed treatment with fungicides and Bio-fertilizers.

- (e) Identification of different types of chemical fertilizers, composts, bio-fertilizers.
- (f) Calculation of fertilizer requirement of crops (for wheat, rice and maize) based on their nutrient needs.
- (g) Preparation of FYM and Compost.
- (h) Uses of sprayers and dusters for pest control and nutrient spray.
- (i) Determination of moisture content of crop seeds (wheat, rice, maize and mustard).
- (j) To find out 100-grain weight of crop seeds (wheat, rice, maize and mustard).
- (k) Visit to a crop field and compare healthy plant with a diseased and insect affected plant.
- (l) Identification of different types of Insecticides, Fungicides and Herbicides.

SECTION: II

Unit II: Post-Harvest Management , Food Processing and Value Addition

14 Periods

- (a) Visit to Bakery Unit, Local Chakki.
- (b) Preparation of Jam, Jelly, ketchup and Morabba
- (c) Drying of fruits, vegetables and flowers.
- (b) Preparation of pickles.
- (c) Identification of fresh and aged vegetables and fruits.
- (d) Visit to cold storage and record the storage of various fruits and vegetables.
- (e) Harvesting and packaging of flowers.
- (f) Preparation of flower arrangements such as garland and rangoli.
- (g) Visit to a flower mandi and record the activities in the mandi.
- (h) Visit to a local fruit market and record the activities in the market.

SECTION: III

Unit III: Subsidiary Enterprises in Agriculture

14 Periods

- (a) Preparation of plant based bio-pesticides (neem)
- (b) Visit to Mushroom production unit.
- (c) Visit to nearby apiary and record the process of beekeeping.
- (d) Observe the characteristics of different bee products (honey and wax).
- (e) Visit to a vermicomposting unit.
- (f) Observe the characteristics of compost.

Notes:

1. The students have to prepare a report on the visits recording their observations on the subject.
2. In case of practical of fruit and vegetable preservation and methods of production of value added products from fruits and vegetables, the student will have to write the procedure adopted and the necessary precautions to be taken in the answer sheet provided.

SECTION - IV

Report on the Visits

The student have to prepare a report of their visit to different organizations and submit to Subject teacher for the evaluation. The report must contain the student's original work and observations.

SECTION - V

Viva Voce

Students can be asked questions based on:

- (i) Identification of objects.
- (ii) Visit Report analysis.
- (iii) Experiences in their field visits, etc.

A range of 5 to 10 questions can be asked depending on the response of the student. Evaluation $5 \times 1 = 5$ Or should be based on number of questions answered. Evaluator should stick to the time and $\frac{1}{2} \times 10 = 5$ number of questions.

AGRICULTURE (Theory) (Code No. 068)
DESIGN OF THE QUESTION PAPER
CLASS - XI 2017-18, CLASS -XII 2017-18

Time: 3 hrs.

Marks: 70

S. No.	Typology of Questions	Learning Outcomes & Testing Skills	Very Short Answer - 1 Mark	Short Answer-I 2 Marks	Short Answer-2 3 Marks	Long Answer 5 marks	Marks	%
1	Remembering- (Knowledge based Simple recall questions, to know specific facts, terms, concepts, principles, or theories, Identify, define, or recite, information); Map skill based questions (Identification, location)	<ul style="list-style-type: none"> ● Reasoning ● Analytical Skills 	3	1	1	1	13	19%
2	Understanding- (Comprehension -to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase information)		3	1	3	2	24	34%
4.	Application (Use abstract information in concrete situation, to apply knowledge to new situations; Use given content to interpret a situation, provide an example, or solve a problem)		2	-	2	2	18	26%
5	High Order Thinking Skills (Analysis & Synthesis- Classify, compare, contrast, or differentiate between different pieces of information; Organize and/or integrate unique pieces of information from a variety of sources)		-	1	1	1	10	14%
6	Evaluation- (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)		1	2	-	-	5	7%
TOTAL			9x1=9	5x2=10	7X3=21	6X5=30	70	100%

Note: No Chapter wise weightage, care should be taken to cover all chapters.