BOARD OF SCHOOL EDUCATION HARYANA

Syllabus and Chapter wise division of Marks (2023-24)

Class- 11th Subject: Agriculture Code:

General Instructions:

1. There will be an Annual Examination based on the entire syllabus.
2. The Annual Examination will be of 60 marks, Practical Examination will be of 20 marks and 20 marks weightage shall be for Internal Assessment.
3. For Practical Examination:

   i) Written test of two questions of 5 marks each

   ii) Practical record of 5 marks.

   iii) Viva-voce of 5 marks.

4. For Internal Assessment:

There will be Periodic Assessment that would include:

a) For 6 marks- Three SAT exams will be conducted and will have a weightage of 06 marks towards the final Internal Assessment.
b) For 2 marks- One half yearly exam will be conducted and will have a weightage of 02 marks towards the final Internal Assessment.
c) For 2 marks- Subject teacher will assess and give maximum 02 marks for CRP (Class room participation).
d) For 5 marks- A project work to be done by students and will have a weightage of 05 marks towards the final Internal Assessment.
e) For 5 marks- Attendance of student will be awarded 05 marks as:

Above 75% to 80% - 01 marks
Above 80% to 85% - 02 marks
Above 85% to 90% - 03 marks
Above 90% to 95% - 04 marks
Above 95% to 100%-05 marks

Course structure (2023-24)

Class-11 **Subject: Agriculture** **Code:**

Sr. no.	Chapter	Marks
1	**Agro-meteorology**	06
2	**Genetics**	08
3	**Genetics & Plant Breeding and Plant Biotechnology**	10
4	**Biochemistry**	08
5	**Microbiology**	08
6	**Livestock Science and Management**	20
	Total	60
	Practical Examination	20
	Internal assessment	20
	Grand Total	**100**

Chapter-1: Agro-meteorology

Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

Chapter-2: Genetics

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity, Cell division – mitosis, meiosis, gene interaction. Multiple alleles, pleiotropism and pseudoalleles, Sex determination, Blood group genetics, Linkage and its estimation, crossing over mechanisms, Mutation, Qualitative & Quantitative traits, multiple factor hypothesis, Epistatic interactions with examples. Cytoplasmic inheritance. Nature, structure & replication of genetic material. Transcription and Protein synthesis, Lac and Trp operons.

Chapter-3: Genetics & Plant Breeding and Plant biotechnology

Historical development, concept, nature and role of plant breeding, major achievements and future prospects; apomixes, self – incompatibility and male sterility; Domestication, Acclimatization, introduction; breeding methods in self- pollinated crops-mass and pure line selection, methods of breeding cross pollinated crops, modes of selection; Breeding methods in asexually propagated crops, Polyploidy breeding, mutation breeding-methods and uses; Plant Breeders and & Farmer's Rights.

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; Somaclonal variation and its use in crop improvement; Introduction to recombinant DNA technology; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR.

Chapter-4: Biochemistry

Importance of Biochemistry. Carbohydrate: Importance and classification. Structures of Monosaccharides, Disaccharides and Polysaccharides & their propertie;. Lipid: Importance and classification; Structures and properties of fatty acids; Proteins: Importance of proteins and classification; Structures and zwitterions nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Nucleic acids: Importance and classification; Structure of Nucleotides, Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation.

Chapter-5: Microbiology

Introduction. History of Microbiology; Contribution of Leeuwenhoek, Louis Pasteur, Robert Koch, John Tyndall, Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, Classification of bacteria based on nutritional attributes. Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and sulphur cycles. Biological nitrogen fixation- symbiotic, associative and aysmbiotic. Mycorrhiza. Rhizosphere and phyllosphere. Biofertilizers and Biopesticides.

Chapter-6: Livestock Science and Management

Scope and opportunities in animal husbandry. Role of livestock in Indian economy. Basic information about external and internal organs of livestock animals. Importance of small ruminants in marginal farmer's economy and food security. Care and management of different livestock species including poultry. System of cattle and poultry housing.

Principles of animal nutrition and feeding practices. Balanced ration: definition, importance and ingredient composition. Importance of mineral mixture for different class of livestock species. Management of newly born calves, bullocks and heifers.

Transition animal challenges, care and management. Care and management of pregnant and milch animals. Poultry production in India. Broiler and layer chicken management. Sign and symptoms of important diseases of livestock and poultry and their management.

Reproduction in different livestock animals. Animal breeding: definition, types and importance. Artificial insemination and its role in preventing inbreeding. Important indigenous and exotic breeds of livestock and poultry.

Practical:

1. Visit of Agrometeorological Observatory
2. Exposure of instruments and weather data recording
3. Study of microscope.
4. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross
5. Practice on mitotic and meiotic cell division
6. Study of models on DNA and RNA structure
7. Plant Breeder's kit & Study of germplasm of various crops.
8. Study of floral structure of self-pollinated and cross pollinated crops
9. Study of Sterilization techniques.
10. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium
11. Demonstration on isolation of DNA.
12. Demonstration of gel electrophoresis techniques and DNA finger printing.
13. Preparation of solution, pH & buffers,

14 Qualitative tests of carbohydrates and amino acids.

15. Quantitative estimation of glucose/ proteins.
16. Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides
17. Staining: Simple staining, Gram staining and Negative staining.
18. Practical approach of identification of different species of animals with their external characteristics.
19. Age determination and estimation of body weight in animals.
20. Dehorning, branding, castration and method of restraining.
21. Identification of different feeds and fodder.
22. General information about pregnancy diagnosis in animals.
23. Visit to an ideal dairy and poultry farm.
24. Preparation of a project report.

Month wise syllabus teaching plan (2023-24)

Class- 11th **Subject: Agriculture** **Code:**

Month	Unit chapter and Topic	Teaching period	Revision period	Practical work
April	**Chapter-1: Agro-meteorology** Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture. **Practical:** 1. Visit of Agrometeorological Observatory 2. Exposure of instruments and weather data recording	12 01 02 02 01 03 03	02	03
May	**Chapter-2: Genetics** Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity, Cell division – mitosis, meiosis, gene interaction. Multiple alleles, pleiotropism and pseudoalleles, Sex determination, Blood group genetics, Linkage and its estimation, crossing over mechanisms, Mutation, Qualitative & Quantitative	16 03 03 02	02	

	traits, multiple factor hypothesis, Epistatic interactions with examples. Cytoplasmic inheritance. Nature, structure & replication of genetic material. Transcription and Protein synthesis, Lac and Trp operons. **Practical:** 3. Study of microscope. 4. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross 5. Practice on mitotic and meiotic cell division 6. Study of models on DNA and RNA structure	02 06		05
June	**June Summer Vacations (Project work and Assignments)**			
July	**Chapter-3: Genetics & Plant Breeding and Plant biotechnology** Historical development, concept, nature and role of plant breeding, major achievements and future prospects; apomixes, self – incompatibility and male sterility; Domestication, Acclimatization, introduction; breeding methods in self- pollinated crops-mass and pure line selection, methods of breeding cross pollinated crops, modes of selection; Breeding methods in asexually propagated crops, Polyploidy breeding, mutation breeding-methods and uses; Plant Breeders and & Farmer's Rights. Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; Somaclonal variation and its use in crop improvement; Introduction to recombinant DNA technology; Transgenics and its importance in crop improvement; PCR	24 02 02 08 04 02 06	04	

	techniques and its applications; RFLP, RAPD, SSR. **Practical:** 7. Plant Breeder's kit & Study of germplasm of various crops. 8. Study of floral structure of self pollinated and cross pollinated crops 9. Study of Sterilization techniques. 10. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium 11. Demonstration on isolation of DNA. 12. Demonstration of gel electrophoresis techniques and DNA finger printing.	03		08
August	**Chapter-4: Biochemistry** Importance of Biochemistry. Carbohydrate: Importance and classification. Structures of Monosaccharides, Disaccharides and Polysaccharides & their propertie;. Lipid: Importance and classification; Structures and properties of fatty acids; Proteins: Importance of proteins and classification; Structures and zwitterions nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Nucleic acids: Importance and classification; Structure of Nucleotides, Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation. **Practical:** 13. Preparation of solution, pH & buffers, 14 Qualitative tests of carbohydrates and amino acids. 15. Quantitative estimation of glucose/ proteins.	16 03 02 03 02 02 04	02	06

	16. Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides			
September	**Chapter-5: Microbiology** Introduction. History of Microbiology; Contribution of Leeuwenhoek, Louis Pasteur, Robert Koch, John Tyndall, Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, Classification of bacteria on the basis of nutritional attributes. Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and sulphur cycles. Biological nitrogen fixation-symbiotic, Associative and aysmbiotic. Mycorrhiza. Rhizosphere and phyllosphere. Biofertilizers and Biopesticides. **Practical:** 17. Staining: Simple staining, Gram staining and Negative staining	16 03 02 02 04 05	03	04
October	**Chapter-6: Livestock Science and Management** Scope and opportunities in animal husbandry. Role of livestock in Indian economy. Basic information about external and internal organs of livestock animals. Importance of small ruminants in marginal farmer's economy and food security. Care and management of different livestock species including poultry. System of cattle and poultry housing. **Practical:** 18. Practical approach of identification of different species of animals with their external characteristics.	12	04	03

November	**Chapter-6: Livestock Science and Management** Principles of animal nutrition and feeding practices. Balanced ration: definition, importance and ingredient composition. Importance of mineral mixture for different class of livestock species. Management of newly born calves, bullocks and heifers. **Practical:** 19. Dehorning, branding, castration and method of restraining. 20. Identification of different feeds and fodder.	14	04	03 02
December	**Chapter-6: Livestock Science and Management** Transition animal challenges, care and management. Care and management of pregnant and milch animals. Poultry production in India. Broiler and layer chicken management. Sign and symptoms of important diseases of livestock and poultry and their management. **Practical:** 21. Age determination and estimation of body weight in animals. 22. General information about pregnancy diagnosis in animals.	16	03	02 02
January	**Chapter-6: Livestock Science and Management** Reproduction in different livestock animals. Animal breeding: definition, types and importance. Artificial insemination and its role in preventing	10	02	

	inbreeding. Important indigenous and exotic breeds of livestock and poultry. **Practical:** 23. Visit to an ideal dairy and poultry farm. 24. Preparation of a project report.			02 02
February	Revisions/ preparation of files/ observations and visits etc.			
March	Annual Examination			

Note:

- **Subject teachers are advised to direct the students to prepare notebook of the Terminology/ Definitional words used in the chapters for enhancement of vocabulary or clarity of the concept.**

Question Paper Design (2023-24)

Class- 11th Subject: Agriculture Code:

Type of Question	Marks	Number	Description	Total Marks
Objective type	1	15	6 Multiple Choice Questions, 3 Fill in the Blanks Questions, 3 One Word Answer Type Questions, 3 Assertion Reason Questions	15
Very short answer	2	6	Internal choice will be given In any 2 questions	12
Short answer	3	6	Internal choice will be given in any 2 questions	18
Essay type	5	3	Internal options will be given in all the questions	15
Total		30		60