

# WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION

## SYLLABUS FOR CLASSES XI AND XII

### SUBJECT: AGRICULTURE (AGRI)

#### COURSE OVERVIEW

India is a developing nation and Agriculture is unquestionably its foundation. The country is leading in the production of food, fodder, fibre, fuel, fruit, flower, fish, and timber contributing raw materials to several large and small-scale industries. In a nutshell, Agriculture contributes a lion's share to the international trade. The mammoth population of the country is exclusively dependent on Agriculture, either directly or indirectly. Being India's largest private enterprise, it shares 18.8% of the country's GDP (PRS India, 2021). We find a number of triumph tales that transformed the nation from the perception of a "begging bowl" to one that is not only "self-sufficient" in food- grains but also a leading exporter of some Agricultural produces in the trans-boundary markets. In this laborious long voyage, the country has added a number of gems to her crown by impressive revolutions in the Agricultural sector -Green, White, Blue and Yellow; of which the "Green Revolution is considered as the most astounding one at the global level thumping the population growth rate. Despite this glorious progress during the last few decades we can not ignore the grey part of the story as well. Although we have made commendable progress in food supply, 21.9% of our population now lives below the poverty line, and it is really ironical that a large portion of our society, mostly women and children goes to bed every night hungry (Asian Development Bank, 2020). The growth achieved in Agricultural sector has been attributed to the concerted efforts of skilled human resource developed through Agricultural Education System (AES).

Success of a curriculum is rated not only based on development of technologies and knowledge but also on demand and marketability of its product, i.e. student. Agricultural education must ensure employment of these 'products' to make it more relevant to the society and the nation.

There is a great demand and opportunities for Agriculture graduates in government departments and non-governmental organizations, banking & insurance sectors, retailing industry, multi-national companies.

It is estimated that, more than 16000 scientific manpower would be required to cater to the needs of R&D in the country. Meagre production of Agriculture graduates vis-a-vis Masters and Doctorates would not suffice this demand. So, the country along with its States would have to produce ample skilled manpower holding diploma, certificate or any other supporting degrees. This would satisfy the prescribed norm of one Agriculture extension person for every 1,000 population as against current availability of one per 10,000. At present day, there is a huge gap between the demand and supply of manpower in this sector. This data clearly show that the importance of AGRICULTURE in the school level is escalating day by day.

That means sincere efforts are required to attract a greater number of students towards Higher Agricultural Education. There is a vast scope for young graduates to undertake Agriculture as their profession which is directly or indirectly contributing to the economic and social sectors.

Agriculture as a subject at Higher Secondary level can play a crucial role in this context. There is a vast scope for young graduates to undertake Agriculture as their profession which is directly or indirectly contributing to the economic and social domains.

The new syllabus may help to reduce the gap between demand and supply of skilled manpower in this sector.

This course and lessons are designed in such a manner that the students will have both knowledge and skills of Agriculture.

## **COURSE OBJECTIVE**

The course is a planned sequence of instructions consisting of units meant for developing the knowledge as well as skills regarding this course.

- To introduce the students with the new subject of Agriculture. They can understand the importance of Agriculture and other associated occupation related to Agriculture in Indian economy.
- To expose the relationship of crop growth with weather to the students. They will get a clear conception about different Agro climatic regions of West Bengal.
- To familiarize the students with soil and physical, chemical and biological properties of soil.
- To develop familiarity with the basic concept of Genetics and Plant Breeding in Agriculture. They will get basic idea about different selection methods like hybridisation, different types of modern crop varieties.
- To introduce the students with varied cultivation practices including handling of different manures, fertilisers, pesticides, fungicides and herbicides.
- To expose the students to different package of practices (POP) of important Agricultural and horticultural crop along with crop protection. They will get a comprehensive idea about IPM, INM, IDM and IWM.
- To help the students to comprehend the facts and importance of livestock management.
- To develop knowledge about different farming systems, cropping pattern, dry land Agriculture as well as different important schemes and policies related to Agriculture.
- The major objective of practical course is to expose students with first-hand knowledge about different aspects. They will be able to run important machines, solve practical mathematical problems, handle semi-sophisticated tools like pH meter, barometer etc.
- To make the students acquainted with the health and environmental management with special reference to Agricultural systems management.
- This course may enlighten rather steer the students in mining their future occupations / jobs through escalating their skills and knowledge. There remains wide opportunity of selecting entrepreneurship too.

# CLASS - XI

## SEMESTER – I

### SUBJECT: AGRICULTURE (AGRI)

FULL MARKS: 35

CONTACT HOURS: 100 Hours

#### COURSE CODE: THEORY

| UNIT NO.   | TOPICS  | CONTACT HOURS | MARKS |
|--|---|---------------|-------|
| <b>I : An Introduction to Agriculture</b>                                | <ul style="list-style-type: none"><li>▪ Agriculture and Its Different Branches, Relationship of Agriculture with other Disciplines</li><li>▪ Importance of Agriculture in Indian Economy, Green Revolution</li><li>▪ Allied Agriculture (Lac Culture, Apiculture, Sericulture, Pisciculture)–a brief concept, Subsidiary occupation related to Agriculture</li></ul>  | 12            | 09    |
| <b>II : Weather, Climate and Crop Seasons</b>                            | <ul style="list-style-type: none"><li>▪ Weather and Climate– A Brief Concept</li><li>▪ Factors Affecting Weather and Crop Growth (Temperature, Sunshine, Cloud, Rainfall, Humidity, Fog, Frost, Wind and Storm)</li><li>▪ Cropping Seasons</li><li>▪ Broad Classification of Crops According to Use</li><li>▪ Agro-Climatic Regions of West Bengal</li><li>▪ Climate Change, Global Warming, and Its Effect on Agriculture</li></ul>  | 25            | 10    |
| <b>III : Soil and Physical Properties of Soil</b>                        | <ul style="list-style-type: none"><li>▪ Definition of Soil, Components of Soil, Formation of Soil Weathering (Physical, Chemical and Biological), Factors of Soil Formation</li><li>▪ Soil Texture and Soil Structure</li><li>▪ Density of Soil (Bulk Density, Particle Density, Porosity and their Inter-Relationship)</li><li>▪ Soil Profile, Soils of India (Name, Area, Basic Properties)</li><li>▪ Soil Water, Types of Soil Water and their Characteristics, Soil Moisture Conservation, Calculation of Soil Moisture</li></ul> | 25            | 10    |
| <b>IV : Genetics and Plant breeding in Agriculture – An Introduction</b> | <ul style="list-style-type: none"><li>▪ Mendel’s Law of Inheritance</li><li>▪ Concept of Gene, Allele, Mutation</li><li>▪ Role of Genetics in Plant Breeding</li><li>▪ Selection Methods of Plant Breeding (Bulk selection, Pure line selection, Mass selection and Pedigree selection)</li><li>▪ Hybridization and Tissue Culture Technique– Basic Concept</li><li>▪ Crop Varieties- Indigenous, HYV, Hybrid, G.M,</li></ul>   | 18            | 06    |

|  |   |     |  |
|--|---|-----|--|
|  | and Transgenic– only definition with examples |     |  |
|  | <b>Contact Hours</b>                          | 80  |  |
|  | <b>Practical Work</b>                         | 20  |  |
|  | <b>Total Hours</b>                            | 100 |  |

**CLASS - XI**  
**SEMESTER – II**  
**SUBJECT: AGRICULTURE (AGRI)**

**FULL MARKS: 35**

**CONTACT HOURS: 100 HOURS**

**COURSE CODE: THEORY**

| UNIT NO.                                     | TOPICS   | CONTACT HOURS | MARKS |
|--|--|---------------|-------|
| <b>V :<br/>Cultivation<br/>Practices</b>     | <ul style="list-style-type: none"> <li>▪ Tillage (Definition, Objectives, Types)</li> <li>▪ Seeds– Categories of Seeds, Seed Germination, Seed Treatment</li> <li>▪ Land Preparation and Seed Bed Preparation, Sowing, Transplanting and intercultural Operations, Harvesting, Winnowing and Storage</li> <li>▪ Different Kinds of Farm Implements and Their Uses</li> </ul> | 10            | 06    |
| <b>VI : Crop<br/>Production</b>              | <ul style="list-style-type: none"> <li>▪ Package and Practices of Jute, Potato, Onion, Maize, Pulse (Gram), Oil seed(Mustard and Groundnut), Millet (Jowar, Bajra)<br/>Fodder crop(Berseem), Fruits (Papaya, Guava)</li> </ul>   | 25            | 11    |
| <b>VII :<br/>Irrigation<br/>and Drainage</b> | <ul style="list-style-type: none"> <li>▪ Irrigation–Concepts, Sources, Types of Irrigation with Special Emphasis on Micro-Irrigation, Fertigation</li> <li>▪ Water requirement of crops, Irrigation Requirements, Irrigation Efficiency and Scheduling of Irrigation.<br/>Drainage–concept, types and importance.</li> </ul>   | 15            | 09    |
| <b>VIII: Farming<br/>System</b>              | <ul style="list-style-type: none"> <li>▪ Farming System–Concept, Objectives, Components/ Enterprises</li> <li>▪ Mixed Farming, Subsistence Farming, Specialized Farming, Crop Rotation, Mixed Cropping, Inter-Cropping, Relay Cropping, Paira Cropping, Multiple Cropping, Multi-Storied Cropping, Cropping Intensity</li> </ul>   | 20            | 09    |
|  | <b>Contact Hours</b>   | 70            |       |
|  | <b>Practical Work</b>  | 10            |       |
|  | <b>Home Assignment, Remedial and Tutorial Class</b>  | 20            |       |
|  | <b>Total Hours</b>   | 100           |       |

**CLASS: XI**

**SUBJECT: AGRICULTURE (AGRI)**

**COURSE CODE: PRACTICAL**

**GROUP: A (20 Marks)**

1. Measurement and record of temperature, rainfall, air pressure.
2. Determination of soil texture by feel method.
3. Study of a soil profile.
4. Acquaintance with common farm implements and their operation (Country plough, mould board plough, seed drill, sprayer and duster).
5. Determination of Test Weight, Germination Percentage.
6. Preparation of seed bed, sowing of seeds.
7. Seed treatment.
8. Calculation of the seed requirement for a particular crop related to theory syllabus.

**GROUP: B (10 Marks)**

1. Project work related to theory course
2. Practical notebook
3. Viva voce

# CLASS - XII

## SEMESTER – III

### SUBJECT: AGRICULTURE (AGRI)

FULL MARKS: 35

CONTACT HOURS: 100 Hours

#### COURSE CODE: THEORY

| UNIT NO.  | TOPICS  | CONTACT HOURS | MARKS |
|---|---|---------------|-------|
| <b>I : Growth of Crops</b>                          | <ul style="list-style-type: none"><li>• Concept of Growth and Development</li><li>• C3,C4,CAM Plants –in brief</li><li>• Yield Components and Yield Calculation</li></ul>   | 12            | 06    |
| <b>II : Soil Chemical and Biological Properties</b> | <ul style="list-style-type: none"><li>• Different Plant Nutrients and Their Availability to Plants</li><li>• Mobility of Plant Nutrients in Soil and Plant</li><li>• Soil Fertility and Productivity</li><li>• Soil Colloid</li><li>• Soil Reaction</li><li>• Problem of Soil (Acid soil, Saline soil, Alkaline soil)</li><li>• Soil MicroOrganism-Important Bacteria, Algae, Fungi, Actinomycetes ( in brief )</li><li>• Soil Organic Matter, Mineralization and Emmobilization</li><li>• Soil Erosion and Its Control</li></ul>   | 25            | 10    |
| <b>III: Manures and Fertilizers</b>                 | <ul style="list-style-type: none"><li>• Role of Manures and Fertilizers in Crop Production</li><li>• Important Manures and Fertilizers– Compost, Farm Yard Manure (FYM), Green Manure, Vermicompost, Oil Cake, Bone meal, Ammonium Sulphate, Urea, Calcium, Ammonium Nitrate, Super-Phosphate, Potassium Sulphate, Potassium Chloride</li><li>• Mixed Fertilizers - Their Properties and Uses</li><li>• Bio-Fertilizers</li><li>• Application of Fertilizers</li><li>• Law of diminishing return in fertiliser use</li><li>• INM (Integrated Nutrient Management)</li></ul> | 25            | 10    |
| <b>IV: Livestock Management</b>                     | <ul style="list-style-type: none"><li>• Importance of Livestock in Agriculture and Industry, White Revolution in India</li><li>• Important Breeds of Cows, Buffaloes,</li></ul>   | 18            | 09    |

|  |  |     |  |
|--|--|-----|--|
|  | Goats and Poultry in India <ul style="list-style-type: none"> <li>• Signs of Sick Animals, Symptoms of Common Diseases in Cattle and Poultry- Rinderpest, Black Quarter, Foot-and-Mouth, Mastitis, Hemorrhagic Septicemia, Foul Pox, Ranikhet and Bird Flu– Their Control</li> <li>• Artificial Insemination– Brief Concept</li> </ul> |     |  |
|  | <b>Contact Hours</b>   | 80  |  |
|  | <b>Practical Work</b>  | 20  |  |
|  | <b>Total Hours</b>   | 100 |  |

## CLASS - XII

### SEMESTER – IV

#### SUBJECT: AGRICULTURE (AGRI)

**FULL MARKS: 35**

**CONTACT HOURS: 100 Hours**

#### COURSE CODE: THEORY

| UNIT NO.                    | TOPICS   | CONTACT HOURS | MARKS |
|-----------------------------|--|---------------|-------|
| <b>V : Crop Production</b>  | <ul style="list-style-type: none"> <li>▪ Package and Practices – Land Preparation, Time of Sowing, Suitable Varieties, Cultivation Procedures, Manures and Fertilizers Application, Irrigation and Drainage, Intercultural Operations and Yield of Rice, Wheat, Sugarcane, Brinjal, Tomato, Mango and Banana (In tabular form-Cabbage, Cauliflower, Bottle Gourd, Bitter Gourd)</li> </ul>                                       | 20            | 11    |
| <b>VI : Crop Protection</b> | <ul style="list-style-type: none"> <li>▪ Concept of Pests and Pesticides (with Special Reference to Target Pests and Mode of Action – Basic Idea)</li> <li>▪ Concept of IPM, IDM and IWM</li> <li>▪ Control of Different Insects, Diseases and Weeds of Different Crops (Rice, Wheat, Jute, Potato, Sugarcane, Brinjal, Mango, Banana, Mustard, Gram)</li> <li>▪ Control of Rodents</li> <li>▪ Handling of Pesticides</li> </ul> | 20            | 10    |

|  |  |     |    |
|--|--|-----|----|
| <b>VII : Food Processing and Preservation</b>              | <ul style="list-style-type: none"> <li>▪ Principles and Methods of Fruits and Vegetables preservation</li> <li>▪ Preparation of Jelly, Jam, Ketchup, Chips and Their Packing</li> </ul>  | 15  | 07 |
| <b>VIII : Dry land AGNM culture and Important Policies</b> | <ul style="list-style-type: none"> <li>▪ Special Features of Dryland Farming / Rainfed Agriculture</li> <li>▪ Different Important Schemes: Crop Insurance, Kishan Credit Card</li> </ul> | 15  | 07 |
|  | <b>Contact Hours</b>   | 70  | 35 |
|  | <b>Practical Work</b>  | 10  |    |
|  | <b>Home Assignment, Remedial and Tutorial Class</b>  | 20  |    |
|  | <b>Total Hours</b>   | 100 |    |

**CLASS: XII**

**SUBJECT: AGRICULTURE (AGRI)**

**COURSE CODE: PRACTICAL**

**GROUP: A (20 Marks)**

1. Collection of Soil sample and preparation of the soil samples for laboratory experiment.
2. Determination of soil pH by pH meter.
3. Identification of different manures and fertilisers.
4. Preparation of compost pit.
5. Identification of crop seeds (related to syllabus only), different farm weeds, important insect pests and diseases and their damages.
6. Mathematical calculation for the formulation of spraying chemicals.
7. Calculation of yield of different crops by studying yield attributes of crop related to theory portion.
8. Mathematical calculation for the requirement of fertiliser in the crop field.
9. Determination of cropping intensity.
10. Cost of cultivation of different crops related to theory portion.
11. Students practice air layering, budding, inarching and Gooti making.

**GROUP: B (10 Marks)**

1. Project work related to theory course.
2. Practical notebook or laboratory notebook.
3. Viva voce.