# School of Agriculture

# Program: B.Sc. (Hons.) Agriculture (Four Years Course)

## 2022-26

## Programme Educational Objective (PEO)
## Programme Outcomes (POs)
## Programme Specific Outcomes (PSOs)
## Course Outcomes (COs)
## and
## Lesson Plans

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RNB GLOBAL UNIVERSITY
Educating stars for tomorrow

# RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road,

Bikaner, Rajasthan 334601

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# Programme Name: B.Sc. (Hons.) Agriculture

## 1. Vision

Vision of School of Agriculture is to be established as advanced studies and research and skill-based centre for students and scholars.

## 2. Mission

Mission of School of Agriculture is to cultivate a scholarly mindset and analytical abilities in students, as well as train them in agricultural sphere, to reach the profession's daunting needs by providing dynamic knowledge in the field of agriculture.

## 3. Program Educational Objectives (PEOs)

After successful completion of the program, the graduates will be

**AGPEO 1:** Able to apply concepts of basic and applied sciences to Agriculture

**AGPEO 2:** Able to design and develop interdisciplinary and innovative systems.

**AGPEO 3:** Able to inculcate effective communication skills, team work, ethics, leadership in preparation for a successful career in agriculture and R&D organizations.

## 4. Program Outcomes (POs)

Students graduating with the B.Sc. (Hons.) Agriculture degree should be able to:

**PO1. Agriculture knowledge**: Apply the knowledge of basic and applied sciences to agriculture, agriculture fundamentals and agriculture specialization to the solution of complex agriculture problems. Apply the knowledge of regenerative agriculture with a conservation and rehabilitation approach to food and farming systems.

**PO2. Problem analysis**: Identify, formulate, review research literature, and analyze complex agriculture problems reaching substantiated conclusions using first principles of basic and applied sciences. Understand rapid appraisal of agricultural innovation systems, a diagnostic tool that can guide the analysis of complex agricultural problems and innovation capacity of the agricultural system towards futuristic agriculture.

**PO3. Design/development of solutions**: Design solutions for complex agriculture problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, social, and environmental considerations.

**PO4. Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5. Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern agriculture and IT tools including prediction and modelling to complex agriculture activities with an understanding of the limitations. Learning use of GIS, IoT, Automation, Intelligent Systems in Farming & Agriculture development & trading.

**PO6. The agriculture graduate and society**: Apply reasoning informed by the contextual knowledge to assess social, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional agriculture practices. Recognize, analyze, and evaluate the critical human and social factors impacting agriculture. Understand the social dimensions of agriculture and its connections with food and environmental systems.

**PO7. Environment and sustainability:** Understand the impact of the professional agriculture solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

**PO8. Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the agriculture practice.

**PO9. Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10. Communication**: Communicate effectively on complex agriculture activities with the agriculture community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11. Project management and finance**: Demonstrate knowledge and understanding of the agriculture and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. Able to design, launch and run a new business, to create job and not to seek for job. Also capable with an effective mix of knowledge, skills, and personal attitudes to be employed initially and function successfully in the required roles.

**PO12. Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## 5. Program Specific Outcomes (PSOs)

At the end of the program, the student will be able to:

**PSO 1**. Clearly understand the concepts and applications in the field of agriculture. Apply the knowledge of crop cultivation, crop improvement, soil and crop management for sustainable organic agricultural production and development.

**PSO 2**. Associate the learning from the courses related to agriculture to arrive at solutions to real world problems. Analyze and identifying complex agricultural problems and formulating ethical solutions using the principles of agricultural science, and business.

**PSO 3**. Have the capability to comprehend the technological advancements in the usage of modern design tools to analyze and design subsystems/processes for a variety of applications. Develop innovative processes, products, and technologies to meet the challenges in agriculture and farming practices

**PSO 4**. Possess the skills to communicate in both oral and written forms, the work already done and the future plans with necessary road maps, demonstrating the practice of professional ethics and the concerns for social and environmental wellbeing.

## Course Outcomes (COs):

| Course | Course outcomes: - After completion of these courses students should be able to |
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| **6.1 Semester – I** | |
| 20023400 Fundamentals of Agronomy | **CO1:** What is agronomy and its scope as well as seed and sowing, Tillage and tilth, Crop density and geometry, and crop nutrition.<br>**CO2:** Outline weeds of different crops and classify weeds<br>**CO3:** Experiment with nutrient use efficiency, soil-plant-water relationship, crop water requirement, water use efficiency.<br>**CO4:** Analyse crop weed competition and function various methods of weed management and categorize herbicides.<br>**CO5:** Assess herbicide selectivity, it's resistance and allelopathy effect. Design crop management technologies in problematic areas, formulate harvesting and threshing of crops. |
| 20023500 Fundamentals of Agronomy Lab | **CO1:** What are crops, seeds, fertilizers, pesticides and tillage implement. What are the agro-climatic zones of India.<br>**CO2:** Classify weeds in crops explain Methods of herbicide and fertilizer application.<br>**CO3:** Model yield contributing characters and yield estimation, experiment with Seed germination and viability test<br>**CO4:** Distinguish the use of tillage implements-reversible plough, One way plough, harrow, leveller, seed drill.<br>**CO5:** Measure field capacity, bulk density and infiltration rate and irrigation water. |
| 20023600 Fundamentals of Soil Science | **CO1:** What is processes and factors of soil formation.<br>**CO2:** Explain Soil Profile, components of soil; Soil physical properties:<br>**CO3:** Identify soil-texture, structure.<br>**CO4:** Classify soils of India.<br>**CO5:** Determine Soil reaction-pH, soil acidity and alkalinity. |
| 20023700 Fundamentals of Soil Science Lab | **CO1:** What is soil sampling tools,<br>**CO2:** Explain collection of soil sample, its processing and storage.<br>**CO3:** Identify soil forming rocks and minerals.<br>**CO4:** Analyse of organic matter content of soil.<br>**CO5:** Determination of soil pH and electrical conductivity. |
| 20026600 Fundamentals of Plant Biochemistry and Biotechnology | **CO1:** Define the chemistry of carbohydrates, lipids, proteins and amino acids<br>**CO2:** Explain the invitro propagation and maintenance.<br>**CO3:** Identify the significance of Biochemistry<br>**CO4:** Determine the classification and structural organization of proteins |

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| | **CO5:** Discuss the importance of plant diversity |
| 20026700 Fundamentals of Plant Biochemistry and Biotechnology Lab | **CO1:** Compare of various tissue culture media and preparation of stock solutions for MS nutrient medium.<br>**CO2:** Interpret the micro-propagation, hardening and acclimatization.<br>**CO3:** Show the gel electrophoresis techniques and DNA finger printing.<br>**CO4:** Develop different concentrated solution and buffers solution.<br>**CO5:** Formulate qualitative tests of carbohydrates, amino acids and protein. |
| 20024000 Introductory Biology | **CO1:** Show the importance of Introductory Biology in agriculture science.<br>**CO2:** Demonstrate internal structure of root, stem and leaf, cell division stages etc.<br>**CO3:** Simplify the knowledge of description of plants-Brassicaceae, Fabaceae and Poaceae<br>**CO4:** Interpret the knowledge of the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics.<br>**CO5:** Elaborate morphology of flowering plants, binomial nomenclature and classification. |
| 20025100 Elementary Mathematics | **CO1:** Find out the definitions about straight lines, Parallel lines, Perpendicular lines and Intercept form of equation of line.<br>**CO2:** Explain the Equation of circle passing through three given points.<br>**CO3:** Make use of Differential Calculus and Integral Calculus in agriculture branch's fields.<br>**CO4:** What about the Matrices and Determinants.<br>**CO5:** Simplify of properties of determinants up to 3rd order and their evaluation of Matrix. |
| 20024100 Fundamentals of Horticulture | **CO1:** Select the basic horticulture, biology, taxonomy, and morphology of fruits and vegetables.<br>**CO2:** Summarize the different methods of propagation and it's use in horticulture.<br>**CO3:** Build the various principles and methods of training, pruning, kitchen gardening, basic principles of orchard establishment and unfruitfulness.<br>**CO4:** Analyse the information related to horticulture as being scientifically based or opinion and contribute to the knowledge based information.<br>**CO5:** Explain the method of seed germination, causes of seed dormancy and breaking method of dormancy breaking. |
| 20024200 Fundamentals of Horticulture Lab | **CO1:** Explain to sexual and asexual methods of propagation including micro-propagation of horticultural crops.<br>**CO2:** Solve the problems about quantity of Fertilizer application in different crops.<br>**CO3:** Build seed bed/nursery bed for different crops.<br>**CO4:** Construct a potting mixture for ornamental crops. |

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| | **CO5:** Why used Training and pruning of fruit trees. |
| 20025500 Rural Sociology and Educational Psychology | **CO1:** How develop communication skill with farmer and easily implement the agricultural policies.<br>**CO2:** Explain the concepts of rural sociology and educational psychology.<br>**CO3:** Develop the personality for professional world, self-assessment, learn rectification and improvement.<br>**CO4:** Discover the evaluative thinking on need of soft skills (self motivation, learning attitude, positive attitude, aspiring thoughts) while improvising one self. Analyzing attitude on rural society, nature and structure of rural society and components of rural society.<br>**CO5:** Perceive the importance of rural sociology and educational psychology in the field of agriculture. |
| 99002200 Business Communication | **CO1:** Explain historical background and the development of communication; Importance and role of communication in everyday life.<br>**CO2:** Understand Mechanics behind the communication process, difficulties experienced in communication. Different types of communication, impedance due to extraneous factors called "barriers"<br>**CO3:** Apply different types of communication, impedance due to extraneous factors called "barriers".<br>**CO4:** Analyse the Important non-verbal parameters in communication. So to make communication effective and attractive.<br>**CO5:** Apply the appropriate body language for making presentation more effective |
| 20001100 Ability and Skill Enhancement - I | **CO1:** Understand the relevance and method of writing impactful and structured resume.<br>**CO2:** Explain the need for right etiquettes to be followed in the professional world.<br>**CO3:** Develop confidence in public speaking and expressing their opinions and ideas clearly and effectively.<br>**CO4:** Build employability skills like critical thinking, team work, conflict management and leadership skills.<br>**CO5:** Communicate effectively in English |
| 99003300-Workshops/ Seminars/ Human Values/ Social Service/ NCC/ NSS | **CO1:** Relate to the concept of cognitive development and Big Five personality characteristics. Explain the basic fundamentals of Emotional Intelligence.<br>**CO2:** Develop ability to practice new problem-solving skills in a group and use these skills in personal life. Build coping strategies and adapt balanced self- determined behaviour.<br>**CO3:** Find about the working and mechanism of human nature. Classify and explain group behavior at organizational level and individual level.<br>**CO4:** Organize and plan organizational change and stress management practices. Discover various human values and their importance in |

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| | real world.<br>**CO5:** Create leadership skills to be effective leader and evaluate the hierarchy of human values. |

## 6.2 Mapping: Semester – I

| 20023400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 |
| CO2 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 |
| CO3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 |
| CO4 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 |
| CO5 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 |

| 20023500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 |
| CO4 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 |
| CO5 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |

| 20023600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |

| 20023700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 2 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 3 | 2 |
| CO4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |

| 20026600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | 2 | 3 | 2 | 2 | 3 | 2 | 2 | | 2 | 2 | 2 |
| CO2 | 2 | | 2 | | 2 | 2 | 3 | 2 | 2 | 1 | 3 | 2 |
| CO3 | 2 | 2 | 2 | 2 | 3 | 1 | | 2 | | 3 | 2 | |
| CO4 | 3 | 2 | 1 | 3 | | 2 | 2 | 2 | 2 | 2 | | 2 |
| CO5 | 2 | 2 | 2 | 2 | 2 | | 2 | | 3 | | 2 | 3 |

| 20026700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | 2 | 3 | 2 | 3 | 3 | 2 | 2 | | 1 | 2 | 2 |
| CO2 | 3 | | 2 | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| CO3 | 2 | 2 | 1 | 1 | 3 | 1 | | 2 | | 3 | 2 | |
| CO4 | 3 | 2 | 2 | 3 | | 2 | 2 | 2 | 2 | 2 | | 2 |
| CO5 | 2 | 2 | 2 | 2 | 2 | | 2 | | 3 | | 2 | 3 |

| 20024000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 1 | | | | 1 | 3 | 3 | 3 | 2 | 1 | 1 |
| CO2 | 2 | | 1 | | 3 | 3 | 1 | | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 |
| CO4 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 2 | 2 |
| CO5 | 1 | 3 | 3 | 3 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 2 |

| 20025100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 3 |
| CO2 | 3 | 3 | | 2 | | | 1 | 2 | 1 | 2 | | 3 |
| CO3 | 3 | 2 | | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | |
| CO4 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | | 2 |
| CO5 | 2 | 1 | 2 | | 3 | 2 | 2 | 2 | 2 | 1 | 2 | |

| 20024100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | | 2 | | | | 2 | 2 | 2 |
| CO2 | 2 | 3 | 2 | 3 | 2 | | | 2 | | | | 2 |
| CO3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | | | | 2 | |
| CO4 | 2 | 2 | 2 | | | | | 2 | | | | 1 |
| CO5 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | | 3 | | 3 |

| 20024200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 1 | | | 2 | | 2 | 1 | 3 | 2 |
| CO2 | 3 | 2 | 3 | 2 | | 3 | 2 | 3 | 2 | 2 | 3 | 2 |
| CO3 | 1 | | | 3 | 3 | 2 | | | 2 | 3 | 2 | |
| CO4 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 2 |
| CO5 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | | 3 | 3 | 3 |

| 20025500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | | 2 | | 2 | 2 | 2 | | 2 |
| CO2 | 2 | 3 | 3 | 3 | | | 2 | 2 | | 2 | | |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | | | 2 | | 3 | 3 |
| CO4 | 3 | 2 | 3 | | 2 | 2 | 2 | | | | 2 | |
| CO5 | 2 | 2 | | 3 | 2 | | | 2 | | 2 | 3 | 3 |

| 99002200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | 2 | 3 | | 1 | 3 | 3 | 1 | 3 |
| CO2 | 3 | 2 | 2 | 2 | 2 | 2 | | 2 | 2 | 3 | 2 | 3 |
| CO3 | 1 | | | | 1 | 3 | | 3 | 2 | 3 | 3 | 3 |
| CO4 | 2 | 2 | 2 | 2 | 3 | 3 | | 3 | 2 | 3 | 3 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 2 | | 2 | 3 | 2 | 3 | 3 |

| 20001100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | | 3 | 3 | 3 | | | 3 | | 3 | | 2 |
| CO2 | 2 | | 3 | 3 | 3 | | | 3 | 3 | 3 | 3 | 3 |
| CO3 | | | | | 2 | 3 | | 3 | 3 | 3 | 3 | 2 |
| CO4 | 2 | | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 | 2 |
| CO5 | 3 | 3 | 2 | 2 | | 2 | 3 | 2 | | 2 | | 2 |

| 99003300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | | 3 | | 3 | | 3 | 3 | 3 | 3 | 3 |
| CO2 | 2 | 2 | 3 | 3 | 3 | 2 | | 2 | | 3 | 2 | |
| CO3 | 2 | 3 | | | 1 | 2 | | 3 | 2 | 3 | | 3 |
| CO4 | 3 | | 2 | 2 | 3 | 2 | | 3 | 2 | 3 | 2 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | 3 | 3 |

## 6.3 Lesson Plan: Semester – I

**20023400 Fundamentals of Agronomy**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit 1 | Agronomy and its scope ; seed, seed rate and sowing methods | C1 | Lecture |
| Unit 1 | Tillage, tilth, objective and types of tillage | C2 | Lecture |
| Unit 1 | Crop stand establishment, Factors affecting plant population | C3 | Lecture |
| Unit 1 | Plant geometry | C4 | Lecture |
| Unit 1 | Crop nutrition, Criteria for essentiality of nutrient, Nutrient use efficiency, Manures and fertilizers | C5 | Lecture |
| Unit 1 | Advantage of green manuring, Characteristics of green manure crops, Classification of Fertilizers, Application of Fertilizers | C6 | Lecture |
| Unit 1 | Application of Fertilizer in Liquid Form, Brown manuring, Biofertilizers, Types of Biofertilizers | C7 | Lecture |
| | Clarification Class | C8 | Clarification Class |
| | Classroom assignment | C9 | Classroom assignment |
| Unit 1 | Field applications liquid biofertilizers & Bio NPK consortium, INM, time of irrigation, irrigation methods | C10 | Lecture |
| Unit 1 | Sub-surface irrigation, pressurized or modern irrigation systems | C11 | Lecture |
| Unit 1 | Drainage, Water Resources, Classification of Water | C12 | Lecture |
| | Water Use Efficiency of Crops, Factors affecting crop water use efficiency | C13 | Lecture |
| Unit-1 | Crop water requirement, Factors affecting crop water requirement, Irrigation requirement, Irrigation interval, Irrigation period | C14 | Lecture |
| Unit-1 | Irrigation scheduling and types of its approach | C15 | Lecture |
| Unit-2 | Crop-weed association | C16 | Lecture |
| Unit-2 | Crop weed competition | C17 | Lecture |
| Unit-2 | Allelopathy, Factors influencing allelopathy | C18 | Lecture |
| Unit-2 | Effect of weed competition on crop growth and yield | C19 | Lecture |
| Unit-2 | Losses Caused by Weeds | C20 | Lecture |
| Unit-2 | Mechanical weed control | C21 | Lecture |
| Unit-2 | Cultural weed control | C22 | Lecture |
| Unit-2 | Classification of herbicides | C23 | Lecture |
| Unit-2 | Formulations, methods of application, benefits of herbicides | C24 | Lecture |
| Unit-2 | Biological control, bio-herbicides/ mycoherbicides | C25 | Lecture |
| Unit-2 | Growth, development, ideotype, harvesting, method of harvesting, | C26 | Lecture |
| Unit-2 | Adaptation and principle of plant distribution | C27 | Lecture |
| | IInd Assignment | C28 | IInd Assignment |
| | Presentation | C29 | Presentation |
| | Clarification Class | C30 | Clarification Class |

**20023500 Fundamentals of Agronomy Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Identification of seed, crops, manure and oil cake | P1 | Practical |
| 2 | Study of agro climatic zone of india and identification of weeds | P2 | Practical |
| 3 | Methods of herbicides & fertilizer application | P3 | Practical |
| 4 | Identification of weeds in crops | P4 | Practical |
| 5 | Methods of herbicide and fertilizer application | P5 | Practical |
| 6 | Identification of crops, seeds, fertilizers, pesticides and tillage implements | P6 | Practical |
| 7 | Study of yield contributing characters and yield estimation | P7 | Practical |
| 8 | Seed germination and viability test | P8 | Practical |
| 9 | Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement | P9 | Practical |
| 10 | Use of tillage implements-reversible plough | P10 | Practical |
| 11 | One way plough, harrow, leveler, seed drill | P11 | Practical |
| 12 | Study of soil moisture measuring devices | P12 | Practical |
| 13 | Measurement of field capacity, bulk density and infiltration rate | P13 | Practical |
| 14 | Study the yield contributing characters and yield estimation | P14 | Practical |
| 15 | Measurement of irrigation water | P15 | Practical |

**20023600 –Fundamentals of Soil Science**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Soil as a natural body, Pedological and edaphological concepts of soil | C-1 | Lecture |
| Unit-I | Soil genesis: soil forming rocks and minerals | C-2 | Lecture |
| Unit-I | Soil genesis: soil forming rocks and minerals | C-3 | Lecture |
| Unit-I | Weathering, processes and factors of soil formation; Soil Profile, components of soil | C-4 | Lecture |
| Unit-I | Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity | C-5 | Lecture |
| Unit-I | Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity | C-6 | Lecture |
| | Clarification class | C-7 | Clarification Class |
| Unit-II | Elementary knowledge of soil taxonomy classification and soils of India | C-8 | Lecture |
| Unit-II | Soil water retention, movement and availability | C-9 | Lecture |
| | Class room assignment | C-10 | Class assignment |
| Unit-II | Soil air, composition, gaseous exchange, problem and plant growth, Soil temperature | C-11 | Lecture |
| Unit-II | Soil air, composition, gaseous exchange, problem and plant growth | C-12 | Lecture |
| Unit-II | Soil temperature; source, amount and flow of heat in soil | C-13 | Lecture |
| Unit-II | Effect on plant growth | C-14 | Lecture |
| Unit-II | Soil reaction-pH, soil acidity and alkalinity | C-15 | Lecture |
| Unit-II | Buffering, effect of pH on nutrient availability | C-16 | Lecture |
| Unit-II | Soil colloids - inorganic and organic | C-17 | Lecture |
| Unit-II | Silicate clays: constitution and properties | C-18 | Lecture |
| Unit-II | Sources of charge; ion exchange, cation exchange capacity, base saturation | C-19 | Lecture |
| | Clarification class | C-20 | Lecture |
| Unit-III | Soil organic matter: composition, properties and its influence on soil properties | C-21 | Lecture |
| Unit-III | Humic substances - nature and properties | C-22 | Lecture |
| | Quiz | C-23 | Quiz |
| Unit-III | Soil organisms: macro and microorganisms, their beneficial and harmful effects | C-24 | Lecture |
| Unit-III | Soil organisms: macro and microorganisms, their beneficial and harmful effects | C-25 | Lecture |
| Unit-III | Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution | C-26 | Lecture |
| | Clarification class | C-27 | Clarification Class |
| | Quiz | C-28 | Quiz |
| | Class room assignment-II | C-29 | Class Assignment |
| | Presentation | C-30 | Presentation |

**20023700 – Fundamentals of Soil Science Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Study of soil profile in field | P1 | Practical |
| 2 | Study of soil sampling tools | P2 | Practical |
| 3 | Collection of representative soil sample, its processing and storage | P3 | Practical |
| 4 | Collection of representative soil sample, its processing and storage | P4 | Practical |
| 5 | Study of soil forming rocks and minerals | P5 | Practical |
| 6 | Determination of soil density, moisture content and porosity | P6 | Practical |
| 7 | Determination of soil texture by feel and Bouyoucos Methods | P7 | Practical |
| 8 | Studies of capillary rise phenomenon of water in soil column and water movement in soil | P8 | Practical |
| 9 | Studies of capillary rise phenomenon of water in soil column and water movement in soil | P9 | Practical |
| 10 | Determination of soil pH and electrical conductivity | P10 | Practical |
| 11 | Determination of cation exchange capacity of soil. Study of soil map | P11 | Practical |
| 12 | Determination of cation exchange capacity of soil. Study of soil map | P12 | Practical |
| 13 | Determination of soil colour | P13 | Practical |
| 14 | Demonstration of heat transfer in soil | P14 | Practical |
| 15 | Estimation of organic matter content of soil | P15 | Practical |

**20026600 –Fundamentals of Plant Biochemistry and Biotechnology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Importance of Biochemistry. Carbohydrate: Importance and classification | C-1 | Lecture |
| Unit-I | Properties of Water, pH and Buffer | C-2 | Lecture |
| Unit-I | Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation | C-3 | Lecture |
| Unit-I | Structure of Disaccharides and Polysaccharides | C-4 | Lecture |
| Unit-I | Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids. | C-5 | Lecture |
| Unit-I | Proteins: Importance of proteins and classification; Structures, titration and zwitterions nature of amino acids; Structural organization of proteins. | C-6 | Lecture |
| | Clarification class | C-7 | Clarification Class |
| Unit-II | Enzymes: General properties; Classification | C-8 | Lecture |
| Unit-II | Mechanism of action; Michaelis & Menten and Line Weaver Burk equation & plots | C-9 | Lecture |
| | Class room assignment | C-10 | Class assignment |
| Unit-II | Introduction to allosteric enzymes. Nucleic acids: Importance and classification | C-11 | Lecture |
| Unit-II | Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure | C-12 | Lecture |
| Unit-II | Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain | C-13 | Lecture |
| Unit-II | Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids | C-14 | Lecture |
| Unit-III | Concepts and applications of plant biotechnology: Scope, organ culture | C-15 | Lecture |
| Unit-III | Embryo culture, cell suspension culture, callus culture | C-16 | Lecture |
| Unit-III | Anther culture, pollen culture and ovule culture and their applications | C-17 | Lecture |
| Unit-III | Micro-propagation methods; organogenesis and embryogenesis | C-18 | Lecture |
| Unit-III | Synthetic seeds and their significance | C-19 | Lecture |
| Unit-III | Embryo rescue and its significance; somatic hybridization and cybrids | C-20 | Lecture |
| Unit-IV | Somaclonal variation and its use in crop improvement; cryo-preservation | C-21 | Lecture |
| Unit-IV | Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods | C-22 | Lecture |
| | Quiz | C-23 | Quiz |
| Unit-IV | Transgenics and its importance in crop improvement | C-24 | Lecture |
| Unit-IV | PCR techniques and its applications; RFLP, RAPD, SSR; Marker | C-25 | Lecture |

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| Unit-IV | Assisted Breeding in crop improvement; Biotechnology regulations | C-26 | Lecture |
| | Clarification class | C-27 | Clarification Class |
| | Quiz | C-28 | Quiz |
| | Class room assignment-II | C-29 | Class Assignment |
| | Presentation | C-30 | Presentation |

**20026700 – Fundamentals of Plant Biochemistry and Biotechnology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Preparation of solution, pH & buffers | P1 | Practical |
| 2 | Qualitative tests of carbohydrates and amino acids | P2 | Practical |
| 3 | Quantitative estimation of glucose | P3 | Practical |
| 4 | Quantitative estimation of proteins | P4 | Practical |
| 5 | Titration methods for estimation of amino acids | P5 | Practical |
| 6 | Titration methods for estimation of lipids | P6 | Practical |
| 7 | Effect of pH, temperature and substrate concentration on enzyme action | P7 | Practical |
| 8 | Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides | P8 | Practical |
| 9 | Sterilization techniques | P9 | Practical |
| 10 | Composition of various tissue culture media | P10 | Practical |
| 11 | Preparation of stock solutions for MS nutrient medium. | P11 | Practical |
| 12 | Callus induction from various explants. | P12 | Practical |
| 13 | Micro-propagation, hardening and acclimatization | P13 | Practical |
| 14 | Demonstration on isolation of DNA | P14 | Practical |
| 15 | Demonstration of gel electrophoresis techniques and DNA finger printing | P15 | Practical |

**20024000 Introductory Biology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Introduction to the living world | C1 | Lecture |
| Unit-1 | Diversity and characteristics of life | C2 | Lecture |
| Unit-1 | origin of life | C3 | Lecture |
| Unit-1 | Evolution | C4 | Lecture |
| Unit-1 | Eugenics | C5 | Lecture |
| Unit-1 | Binomial nomenclature and classification | C6 | Lecture |
| Unit-1 | Cell and cell division | C7 | Lecture |
| Unit-1 | Morphology of flowing plants | C8 | Lecture |
| Unit-1 | Seed and seed germination | C9 | Lecture |
| Unit-1 | Plant systematic, Brassicaceae | C10 | Lecture |
| Unit-1 | Fabaceae and Poaceae | C11 | Lecture |
| Unit-1 | Role of animals in agriculture | C12 | Lecture |
| Unit-1 | Class Room Assignment | C13 | Class Room Assignment |
| Unit-1 | Class Room Assignment | C14 | Class Room Assignment |
| Unit-1 | Class Room Assignment | C15 | Class Room Assignment |

**20024000 Introductory Biology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Morphology of flowering plants – root and its modifications | P1 | Practical |
| 2 | Morphology of flowering plants – stem and its modifications | P2 | Practical |
| 3 | Morphology of flowering plants – leaf and its modifications | P3 | Practical |
| 4 | Morphology of flowering plants - inflorescence | P4 | Practical |
| 5 | Morphology of flowering plants - flower | P5 | Practical |
| 6 | Morphology of flowering plants - fruits | P6 | Practical |
| 7 | Cell, tissues | P7 | Practical |
| 8 | Cell division | P8 | Practical |
| 9 | Internal structure of root | P9 | Practical |
| 10 | Internal structure of stem | P10 | Practical |
| 11 | Internal structure of leaf | P11 | Practical |
| 12 | Study of specimens and slides | P12 | Practical |
| 13 | Description of plants - Brassicaceae | P13 | Practical |
| 14 | Description of plants - Fabaceae | P14 | Practical |
| 15 | Description of plants - Poaceae | P15 | Practical |

**20025100 Elementary Mathematics**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Straight lines : Distance formula, section formula (internal and external division), Change of axes (only origin changed), Equation of co-ordinate axes, Equation of lines parallel to axes | C-1 | Lecture |
| Unit-I | Slope-intercept form of equation of line, Slope-point form of equation of line, Two point form of equation of line, Intercept form of equation of line | C-2 | Lecture |
| Unit-I | Normal form of equation of line, General form of equation of line, Point of intersection of two st. lines | C-3 | Lecture |
| Unit-I | Angles between two st. lines, Parallel lines, Perpendicular lines, Angle of bisectors between two lines | C-4 | Lecture |
| Unit-I | Area of triangle and quadrilateral. Circle: Equation of circle whose centre and radius is known, General equation of a circle, Equation of circle passing through three given points | C-5 | Lecture |
| Unit-I | Equation of circle whose diameters is line joining two points (x1, y1) & (x2, y2), Tangent and Normal to a given circle at given point (Simple problems), Condition of tangency of a line $y = mx + c$ to the given circle $x^2 + y^2 = a^2$ | C-6 | Lecture |
| | Clarification class | C-7 | Clarification Class |
| Unit-II | Differential Calculus : Definition of function, limit and continuity | C-8 | Lecture |
| Unit-II | Simple problems on limit, Simple problems on continuity | C-9 | Lecture |
| | Class room assignment | C-10 | Class assignment |
| Unit-II | Differentiation of $x^n$ , $e^x$ , sin x & cos x from first principle, Derivatives of sum, difference, product and quotient of two functions | C-11 | Lecture |
| Unit-II | Differentiation of functions of functions (Simple problem based on it), Logarithmic differentiation (Simple problem based on it) | C-12 | Lecture |
| Unit-II | Differentiation by substitution method and simple problems based on it, Differentiation of Inverse Trigonometric functions | C-13 | Lecture |
| Unit-II | Maxima and Minima of the functions of the form y=f (x) (Simple problems based on it) | C-14 | Lecture |
| Unit-III | Integral Calculus | C-15 | Lecture |
| Unit-III | Integration of simple functions | C-16 | Lecture |
| Unit-III | Integration of Product of two functions | C-17 | Lecture |
| Unit-III | Integration by substitution method | C-18 | Lecture |
| Unit-III | Definite Integral (simple problems based on it) | C-19 | Lecture |
| Unit-III | Area under simple well-known curves (simple problems based on it) | C-20 | Lecture |
| Unit-IV | Matrices and Determinants | C-21 | Lecture |
| Unit-IV | Definition of Matrices, Addition | C-22 | Lecture |
| | Quiz | C-23 | Quiz |

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| Unit-IV | Subtraction, Multiplication | C-24 | Lecture |
| Unit-IV | Transpose and Inverse up to 3rd order | C-25 | Lecture |
| Unit-IV | Properties of determinants up to 3rd order and their evaluation | C-26 | Lecture |
| | Clarification class | C-27 | Clarification Class |
| | Quiz | C-28 | Quiz |
| | Class room assignment-II | C-29 | Class Assignment |
| | Presentation | C-30 | Presentation |

**20024100 Fundamentals of Horticulture**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Hort-Definition Importance & Scope | 1 | Lecture |
| 2 | Botanical Class of Hort | 1 | Lecture |
| 3 | Soil & Climate | 1 | Lecture |
| 4 | Nursery | 1 | Lecture |
| 5 | Revision | 1 | Lecture |
| 6 | Propagation | 1 | Lecture |
| 7 | Principles of orchard estabt & Layout | 1 | Lecture |
| 8 | Types of Orchard | 1 | Lecture |
| 9 | Orchard Management | 1 | Lecture |
| 10 | Revision | | Activity |
| 11 | Water Req & Irrigation Methods for Hort Crops | 1 | Lecture |
| 12 | Seed dormancy | 1 | Lecture |
| 13 | REVISION | REVISION | Activity |
| 14 | Principles and methods of training | 1 | Lecture |
| 15 | Principles and methods of pruning | 1 | Lecture |
| 16 | juvenility and flower bud differentiation | 1 | Lecture |
| 17 | Unfruitfulness, Pollination, pollinizers and pollinators | 1 | Lecture |
| 18 | Fertilization and parthenocarpy | 1 | Lecture |
| 19 | Medicinal and Aromatic plants | 1 | Lecture |
| 20 | Importance of plant bio-regulatores in horticulture | 1 | Lecture |
| 21 | Irrigation methods | 1 | Lecture |
| 22 | Fertilizer application in horticulture crops | 1 | Lecture |
| 23 | Revision | 1 | Activity |
| 24 | Home Assignment | 2 | Activity |

**20024200 Fundamentals of Horticulture Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Identification of Horticultural Crops | 1 | Practical |
| 2 | Identification of garden tools | 1 | Practical |
| 3 | Preparation of seed bed/ nursery bed | 1 | Practical |
| 4 | Propagation Through Cutting and Layering | 1 | Practical |
| 5 | Propagation Through Budding and Grafting | 1 | Practical |
| 6 | Planning, Layout and Planting of Horticultural Crops | 1 | Practical |
| 7 | Training and Pruning of Fruit Crops | 1 | Practical |
| 8 | Preparation of potting mixture | 1 | Practical |
| 9 | Fertilizer application in different crops | 1 | Practical |
| 10 | Visits to commercial nurseries/ orchard | 1 | Practical |

**20025500 Rural Sociology and Educational Psychology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Sociology and Rural sociology- Meaning, Definition, scope, importance of rural sociology in agricultural extension and interrelationship between rural and urban societies | C1-C2 | Lecture |
| Unit I | Indian rural society, important characteristics, differences and relationship between rural and urban societies | C3 | Lecture |
| Unit I | Social groups- Meaning, Definition, Classification, Factors considered in formation and organization of groups | C4 | Lecture |
| Unit I | Social Stratification-Meaning, Definition, Functions and forms of social stratification | C5 | Lecture |
| | Clarification class | C6 | Clarification class |
| Unit II | Cultural Concepts-Culture, customs, folkways, mores, taboos, rituals and traditions-Meaning, Definition and their role in Agriculture Extension | C7-C8 | Lecture |
| Unit II | Social Values- Meaning, Definition, types and role in Agriculture extension | C9 | Lecture |
| Unit II | Class room Assignment 1 Attitude-Meaning, Definition, types and role in Agriculture extension | C10-C11 | Lecture |
| Unit II | Social institutions- Meaning, Definition, major institutions in rural society, functions | C12-C13 | Lecture |
| Unit II | Social Control-Meaning, Definition, Need and means of social control | C14 | Lecture |
| | Group Discussion-1 | C15 | Group Discussion |
| Unit II | Social Change- Meaning, Definition, nature and factors of social change | C16 | Lecture |
| Unit II | Leadership- Meaning, Definition, Classification, role of leaders, mode of selection of leaders | C17-C18 | Lecture |
| | Clarification class | C19 | Clarification class |
| | Test | C20 | Test |
| | Presentation | C21-C24 | Presentation |
| | Quiz-1 | C25 | Quiz-1 |
| Unit III | Psychology and educational psychology-meaning, definition, scope and importance of educational psychology in agriculture extension | C26-C27 | Lecture |
| Unit III | Intelligence-meaning, definition, types, factors affecting intelligence | C28 | Lecture |
| Unit III | Personality-meaning, definition, types, factors influencing personality and roles of personality in agriculture extension | C29-C30 | Lecture |
| | classroom assignment -2 | C31 | class assignment |
| Unit III | Teaching learning process- meaning, definition of teaching, learning, learning experience and learning situation | C32-C33 | Lecture |
| | Group Discussion-2 | C34 | Group Discussion |
| Unit III | Elements of learning situation and its characteristics | C35 | Lecture |

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| | Clarification Class | C36 | Clarification Class |
| | Quiz-2 | C37 | Quiz-2 |
| | Presentation | C38-C45 | Presentation |

**99002200 – Business Communication**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Syllabus, Teaching Pedagogy Reference Books and Text Books | C1 | Lecture |
| Unit I | Introduction: Theory of Communication, Types and modes of Communication | C2 | Lecture |
| Unit I | Fundamentals of Communication: Communication defined, Models of Communication, | C3 | Lecture |
| Unit I | Fundamentals of Communication: Communication defined, Models of Communication, | C4 | Lecture |
| Unit I | Barriers in communication, | C5 | Lecture |
| Unit I | Perception and communication, | C6 | Lecture |
| Unit I | Essentials of good communication. | C7 | Lecture |
| | Clarification Class | C8 | Clarification Class |
| | Activity | C9 | Activity |
| Unit II | Language of Communication: Verbal and Non-verbal (Spoken and Written) Personal, | C10 | Lecture |
| Unit II | Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication | C11 | Lecture |
| Unit II | Modes of human communication: Basic differences in the principal | C12 | Lecture |
| Unit II | Webinar | C13 | Webinar |
| Unit II | modes of human communication – reading, writing, listening, speaking and non-verbal | C14 | Lecture |
| Unit II | Activity | C15 | Activity |
| Unit II | Spoken communication: Importance of spoken communication, | C16 | Lecture |
| Unit II | Letter writing | C17 | Activity |
| | Activity | C18 | Activity |
| Unit II | Class Room Assignment | C19 | Class Assignment |
| Unit II | designing receiver-oriented messages, comprehending cultural dimension. Speaking | C20 | Lecture |
| Unit II | Skills Monologue Dialogue Group Discussion Effective Communication/ Miscommunication | C21 | Lecture |
| Unit II | Presentations | C22 | Presentation |
| Unit II | Presentations | C23 | Presentation |
| | Clarification Class | C24 | Clarification Class |
| Unit III | Making Oral presentations: Functions of presentations, defining objective, | C25 | Lecture |
| Unit III | audience analysis, collection of materials, organization of materials, | C26 | Lecture |
| | Activity | C27 | Activity |
| Unit III | body language, effective delivery techniques. | C28 | Lecture |
| | Class Room Assignment | C29 | Class Assignment |
| Unit III | Reading and Understanding Close Reading Comprehension Writing | C30 | Lecture |
| | Webinar | C31 | Webinar |
| | Quiz- Unit-II based (Oral Test) | C32 | Quiz |

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|---|---|---|---|
| Unit III | Summary Paraphrasing Analysis and Interpretation Translation (from Indian language to English and vice-versa) | C33 | Lecture |
| Unit III | Literary/Knowledge Texts Writing Skills Documenting Report | C34 | Lecture |
| Unit III | Writing Making notes Letter writing. | C35 | Lecture |
| | Presentation | C36 | Presentation |
| | Guest Lecture | C37 | Guest Lecture |
| | Activity | C38 | Activity |
| Unit III | Class Room Assignment | C39 | Class Assignment |
| | Video Lecture | C40 | Lecture |
| | Presentation | C41 | Presentation |
| Unit III | Clarification Class | C42 | Clarification Class |
| UNIT IV | Fundamental of technical writing: Special features of technical writing, the word choice, | C43 | Lecture |
| UNIT IV | Fundamental of technical writing: Special features of technical writing, the word choice, | C44 | Lecture |
| UNIT IV | developing clarity and conciseness, Report writing, Business letters, Applications and resumes | C45 | Lecture |
| UNIT IV | Report Writing | C46 | Lecture |
| UNIT IV | Transactional Analysis: Three human ego states, 4 life positions, different types of transactions | C47 | Lecture |
| UNIT IV | Clarification Class | C48 | Clarification Class |
| UNIT IV | Activity | C49 | Activity |
| | quiz- Unit-III & IV based (Oral Test) | C50 | Quiz |
| Unit V | The significance of communication in a business organization: Channels of communication – Downwards, Upwards, Horizontal, Consensus, and Grapevine. | C51 | Lecture |
| Unit V | The significance of communication in a business organization: Channels of communication – Downwards, Upwards, Horizontal, Consensus, and Grapevine. | C52 | Lecture |
| Unit V | Literary discussions: Analysis and discussion of the novel The Funda of Mix-ology and short stories from the books Under the banyan tree and other stories and Popular short stories. | C53 | Lecture |
| Unit V | Literary discussions: Analysis and discussion of the novel The Funda of Mix-ology and short stories from the books Under the banyan tree and other stories and Popular short stories. | C54 | Lecture |
| Unit V | Class Room Assignment | C55 | Class Assignment |
| Unit V | Clarification Class | C56 | Clarification Class |
| | Unit-I | C57 | Lecture |
| | Unit-II | C58 | Lecture |
| | Unit-III | C59 | Lecture |
| | Unit-IV & V | C60 | Lecture |

**20001100 – Ability and Skill Enhancement**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT I | Ice Breaking Session & Recap of Language Skills | C-1 | Activity |
| UNIT I | Ice Breaking Session& Recap of language | C-2 | Lecture |
| UNIT I | Phrases, clause, sentence | C-3 | Lecture |
| UNIT I | Phrases, clause, sentence | C-4 | Lecture |
| UNIT I | Word Classes (part of Speech) | C-5 | Lecture |
| UNIT I | Word Classes (part of Speech) | C-6 | Lecture |
| UNIT I | Clarification class | C-7 | Clarification Class |
| UNIT I | Tenses | C-8 | Lecture |
| UNIT I | home Assignment | | Home Assignment |
| UNIT II | Recap of Language Skills | | |
| Unit II | Class Room Assignment | C-9 | Class Room Assignment |
| Unit II | Modals | C-10 | Lecture |
| UNITII | Articles | C-11 | Lecture |
| Unit II | Clarification class/activity | C-12 | Clarification Class |
| Unit II | Activity | C-13 | Activity |
| | Home Assignment | | Home Assignment |
| Unit III | Importance of Reading | C-14 | Activity/comprehension |
| Unit III | comprehension/Reading news | C-15 | Lecture |
| Unit III | Reading News | C-16 | Activity |
| Unit III | Writing Skills generating ideas | C-17 | Lecture |
| Unit III | Activity | C-18 | Activity |
| Unit III | Clarification class | C-19 | Clarification Class |
| | Presentation | C-20 | Presentation |
| Unit IV | Email-writing/Note taking | C-21 | Lecture |
| Unit IV | Proof Reading / Story writing | C-22 | Lecture |
| Unit IV | Clarification class | C-23 | Lecture |
| Unit IV | Dialogue writing short and Debate | C-24 | Lecture |
| Unit-IV | Listening to inspirational movies/Clips | C-25 | Presentation |
| Unit-IV | Techniques to improve speaking skill introduce yourself | C-26 | Lecture |
| UNIT IV | Seminar | C-27 | Seminar |
| Unit-IV | Webinar | C-28 | Webinar |
| Unit -IV | Guest Lecture | C-29 | Guest lecture |
| Unit-IV | Clarification class | C-30 | Clarification Class |

| Course | Course outcomes: - After completion of these courses students should be able to |
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| **7.1 Semester – II** | |
| 20023800 Fundamentals of Genetics | **CO1:** Make use of methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation.<br>**CO2:** Utilize the role of genetic technologies in industries related to biotechnology, pharmaceuticals, energy, and other fields.<br>**CO3:** Analyse the mendelian principles and their significance in heredity and inheritance of Qualitative & Quantitative traits.<br>**CO4:** Analyse the possible genotypes that could occur in an offspring, according to the genotype of the two parents with help of Probability and Chi-square test.<br>**CO5:** Estimate the probability of trait transfer from one generation to next generation. |
| 20023900 Fundamentals of Genetics Lab | **CO1:** Show mitosis and meiosis cell division, cell structure etc.<br>**CO2:** Demonstrate microscope parts, models on DNA and RNA structures<br>**CO3:** Solve the problems of monohybrid, dihybrid, trihybrid, test cross and back cross<br>**CO4:** Analyse linkage and cross-over problems<br>**CO5:** Interpret experiments on epistatic interactions including test cross and back cross |
| 20024300 Fundamentals of Agricultural Economics | **CO1:** Explain the different concepts of Agricultural economics, nature of economics, human behaviour, goods and services, need, want, demand, etc.<br>**CO2:** Illustrate the basic principles of economics and concepts of micro and macroeconomics.<br>**CO3:** Summarize the elements that determine economic role of agriculture in national economy<br>**CO4:** Classify the national income, concepts of national income accounting and approaches to measurement etc.<br>**CO5:** Discuss the overall principles of agricultural economics |
| 20024800 Agricultural Microbiology | **CO1:** Define prokaryotic and eukaryotic microbes, bio-fuel production and biodegradation of agro-waste.<br>**CO2:** Explain the role of soil microorganisms in soil fertility and plant growth promotion.<br>**CO3:** Explain about silage production, bio-fertilizers, bio pesticides.<br>**CO4:** Develop experimental skills in soil microbiology which includes isolation of beneficial microorganisms from soil and their mass production.<br>**CO5:** Elaborate the use of microbes and their culture techniques. |
| 20024900 Agricultural Microbiology Lab | **CO1:** Name Different Laboratory equipment used in plant pathology and tell what is the work of these equipment.<br>**CO2:** Explain the methods of Nutrient media preparation and sterilization of media. |

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| | **CO3:** Utilize the methods of isolation and purification of culture media and experiment with *Rhizobium, Azotobacter and BGA*<br>**CO4:** Analyse Different Microorganisms by staining and microbial examination.<br>**CO5:** Measure or evaluate the microbial population in soil- bacteria, fungi and actinomycetes. |
| 20025300 Fundamentals of Entomology | **CO1:** Define the entomology relate to agricultural pests.<br>**CO2:** Classification of phylum Arthropoda up to classes.<br>**CO3:** Identify the different insects based on morphology.<br>**CO4:** Analyse the different insect populations relate to crop and environment.<br>**CO5:** Choose the proper insect management practices. |
| 20025400 Fundamentals of Entomology Lab | **CO1:** Label of collection and preserve insects including immature stages.<br>**CO2:** Demonstrate of insect antennae, mouthparts and legs.<br>**CO3:** Identify the insect larvae and pupae.<br>**CO4:** Categorize the insects based on wing venation, types of wings and wing coupling apparatus<br>**CO5:** Assess the loss of crop production due to insect attack. |
| 20001800 Irrigation & Water Management | **CO1:** Select soil and water engineering concepts like measurement of land, surveying and levelling.<br>**CO2:** Classify irrigation and it's different methods.<br>**CO3:** Determine the irrigation water quality and its management including conjunctive use of water and water management of different crops.<br>**CO4:** Discuss about agricultural drainage.<br>**CO5:** Explain scheduling of irrigation based on different approaches. |
| 20025600 Soil & water Conservation Engineering | **CO1:** Recall the soil and water conservation techniques and spell the terms like soil erosion, their causes and agents.<br>**CO2:** Explain water erosion, its classification, their control and soil loss measurement techniques.<br>**CO3:** Plan the mechanical measure for controlling soil and water erosion.<br>**CO4:** Examine the degradation of soil's chemical and physical properties.<br>**CO5:** Value the water harvesting techniques for water conservation. |
| 20012500 Soil & water Conservation Engineering Lab | **CO1:** Define the general status of soil conservation in India and Rajasthan.<br>**CO2:** Interpret the erosion index and estimate the soil loss.<br>**CO3:** Build contour maps and experiment with numerical on designs of contour bunding.<br>**CO4:** Analyse different methods of measurement of irrigation water.<br>**CO5:** Compare irrigation efficiency of different methods of irrigation- Drip irrigation, sprinkler irrigation. |
| 20025700 Fundamentals of Crop | **CO1:** Define the knowledge of physiological phenomenon in plant cells, absorption of water, transpiration, diffusion, osmosis, imbibitions, mineral nutrition of plants, plant growth and regulators. |

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| Physiology | **CO2:** Explain Importance of growth Harmon in Agriculture.<br>**CO3:** Develop the understanding about the mechanisms of various metabolic processes in plants - Photosynthesis, respiration, fat metabolism, plant growth, nutrient absorption, etc.<br>**CO4:** Formulate the quantity of plant growth regulators.<br>**CO5:** Discuss ability to identify C3, C4 and CAM plants, analyze the physical and chemical factors regulate plant growth, evaluate visual symptoms of nutrients deficiency in plants. |
| 20013500 Fundamentals of Crop Physiology Lab | **CO1:** Define the structure and distribution of stomata<br>**CO2:** Compare the different process and cycle of photosynthesis<br>**CO3:** Compare the different process and cycle of respiration<br>**CO4:** Model the plant cells<br>**CO5:** Estimate the osmosis and plasmolysis process |
| 20026200 Fundamentals of Plant Pathology | **CO1:** Name and identify different Diseases, nature of pathogens and different strategies for management of plant diseases.<br>**CO2:** Outline concepts, nomenclature, classification and characters of pathogens<br>**CO3:** Apply different principles and methods for plant disease management.<br>**CO4:** Take a part in identification of diseases and marketing of relevant pesticides.<br>**CO5:** Conclude methods to diagnose and manage a wide range of plant diseases. |
| 20026300 Fundamentals of Plant Pathology Lab | **CO1:** Tell What are the different equipment's used in plant pathology lab and what is the work of these equipment's.<br>**CO2:** Explain the methods of nutrient media preparation for microorganisms.<br>**CO3:** Identify and isolate microorganisms from soil as well as from infected plant part.<br>**CO4:** Examine symptoms of various diseases and test for Koch's postulate.<br>**CO5:** Evaluate and identify Plant parasitic nematodes and extract plant parasitic nematode from soil. |
| 20026000 Fundamentals of Agricultural Extension Education | **CO1:** Explain an understanding on the process, steps, principles, monitoring and evaluation involved in agricultural extension programme development for transfer of technology.<br>**CO2:** Illustrate the skills about genesis of agricultural extension, extension efforts in pre and post-independence era along with specific agricultural programmes.<br>**CO3:** Build new trends in agricultural extension like private extension, market led extension, expert systems, farmer led extension and cyber extension.<br>**CO4:** Discover communication strategies using agricultural journalism for innovation, diffusion and adoption of agricultural technology.<br>**CO5:** Decide when, where and to whom to use the appropriate extension teaching methods. |
| 20026100 Fundamentals of Agricultural | **CO1:** What is university extension systems, how it has been functioning and introduction to various audio visual tools |

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| Extension Education Lab | **CO2:** Explain the concepts of creating awareness and attention seeking<br>**CO3:** Construct the Interview schedule for gathering data<br>**CO4:** Perceive about rural community by visiting and interpreting them<br>**CO5:** Create scripts for various mass media |
| 20002300 - Ability and Skill Enhancement | **CO1:** Select the correct phonetic symbols for improving language<br>**CO2:** Operate reading and writing skills in English<br>**CO3:** Prepare listening and speaking skills in English<br>**CO4:** Focus in understanding the ethics, virtues and values<br>**CO5:** Aware about etiquettes and personal branding |

## 7.2 Mapping: Semester – II

| 20023800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | | 2 | 3 | | 2 | 2 | 3 | 2 | 2 |
| CO2 | 2 | 3 | 3 | 2 | | 2 | 2 | | 3 | 3 | 2 | 3 |
| CO3 | 3 | 2 | | | 3 | 2 | 3 | 2 | 2 | | 2 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 2 | | 2 | | 3 | 2 | 3 | 2 |
| CO5 | 2 | 3 | 2 | 3 | | 2 | 3 | 3 | 2 | | | |

| 20023900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 1 | | | | 1 | 3 | 3 | 3 | 2 | 1 | 1 |
| CO2 | 2 | | 1 | | 3 | 3 | 1 | | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 |
| CO4 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 2 | 2 |
| CO5 | 1 | 3 | 3 | 3 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 2 |

| 20024300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | | 2 | 2 | | | 2 | 2 | 2 | 3 |
| CO2 | 3 | 3 | | 2 | | | | 2 | 2 | 2 | | 2 |
| CO3 | 3 | 3 | 2 | 2 | | 2 | | 2 | | 2 | 2 | |
| CO4 | 3 | 2 | | | 2 | | 2 | 2 | | | 2 | 2 |
| CO5 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | | 3 |

| 20024800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | | 2 | | 2 | 2 | 2 | 2 | 2 |
| CO2 | 3 | 2 | 3 | 2 | 2 | | | 3 | 3 | | 1 | |
| CO3 | 2 | 3 | 2 | 3 | | | 2 | 3 | 3 | 2 | | 2 |
| CO4 | 3 | 2 | | | 3 | 2 | 3 | | | 2 | 2 | 3 |
| CO5 | 2 | | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | 3 | 3 |

| 20024900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | | 2 | | | 2 | 3 | 2 | 2 |
| CO2 | 2 | | | 2 | 2 | | 3 | 3 | 3 | | 1 | |
| CO3 | 3 | 3 | 2 | | | | 2 | 3 | 3 | 2 | | 2 |
| CO4 | 3 | 2 | 3 | 3 | 3 | 2 | | | | 2 | 3 | |
| CO5 | 2 | | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | 3 | 3 |

| 20025300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 1 | 3 | 2 | 1 |
| CO2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 1 |
| CO4 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 1 | 3 | 3 | 3 | 1 | 2 | 3 | 1 | 3 | 1 |

| 20025400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 1 | 3 | 2 |
| CO2 | 3 | 1 | 3 | | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 2 |
| CO3 | 2 | 3 | 3 | 3 | | 3 | 3 | 3 | 1 | 1 | 3 | 3 |
| CO4 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 1 | 2 | | 3 | 3 |
| CO5 | 3 | 3 | 2 | 3 | | 3 | 3 | 1 | 2 | 3 | 1 | 3 |

| 20001800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | | | 2 | 2 | | 3 | 2 |
| CO2 | 3 | | 3 | | 2 | 2 | 3 | 2 | | 2 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | | | 3 | 3 |
| CO4 | 2 | 2 | | 3 | 3 | 2 | 3 | | 2 | | 3 | 3 |
| CO5 | 3 | 3 | | 3 | | 3 | 3 | | 2 | 3 | | 3 |

| 20025600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |
| CO4 | 2 | 1 | 1 | | 1 | 3 | 2 | 1 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 3 | 2 | 3 | 1 | 2 | 2 | 3 | 3 | 2 |

| 20012500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 |
| CO2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 |
| CO5 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 |

| 20025700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | | 2 | 2 | | 2 | 2 | 3 | 3 | |
| CO2 | 2 | 3 | 3 | 2 | | 3 | 2 | | 2 | 2 | 2 | 2 |
| CO3 | 3 | 2 | | 2 | 2 | 2 | 3 | | 2 | | 3 | 3 |
| CO4 | 3 | 2 | 2 | 2 | 3 | | 2 | 3 | 3 | | 2 | 3 |
| CO5 | 3 | 3 | 3 | 3 | | 2 | 3 | 3 | 3 | 3 | | 2 |

| 20013500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | | 2 | 3 |
| CO2 | 3 | | | | 3 | 1 | 3 | 3 | 2 | 1 | 3 | 2 |
| CO3 | 2 | 2 | 2 | 2 | 2 | 2 | | 2 | | 2 | 2 | |
| CO4 | 3 | 2 | 1 | 3 | | 2 | 2 | 2 | 2 | 3 | | 2 |
| CO5 | 2 | 2 | 3 | 2 | 2 | | 2 | | 3 | | 2 | 3 |

| 20026200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 2 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 |

| 20026300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 |
| CO2 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 |
| CO3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO4 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |

| 20026000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | | 2 | 2 | | 2 | 3 | 2 | | 3 |
| CO2 | 3 | 2 | 2 | 2 | 2 | 2 | | 2 | 2 | 2 | 2 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | 2 | |
| CO4 | 3 | 3 | 2 | 2 | 2 | | | 2 | 2 | | 2 | 2 |
| CO5 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 |

| 20026100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | 2 | 3 | 3 | 2 | 2 | 3 | | | 3 | 2 |
| CO2 | 3 | 3 | | | 2 | | | 2 | 2 | 3 | | 2 |
| CO3 | 2 | | 2 | | | 3 | 2 | | | 3 | 2 | |
| CO4 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | | 3 | | 3 |
| CO5 | 2 | 3 | | | 2 | 3 | 2 | | 3 | | | 3 |

| 20002300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | | 3 | 3 | | 3 | | 3 | 3 | 2 |
| CO2 | 3 | | 2 | 3 | 2 | 2 | | 2 | | 3 | | 2 |
| CO3 | 3 | 3 | | | 2 | | | 3 | 3 | 3 | | 2 |
| CO4 | 3 | 3 | 3 | 2 | 2 | 2 | | 2 | | 3 | 2 | 2 |
| CO5 | 3 | 3 | | 3 | | 3 | 3 | 3 | 2 | | 2 | 2 |

## 7.3 Lesson Plan: Semester – II

**20023800 Fundamentals of Genetics**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Mendelian principles of heredity, Cell division – mitosis, Cell division – meiosis | C1 | Lecture |
| Unit-1 | Dominance relationships, gene interaction, | C2 | Lecture |
| Unit-1 | Epistatic gene interactions with examples and Epistatic gene interactions | C3 | Lecture |
| Unit-2 | Pleiotropism, pseudoalleles, Multiple alleles and Blood group genetics, Sex determination, | C4 | Lecture |
| Unit-2 | Sex limited, sex influenced and sex linked traits, Sex linkage | C5 | Lecture |
| Unit-3 | Linkage and its estimation, Crossing over, Mutation, and Mutagenic agents | C6 | Lecture |
| Unit-3 | Multiple factor hypothesis, Cytoplasmic inheritance, Genetic disorders, | C7 | Lecture |
| Unit-4 | Nature, structure and types of genetic material | C8 | Lecture |
| Unit-4 | Replication of genetic material, Genetic code & Protein synthesis | C9 | Lecture |
| Unit-4 | Gene concept and Gene regulation, operon concept, Lac and Trp operons | C10 | Lecture |
| Unit-4 | Transcription | C11 | Lecture |
| Unit-4 | Translational mechanism of genetic material, | C12 | Lecture |
| Unit 1-4 | Class Room Assignment | C13 | Class Room Assignment |
| Unit 1-5 | Class Room Assignment | C14 | Class Room Assignment |
| Unit 1-6 | Class Room Assignment | C15 | Class Room Assignment |

**20023900 Fundamentals of Genetics Lab**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Study of microscope. | P1 | Practical |
| Unit-2 | Study of cell structure. | P2 | Practical |
| Unit-3 | Mitosis and Meiosis cell division. | P3 | Practical |
| Unit-4 | Experiments on dihybrid | P4 | Practical |
| Unit-5 | Practice on mitotic and meiotic cell division, | P5 | Practical |
| Unit-6 | Determination of Chromosome map and interference | P6 | Practical |
| Unit-7 | Study of models on DNA and RNA structures. | P7 | Practical |

**20024300 Fundamentals of Agricultural Economics**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Meaning and scope of agri economics | C1 | Lecture |
| 1 | Definition activity and approach | C2 | Lecture |
| 1 | Positive and Normative economics Nature of economic theories | C3 | Lecture |
| 1 | Classification of Agri Credit and credit analysis | C4 | Lecture |
| 1 | Concept of equilibrium, Goods and services | C5 | Lecture |
| 1 | Concept of desire want and demand | C6 | Lecture |
| 1 | Agri economics definition characteristics importance | C7 | Lecture |
| 1 | Economic development | C8 | Lecture |
| 1 | Agri planning and development in country | C9 | Lecture |
| II | Demand meaning schedule and curve | C10 | Lecture |
| II | Demand meaning schedule and curve | C11 | Lecture |
| II | Elasticity of demand | C12 | Lecture |
| II | Elasticity of demand | C13 | Lecture |
| II | Utility analysis | C14 | Lecture |
| II | Utility analysis | C15 | Lecture |
| II | Production meaning factors law | C16 | Lecture |
| II | Cost Meaning types and behaviour | C17 | Lecture |
| II | Cost Meaning types and behaviour | C18 | Lecture |
| II | Law of supply elasticity and concept | C19 | Lecture |
| II | Law of supply elasticity and concept | C20 | Lecture |
| II | Law of supply elasticity and concept | C21 | Lecture |
| III | Market meaning, structure and types | C22 | Lecture |
| III | Price determination under perfect competition market | C23 | Lecture |
| III | Price determination under perfect competition market | C24 | Lecture |
| III | Clarification class | C25 | Clarification class |
| III | Distribution theory and pricing | C25 | Lecture |
| IV | National Income | C27 | Lecture |
| IV | GST meaning and implementation | C28 | Lecture |
| IV | Direct Tax meaning and Indian economy | C29 | Lecture |
| IV | Clarification class | C30 | Lecture |

**20024800 Agricultural Microbiology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Scope and applications of microbiology | C1 | Lecture |
| Unit I | Applications of agricultural microbiology | C2 | Lecture |
| Unit II | importance of microbes in human welfare | C3 | Lecture |
| Unit II | Biodegradation of agro-waste | C4 | Lecture |
| Unit II | roles of microbes in biofuel production | C5 | Lecture |
| Unit II | Importance of biofertilizers | C6 | Lecture |
| | Clarification Class-1 | C7 | Clarification Class |
| Unit-II | Microbes in production of biopesticides | C8 | Lecture |
| Unit-II | Microbes in silage production | C9 | Lecture |
| Unit-II | Biological nitrogen fixation | C10 | Lecture |
| Unit-II | Symbiotic and asymbiotic nitrogen fixation | C11 | Lecture |
| | Clarification Class-2 | C12 | Clarification Class |
| | Guest Lecture | C13 | Guest lecture |
| | Quiz-1 | C14 | Quiz |
| Unit-II | Role of Azolla in BNF | C15 | Lecture |
| Unit-II | Structure and importance of mycorrhiza | C16 | Lecture |
| Unit-II | Rhizosphere | C17 | Lecture |
| Unit-II | Phyllosphere | C18 | Lecture |
| | Clarification Class-3 | C19 | Clarification Class |
| | Webinar-1 | C20 | Webinar |
| | Home Assignment-1 | | Take Home Assignments |
| | Class Room Assignment 1 | C21 | Class Room Assignment |
| | Presentation-1 | C22-C23 | Presentation |
| | Quiz-2 | C24 | Quiz |
| Unit-I | Prokaryotes and Eukaryotes organisms | C25 | Lecture |
| Unit-I | Bacterial cell wall structure | C26 | Lecture |
| Unit-I | Mode of bacterial nutrition | C27 | Lecture |
| Unit-I | Mode of bacterial reproduction | C28 | Lecture |
| Unit-I | Different biogeochemical Cycles | C29 | Lecture |
| | Clarification Class-4 | C30 | Clarification Class |

**20024900 Agricultural Microbiology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to microbiology laboratory and its equipments | P1-P2 | Practical |
| 2 | Microscope- parts, principles of microscopy, resolving power and numerical aperture. | P3-P4 | Practical |
| 3 | Methods of sterilization | P5-P6 | Practical |
| 4 | Nutritional media and their preparations | P7-P8 | Practical |
| 5 | Methods of isolation and purification of microbial cultures | P9-P10 | Practical |
| 6 | Isolation of Azotobacter from soil. Isolation of Azospirillum from roots | P9-P11 | Practical- 5 |
| 7 | Enumeration of microbial population in soil- bacteria, fungi, actinomycetes | P9-P12 | Practical- 5 |

**20025300 Fundamentals of Entomology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom | C-1 | Lecture |
| Unit-I | Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting | C-2 | Lecture |
| Unit-I | Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus | C-3 | Lecture |
| Unit-I | Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae | C-4 | Lecture |
| Unit-I | Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system in insects | C-5 | Lecture |
| Unit-I | Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor | C-6 | Lecture |
| | Clarification class | C-7 | Clarification Class |
| Unit-II | Insect Ecology: Introduction, Effect of abiotic factors–temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents | C-8 | Lecture |
| Unit-II | Environment and its components | C-9 | Lecture |
| | Class assignment | C-10 | Class assignment |
| Unit-II | Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents | C-11 | Lecture |
| Unit-II | Effect of abiotic factors–humidity, rainfall, light | C-12 | Lecture |
| Unit-II | Effect of abiotic factors–atmospheric pressure and air currents | C-13 | Lecture |
| Unit-II | Effect of biotic factors – food competition, natural and environmental resistance | C-14 | Lecture |
| Unit-III | Categories of pests | C-15 | Lecture |
| Unit-III | Concept of IPM, Practices, scope and limitations of IPM | C-16 | Lecture |
| Unit-III | Classification of insecticides, toxicity of insecticides and formulations of insecticides | C-17 | Lecture |
| Unit-III | Chemical control-importance, hazards and limitations | C-18 | Lecture |
| Unit-III | Recent methods of pest control, repellents, antifeedants, hormones, attractants, gamma radiation | C-19 | Lecture |
| Unit-III | Insecticides Act 1968-Important provisions. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes | C-20 | Lecture |
| Unit-IV | Systematics: Taxonomy –importance, history and | C-21 | Lecture |

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| | development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance | | |
| Unit-IV | Orthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae | C-22 | Lecture |
| | Quiz | C-23 | Quiz |
| Unit-IV | Lepidoptera:Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae | C-24 | Lecture |
| Unit-IV | Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae, Chalcididae | C-25 | Lecture |
| Unit-IV | Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae | C-26 | Lecture |
| | Clarification class | C-27 | Clarification Class |
| | Quiz | C-28 | Quiz |
| | Class room assignment-II | C-29 | Class Assignment |
| | Presentation | C-30 | Presentation |

**20025400 – Fundamentals of Entomology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Methods of collection and preservation of insects including immature stages | P1 | Practical |
| 2 | External features of Grasshopper/Blister beetle | P2 | Practical |
| 3 | Types of insect antennae, mouthparts and legs | P3 | Practical |
| 4 | Wing venation, types of wings and wing coupling apparatus | P4 | Practical |
| 5 | Types of insect larvae and pupae | P5 | Practical |
| 6 | Dissection of digestive system in insects (Grasshopper) | P6 | Practical |
| 7 | Dissection of male and female reproductive systems in insects (Grasshopper) | P7 | Practical |
| 8 | Study of characters of orders Orthoptera, Dictyoptera and their families of agricultural importance | P8 | Practical |
| 9 | Study of characters of Odonata, Isoptera, Thysanoptera and their families of agricultural importance | P9 | Practical |
| 10 | Study of characters of Hemiptera, Lepidoptera and their families of agricultural importance | P10 | Practical |
| 11 | Study of characters of Neuroptera, Coleoptera, and their families of agricultural importance | P11 | Practical |
| 12 | Study of characters of Hymenoptera, Diptera and their families of agricultural importance | P12 | Practical |
| 13 | Insecticides and their formulations | P13 | Practical |
| 14 | Pesticide appliances and their maintenance | P14 | Practical |
| 15 | Sampling techniques for estimation of insect population and damage | P15 | Practical |

**20001800 – Irrigation & Water Management**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Irrigation: definition and objectives | C-1 | Lecture |
| Unit-I | Water resources and irrigation development in India and Rajasthan | C-2 | Lecture |
| Unit-I | Soil moisture constants and theories of soil water availability | C-3 | Lecture |
| Unit-I | Methods of soil moisture estimation | C-4 | Lecture |
| Unit-I | Methods of soil moisture estimation | C-5 | Lecture |
| Unit-I | Evapo transpiration and crop water requirement | C-6 | Lecture |
| Unit-I | Scheduling of irrigation | C-7 | Lecture |
| Unit-I | Scheduling of irrigation | C-8 | Lecture |
| Unit-I | Scheduling of irrigation | C-9 | Lecture |
| Unit-I | Clarification class | C-10 | Clarification Class |
| Unit-II | Methods of irrigation: surface, sprinkler and drip irrigation | C-11 | Lecture |
| Unit-II | Methods of irrigation: surface, sprinkler and drip irrigation | C-12 | Lecture |
| | Guest Lecture | C-13 | Guest lecture |
| Unit-II | Irrigation efficiency and water use efficiency | C-14 | Lecture |
| Unit-II | Irrigation water quality and its management including conjunctive use of water | C-15 | Lecture |
| Unit-II | Irrigation water quality and its management including conjunctive use of water | C-16 | Lecture |
| Unit-II | Assignment-1 | C-17 | Class Assignment |
| Unit-II | Water management of different crops (rice, wheat, maize, groundnut, sugarcane, pearl millet, chickpea, mustard) | C-18 | Lecture |
| Unit-II | Water management of different crops (rice, wheat, maize, groundnut, sugarcane, pearl millet, chickpea, mustard) | C-19 | Lecture |
| Unit-II | Quiz | C-20 | Quiz |
| Unit-II | Agricultural drainage | C-21 | Lecture |
| Unit-II | Agricultural drainage | C-22 | Lecture |
| Unit-II | Clarification class | C-23 | Lecture |
| Unit-III | Importance of water in crop production | C-24 | Lecture |
| Unit-III | Soil Moisture constant | C-25 | Guest lecture |
| Unit-III | Soil Moisture constant | C-26 | Lecture |
| Unit-III | Assignment-2 | C-27 | Class Assignment |
| Unit-III | Estimation of potential evapo-transpiration and consumptive use | C-28 | Lecture |
| Unit-III | Estimation of potential evapo-transpiration and consumptive use | C-29 | Lecture |
| Unit-III | Home assignment | | Home Assignments |
| Unit-III | Water requirement of crops and factors affecting it | C-30 | Lecture |
| Unit-III | Approaches of irrigation scheduling | C-31 | Lecture |
| Unit-III | Approaches of irrigation scheduling | C-32 | Lecture |
| Unit-III | Quiz | C-33 | Quiz |
| Unit-III | Systems and methods of irrigation – drip, sprinkler and mist Irrigation | C-34 | Lecture |
| Unit-III | Systems and methods of irrigation – drip, sprinkler | C-35 | Lecture |

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|---|---|---|---|
| | and mist Irrigation | | |
| Unit-III | Webinar | C-36 | Webinar |
| Unit-III | Quantity and quality of irrigation | C-37 | Lecture |
| | Guest Lecture | C-38 | Guest lecture |
| Unit-III | Home assignment | | Home Assignments |
| Unit-III | Measurement of irrigation water | C-39 | Lecture |
| Unit-III | Measurement of irrigation water | C-40 | Lecture |
| Unit-III | Elementary idea of drainage on farms | C-41 | Lecture |
| Unit-III | Elementary idea of drainage on farms | C-42 | Lecture |
| Unit-III | Clarification class | C-43 | Clarification Class |
| Unit-III | Webinar | C-44 | Webinar |
| Unit-III | Presentation | C-45 | Presentation |

**20025600 – Soil & water Conservation Engineering**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Introduction to soil and water conservation | C-1 | Lecture |
| UNIT-I | Definition and Causes of soil erosion | C-2 | Lecture |
| UNIT-I | Agents of soil erosion | C-3 | Lecture |
| | Clarification class | C-4 | Clarification Class |
| UNIT-I | Introduction and forms of water erosion | C-5 | Lecture |
| UNIT-I | Types of water erosion | C-6 | Lecture |
| UNIT-I | Gully erosion and classification of gullies | C-7 | Lecture |
| | Clarification class | C-8 | Clarification Class |
| | Class room assignment | C-9 | Class Room Assignment |
| UNIT-I | Universal soil loss equation | C-10 | Lecture |
| UNIT-I | Soil loss measurement techniques | C-11 | Lecture |
| | Presentation | C-12 | Presentation |
| | Home assignment | C-12 | Home assignment |
| UNIT-II | Principals of erosion control | C-13 | Lecture |
| UNIT-II | Introduction of contouring and its design | C-14 | Lecture |
| | Class room assignment | C-15 | Class Room Assignment |
| UNIT-II | Introduction of strip cropping and its design | C-16 | Lecture |
| UNIT-II | Introduction of contour bunds and its design | C-17 | Lecture |
| | Home assignment | C-17 | Home assignment |
| UNIT-II | Introduction of graded bunds and its design | C-18 | Lecture |
| UNIT-II | Introduction of bench terraces and its design | C-19 | Lecture |
| | Clarification class | C-20 | Clarification Class |
| | Home assignment | C-20 | Home assignment |
| UNIT-II | Introduction of grassed waterways and its design | C-21 | Lecture |
| UNIT-II | Water harvesting and its techniques | C-22 | Lecture |
| | Class room assignment | C-23 | Class Room Assignment |
| UNIT-II | Wind erosion and its mechanics | C-24 | Lecture |
| UNIT-II | Types of soil movement | C-25 | Lecture |
| UNIT-II | Principals of wind erosion control | C-26 | Lecture |
| UNIT-II | Measures of wind erosion control | C-27 | Lecture |
| | Clarification class | C-28 | Clarification Class |
| | Quiz | C-29 | Quiz |
| | Presentation | C-30 | Presentation |

**20012500 – Soil & water Conservation Engineering Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Study of different types and forms of water erosion | P-1 | Practical |
| 2 | Computation on rainfall erosivity index | P-2 | Practical |
| 3 | Computation on rainfall erodibility index | P-3 | Practical |
| 4 | Determination of LS and CP for soil loss estimation through USLE and MUSLE | P-4 | Practical |
| 5 | Soil loss estimation techniques | P-5 | Practical |
| 6 | Study of rainfall simulator for erosion estimation | P-6 | Practical |
| 7 | Estimation of soil loss through cohoshton wheel sampler and multy slot devisor | P-7 | Practical |
| 8 | Determination of sediment concentration through oven dry method | P-8 | Practical |
| 9 | Design and layout of contour bunds | P-9 | Practical |
| 10 | Design and layout of graded bunds | P-10 | Practical |
| 11 | Design and layout of broad base terraces | P-11 | Practical |
| 12 | Design and layout of bench terraces, Design and layout of vegetative waterways | P-12,13 | Practical |
| 13 | Exercise on rate of sedimentation and storage loss in tanks, Computation of soil loss through wind erosion | P-14,15 | Practical |
| 14 | Design of wind breaks and shelterbelts | P-16 | Practical |
| 15 | Visit of soil erosion sites and water shed project to know the measures of soil conservation | P-17 | Practical |

**20025700– Fundamentals of Crop Physiology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Introduction to crop physiology and its importance in Agriculture | C1 | Lecture |
| Unit-1 | Plant cell: an Overview | C2 | Lecture |
| Unit-1 | Diffusion and osmosis | C3 | Lecture |
| Unit-1 | Absorption of water | C4 | Lecture |
| Unit-1 | Transpiration and Stomatal Physiology | C5 | Lecture |
| Unit-1 | Clarification Class | C6 | Clarification Class |
| Unit-1 | Mineral nutrition of Plants | C7 | Lecture |
| Unit-1 | Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms | C8 | Lecture |
| Unit-1 | Photosynthesis | C9 | Lecture |
| Unit-1 | Light and Dark reactions | C10 | Lecture |
| Unit-1 | C3 Cycle | C11 | Lecture |
| Unit-1 | Clarification Class | C12 | Clarification Class |
| Unit-1 | C4 Cycle | C13 | Lecture |
| Unit-1 | CAM Cycle | C14 | Lecture |
| Unit-1 | Respiration | C15 | Lecture |
| Unit-1 | Glycolysis | C16 | Lecture |
| Unit-1 | TCA cycle and electron transport chain | C17 | Lecture |
| Unit-1 | Clarification Class | C18 | Clarification Class |
| Unit-1 | Fat Metabolism: Fatty acid synthesis and Breakdown | C19 | Lecture |
| Unit-1 | Plant growth regulators | C20 | Lecture |
| Unit-1 | Physiological roles and agricultural uses | C21 | Lecture |
| Unit-1 | Physiological aspects of growth and development of major crops: Growth analysis | C22 | Lecture |
| Unit-1 | Role of Physiological growth parameters in crop productivity | C23 | Lecture |
| Unit-1 | Clarification Class | C24 | Clarification Class |
| Unit-1 | Class Room Assignment | C25 | Class Room Assignment |
| Unit-1 | Class Room Assignment | C26 | Class Room Assignment |
| Unit-1 | Class Room Assignment | C27 | Class Room Assignment |
| Unit-1 | Presentation | C28 | Presentation |
| Unit-1 | Presentation | C29 | Presentation |
| Unit-1 | Quiz | C30 | Quiz |

**20013500 – Fundamentals of Crop Physiology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Structure & Function of Plant Cell | P1 | Practical |
| 2 | Structure and distribution of stomata | P2 | Practical |
| 3 | Demonstration of imbibitions, osmosis and plasmolysis | P3 | Practical |
| 4 | Measurement of root pressure | P4 | Practical |
| 5 | Measurement of transpiration by different methods | P5 | Practical |
| 6 | Separation of photosynthetic pigments through paper chromatography | P6 | Practical |
| 7 | Separation of photosynthetic pigments through paper chromatography | P7 | Practical |
| 8 | Measurement of respiration by using Ganong's respirometer. | P8 | Practical |
| 9 | Measurement of respiration by using Ganong's respirometer. | P9 | Practical |
| 10 | Tissue tests for mineral nutrients | P10 | Practical |
| 11 | Tissue tests for mineral nutrients | P11 | Practical |
| 12 | Estimation of relative water content (RWC) | P12 | Practical |
| 13 | Estimation of relative water content (RWC) | P13 | Practical |

**20026200 – Fundamentals of Plant Pathology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to the science of phytopathology | C-1 | Lecture |
| 1 | Objectives and Scope of Plant Pathology | C-2 | Lecture |
| 1 | Historical Background | C-3 | Lecture |
| 2 | Classification of plant diseases | C-4 | Lecture |
| 2 | Symptoms, Signs, and related Terminology | C-5 | Lecture |
| 2 | Symptoms, Signs, and related Terminology | C-6 | Lecture |
| 1 | Clarification Class I | C-7 | Clarification Class |
| 3 | Quiz | C-8 | Lecture |
| 3 | Parasitic causes of plant diseases (fungi) their characteristics and classification | C-9 | Lecture |
| 3 | Plasmodiophoromycetes | C-10 | Lecture |
| 3 | Oomycetes and Ascomycetes | C-11 | Lecture |
| 3 | Basideomycetes | C-12 | Lecture |
| 3 | Class Room Assignment I | C-13 | Class Assignment |
| 3 | Deuteromyctes; Leaf spot, Blight | C-14 | Lecture |
| 3 | Deuteromycetes; Wilt and Rots | C-15 | Lecture |
| 3 | Nematodal Diseases | C-16 | Lecture |
|  | Presentation I | C-17 | Presentation |
| 3 | Bacterial Diseases | C-18 | Lecture |
| 3 | Virusal Diseases | C-19 | Lecture |
| 3 | Phytoplasma, Protozoa, Algal Diseases | C-20 | Lecture |
|  | Take Home Assignments I |  | Home Assignments |
| 3 | Flowering parasitic plants | C-21 | Lecture |
| 3 | Classroom Assignment II | C-22 | Class Assignment |
| 3 | Clarification Class II | C-23 | Clarification Class |
| 4 | Non-parasitic causes of plant diseases | C-24 | Lecture |
| 4 | Non-parasitic causes of plant diseases | C-25 | Lecture |
| 4 | Infection process I | C-26 | Lecture |
| 4 | Infection process II | C-27 | Lecture |
|  | Take Home Assignments II |  | Home Assignments |
| 4 | Survival of plant pathogens. | C-28 | Lecture |
| 4 | Dispersal of Plant Pathogens | C-29 | Lecture |
| 5 | Plant disease epidemiology | C-30 | Lecture |
|  | Presentation II | C-31 | Presentation |
| 5 | Disease forecasting | C-32 | Lecture |
| 5 | Disease Assessment | C-33 | Lecture |
| 5 | Clarification Class III | C-34 | Clarification Class |
| 6 | Disease management; Principles | C-35 | Webinar |
| 6 | Home Assignment-III |  | Home Assignments |
| 6 | Regulatory Methods and Cultural Practices | C-36 | Lecture |
| 6 | Physical Methods | C-37 | Lecture |
| 6 | Biological control | C-38 | Lecture |
| 6 | Production of Resistant Variety | C-39 | Lecture |
| 7 | Integrated Plant Disease Management | C-40 | Lecture |
| 8 | Fungicides classification based on chemical nature | C-41 | Lecture |
| 8 | Commonly used Fungicides | C-42 | Lecture |
| 8 | Bactericides and Nematicides | C-43 | Lecture |
| 8 | Classroom Assignment III | C-44 | Class Assignment |
| 8 | Clarification Class IV | C-45 | Clarification Class |

**20026300 – Fundamentals of Plant Pathology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | General Plant Pathological Laboratory Equipments | P1-P2 | Practical |
| 2 | Plant Pathological Field Equipments | P3-P4 | Practical |
| 3 | Diseases Caused by Plasmodiophoromycota, Chytridiomycota, zygomycota and Oomycota | P5-P6 | Practical |
| 4 | Diseases Caused by Basidiomycota - Smuts, rust | P7-P8 | Practical |
| 5 | Diseases Caused by Ascomycota - Powdery mildews, wilt and root rots | P9-P10 | Practical |
| 6 | Diseases Caused by Ascomycota –Stem, leaf and fruit diseases, Post Harvest Diseases of Fruits and Vegetables | P11-P12 | Practical |
| 7 | Bacterial Plant Diseases, Viral Diseases of Horticultural Plants, Parasitic Algae and Flowering Plants | P13-P14 | Practical |
| 8 | Culture Media and Sterilization | P15-P16 | Practical |
| 9 | Isolation of Fungal and Bacterial Plant Pathogens | P17-P18 | Practical |
| 10 | Fungicidal Solutions, Slurries and Pastes, and their Applications | P19-P20 | Practical |

**20026000 – Fundamentals of Agricultural Extension Education**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Education: Meaning, Definition & Types | C1 | Lecture |
| UNIT-I | Extension Education- Meaning, Definition, Scope & Process | C2 | Lecture |
| UNIT-I | Extension Programme Planning- Meaning, Process, Principles & Steps in Programme Development | C3 | Lecture |
| UNIT-I | Clarification Class | C4 | Clarification Class |
| UNIT-I | Extension System in India: Extension efforts in Pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment.) | C5 | Lecture |
| UNIT-I | Post-Independence era (Etawah Pilot Project, Nilokheri Experiment) | C6 | Lecture |
| UNIT-I | Various Extension/Agriculture development programmes launched by ICAR/Govt. of India-IADP, IAAP. | C7 | Lecture |
| UNIT-I | HYVP, KVK, IVLP, ORP, NDP | C8 | lecture |
| UNIT-I | NARP, ATIC, RKVY, Pradhan Mantri fasal bima yojna, soil health Card, NRLM | C9 | lecture |
| UNIT-I | Clarification Class | C10 | Clarification Class |
| UNIT-I | New Trends in Agriculture extension, privatization extension | C11 | Lecture |
| UNIT-I | Presentation | C12 | Presentation |
| UNIT-I | Cyber extension/e-extension | C13 | Lecture |
| UNIT-I | market-led extension, | C14 | Lecture |
| UNIT-II | Rural development: Concept, Meaning & definition | C15 | Lecture |
| UNIT-II | Webinar | C16 | Webinar |
| UNIT-II | various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, | C17 | Lecture |
| UNIT-II | Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; | C18 | Lecture |
| UNIT-II | Class Room Assignment | C19 | Class Room Assignment |
| UNIT-II | extension administration: meaning and concept, principles and functions. | C20 | Lecture |
| UNIT-II | Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel; | C21 | Lecture |
| UNIT-II | extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies; | C22 | Lecture |
| UNIT-II | Presentation | C23 | Presentation |
| UNIT-II | Class Room Assignment | C24 | Class Assignment |
| UNIT-II | Clarification Class | C25 | Clarification Class |
| UNIT-II | communication: meaning and definition; | C26 | Lecture |
| UNIT-II | Principles and Functions of Communication, models and barriers to communication. | C27 | Lecture |
| UNIT-II | | C28 | Lecture |

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|---|---|---|---|
| UNIT-II | Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories. | C29 | Lecture |
| UNIT-II | Clarification Class | C30 | Clarification Class |

**20026100 – Fundamentals of Agriculture Extension Education Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | To get acquainted with university extension system | P1 | Practical |
| 2 | Group discussion- exercise | P2 | Practical |
| 3 | Handling and use of audio visual equipments and digital camera and LCD projector | P3 | Practical |
| 4 | Preparation and use of AV aids, preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories | P4 | Practical |
| 5 | Presentation skills exercise; micro teaching exercise | P5 | Practical |
| 6 | A visit to village to understand the problems being encountered by the villagers/ farmers | P6 | Practical |
| 7 | To study organization and functioning of DRDA and other development departments at district level | P7 | Practical |
| 8 | To study organization and functioning of DRDA and other development departments at district level | P8 | Practical |
| 9 | Visit to NGO and learning from their experience in rural development | P9 | Practical |
| 10 | Understanding PRA techniques and their application in village development planning | P10 | Practical |
| 11 | Understanding PRA techniques and their application in village development planning | P11 | Practical |
| 12 | Exposure to mass media: visit to community radio and television studio for understanding the process of programme production | P12 | Practical |
| 13 | Exposure to mass media: visit to community radio and television studio for understanding the process of programme production | P13 | Practical |
| 14 | Script writing, writing for print and electronic media, developing script for radio and television | P14 | Practical |
| 15 | Script writing, writing for print and electronic media, developing script for radio and television | P15 | Practical |

**20002300 – Ability and Skill Enhancement**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT I | Phonetic symbols and the International Phonetic Alphabets (IPA) | C-1 | Lecture |
| UNIT I | Phonetic symbols and the International Phonetic Alphabets (IPA) | C-2 | Lecture |
| UNIT I | The Description and Classification of Vowels (Monophthongs & Diphthong) Consonants, | C-3 | Lecture |
| UNIT I | Syllable, Stress &Intonations | C-4 | Lecture |
| UNIT I | Reading aloud, recording audio clips. | C-5 | Lecture |
| UNIT I | Reading aloud, recording audio clips. | C-6 | Lecture |
| | Clarification Class-1 | C-7 | Clarification Class -1 |
| | Class Room Assignment No .1 | C-8 | Class Assignment |
| UNIT II | Idioms and Phrases | C-9 | Lecture |
| UNIT II | Presentation | C-10 | Presentation |
| UNIT II | Words Often Confused | C-11 | Lecture |
| | Take Home Assignment -1 | | Home Assignments |
| UNITII | One word Substitution Word Formation Prefix and Suffix | C-12 | Lecture |
| UNIT II | Clarification Class -2 | C-13 | Clarification Class |
| UNIT II | Guest Lecture | C-14 | Guest Lecture |
| UNIT II | Class Room Assignment No .2 | C-15 | Class Assignment |
| UNIT III | What are ethics, what are values, difference between ethics and moral | C-16 | Lecture |
| UNIT III | Webinar | C-17 | Webinar |
| UNIT III | Business ethics, workplace ethics, what are virtues for e.g. civic virtues, etc./Moot court workshop | C-18 | Lecture |
| UNIT III | QUIZ | C-19 | Quiz |
| UNIT III | Human ethics 5 core human values are: right conduct, living in peace, speaking the truth, loving and care, and helping others. /Moot Court workshop | C-20 | Lecture |
| UNIT III | Seminar | C-21 | Seminar |
| UNIT III | Etiquettes awareness importance of First Impression Personal Appearance & Professional presence, Personal Branding, Dressing Etiquette | C-22 | Activity |
| UNIT III | Dining Etiquettes/first impression | C-23 | Activity |
| | Clarification Class -3 | C-24 | Clarification Class |
| Unit IV | Reading Comprehension | C-25 | Lecture |
| UNIT IV | News Reading, News Writing | C-26 | Activity |
| UNIT IV | Picture Description, Paragraph Writing | C-27 | Lecture |
| UNIT IV | Public Speaking/Debate/listening | C-28 | Activity |
| UNIT IV | Presentation -2 | C-29 | Activity |
| UNIT IV | Inspirational Movie Screening, Skit Performance. | C-30 | Activity |

| Course | Course outcomes: - After completion of these courses students should be able to |
|---|---|
| **8.1 Semester – III** | |
| 20012200 - Crop Production Technology – I (Kharif Crops) | **CO1:** Find the knowledge on kharif season crops, its classification (cereal crops, oilseed crops, pulse crops, sugar crops, fodder crops) and its importance in agriculture and national economy.<br>**CO2:** Illustrate the origin, geographical distribution and economic importance of kharif crops<br>**CO3:** Identify the soil and climatic requirements of Kharif crops<br>**CO4:** Examine the cultural practices, varieties and yield of Kharif crops<br>**CO5:** Identification of different weeds of Kharif season |
| 20012300 Crop Production Technology – I Lab (Kharif Crops) | **CO1:** List of Kharif crop with their botanical name<br>**CO2:** Explain effect of sowing depth on germination of kharif crops.<br>**CO3:** Identification of weeds in kharif season crops,<br>**CO4:** Compare method of rice nursery rising.<br>**CO5:** Importance of top dressing and foliar feeding of nutrients. |
| 20002100 Fundamentals of Plant Breeding | **CO1:** Explain about centers of origin, components of genetic variation; heritability and genetic advance.<br>**CO2:** Interpret modes of reproduction and apomixes, self-incompatibility and male sterility.<br>**CO3:** Evaluate the Genetic basis, methods of breeding in cross pollinated crops and modes of selection.<br>**CO4:** Adapt the breeding method for self, cross and asexually propagated crops.<br>**CO5:** Develop a consultant company to guide & supply the better varieties to the farmers. |
| 20002200 Fundamentals of Plant Breeding Lab | **CO1:** Define the study of floral structure of self pollinated and cross pollinated crops.<br>**CO2:** Interpret the consequences of inbreeding on genetic structure of resulting populations.<br>**CO3:** Explain the emasculation and hybridization techniques in self & cross pollinated crops.<br>**CO4:** Examine the handling of segregating populations.<br>**CO5:** Classify different germplasm of various crops. |
| 20012600 - Agricultural Finance and Cooperation | **CO1:** Explain the different credit needs and its role in Indian agriculture.<br>**CO2:** Summarize how the commercial banks are working, functioning the RRB's, KCC and lead bank scheme, preparing the income statements, balance sheets and project proposal.<br>**CO3:** Summarize the ability to understand the terminology and facts about agriculture Finance and Cooperation.<br>**CO4:** Classify with the different cooperatives working in India.<br>**CO5:** Discuss the roles and responsibility of ICA, NCUI, NCDC, and NAFED. |

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| 20012700 Agricultural Finance and Cooperation Lab | **CO1:** Analysis of progress and performance of cooperatives using published data.<br>**CO2:** Identify of most profitable level of capital use. Optimum allocation of limited amount of capital among different enterprise.<br>**CO3:** Apply of a loan proposal- A case study.<br>**CO4:** Classify and analysis of income statement – A case study.<br>**CO5:** Criteria for Bankable projects for various agricultural products and its value- added products. |
| 20012800 - Agri-Informatics | **CO1:** Interpret with basic terms of software and hardware, input/output devices, database, World Wide Web, DBMS in Agriculture, ICT in Agriculture, etc.<br>**CO2:** Explain about computer models for understanding plant processes.<br>**CO3:** Make use of MS Office for document creation & Editing, Data presentation, interpretation, graph creation, statistical analysis and mathematical expressions.<br>**CO4:** Develop the understanding of application software, Smartphone apps, programming languages, geospatial technology for generating valuable agri-information, decision support systems, etc.<br>**CO5:** Importance of geospatial technology for generating valuable agri-information, decision support systems |
| 20012900 Agri- Informatics Lab | **CO1:** What are the components of a computer, introduction to computer languages, operating system, mobile agricultural applications, expert systems and decision support systems<br>**CO2:** Demonstrating how to use expert system and of geospatial technology for generating valuable information for agriculture.<br>**CO3:** Construct word document, excel sheets, power point and data bases using MS Office<br>**CO4:** Estimate the crop stimulation models<br>**CO5:** Develop contingent crop planning. |
| 20013000 - Farm Machinery and Power | **CO1:** What are primary and secondary tillage implement and Tell about the implement used for hill agriculture.<br>**CO2:** Explain about air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor<br>**CO3:** Identify different components of I.C. engine, I.C. engine terminology and solved problems.<br>**CO4:** Analyse the operation of farm machinery equipment also examines the harvesting, threshing and land preparation (heavy) machinery needed for agricultural farm.<br>**CO5:** Develop the Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment. |
| 20013100 Farm Machinery and Power lab | **CO1:** Create a habit of handling the implements carefully.<br>**CO2:** Compare the efficiency of two stroke and four stroke engine.<br>**CO3:** Operation of tractor and its mechanization.<br>**CO4:** Demonstrate through various models' farm implements. |

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| | **CO5:** Identify different components of engine and various agricultural implements. |
| 20013200 - Production Technology for Vegetables and Spices | **CO1:** Find practical knowledge on specific production techniques of vegetables and spices.<br>**CO2:** Explain importance of vegetables and spices in human nutrition.<br>**CO3:** Outline scope of vegetables and spices in national economy.<br>**CO4:** Solve the Problems of nursery and field.<br>**CO5:** Evaluate the nutrition requirement for humans through Vegetables |
| 20013300 Production Technology for Vegetables and Spices Lab | **CO1:** Develop the understanding of vegetable growing.<br>**CO2:** Compare between various parts vegetable and spices.<br>**CO3:** Design of various nursery beds for raising of seedlings.<br>**CO4:** Classify the various vegetables on basis of their nutritional Values.<br>**CO5:** Develop the seedlings through the pro-tray method. |
| 20025200 Environmental Studies & Disaster Management | **CO1:** What is environment and its multidisciplinary nature.<br>**CO2:** Understanding ecosystem and its components.<br>**CO3:** Utilize natural resources in a sustainable manner and prevent their extinction at individual level.<br>**CO4:** Analyse problems related to environment- Global warming, Acid rain, Ozone layer depletion and their management.<br>**CO5:** Determine causes of environmental pollution, Extinction of biodiversity, solid waste, wasteland, natural disasters and manmade disasters and their management. |
| 20025800 Statistical Methods | **CO1:** Define the basic statistical tools used for managerial decision-making.<br>**CO2:** Understand and interpret simple linear regression analysis and use it in decision making.<br>**CO3:** Apply Numerical Analysis & have wider knowledge of statistics with more emphasis on applications.<br>**CO4:** Analyse the data & take the decisions, combine judgment and statistical analysis are more likely to be successful.<br>**CO5:** Decide the use of suitable statistical tools and techniques to suitable data for analysis and decision making. |
| 20013800 - Livestock and Poultry Management | **CO1:** Identify indigenous and exotic breeds of cattle, buffalo, sheep, goat and poultry.<br>**CO2:** Discover the understanding about principles, planning, and technical approach for reproduction management in different farm animals. Introduce the diseases of livestock and poultry and its prevention (including vaccination schedule) and control of important diseases of livestock and poultry.<br>**CO3:** Determine the ability to select different types of houses suited in specific climatic conditions for best management of calves, growing heifers and milch animals.<br>**CO4:** Discuss digestive system of livestock and poultry, classification of feed stuffs, nutrients and their functions with animal diseases. |

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| | **CO5:** Information about Indian agricultural concerns and future prospects |
| 20013900 Livestock and Poultry Management Lab | **CO1:** What are external body parts of different animals.<br>**CO2:** Classify the different animals.<br>**CO3:** Identification methods of farm animals and poultry.<br>**CO4:** Survey of IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records.<br>**CO5:** Estimate the economics yield of cattle, buffalo, sheep, goat, swine and poultry production. |
| 20014100 - Ability and Skill Enhancement - III | **CO1:** Classify the different types of reviews i.e. book review, movie review etc.<br>**CO2:** Express his/ her feeling at pressor situation or emotional situation<br>**CO3:** Explain his/her thoughts in group discussion and also build leadership quality<br>**CO4:** Enhance creativity in making documentary etc.<br>**CO5:** Manage negative emotions keeping balance of mental stability, stress and distress. |

## 8.2 Mapping: Semester – III

| 20012200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | 2 | 3 | 3 | 2 | | 2 | 2 | | 3 | 2 |
| CO2 | 3 | | | 2 | | 3 | 2 | 2 | | | | |
| CO3 | 3 | 2 | 2 | | 3 | 3 | 2 | | 2 | 3 | 3 | 3 |
| CO4 | 2 | 3 | 3 | 3 | 3 | | 3 | 3 | | 3 | 3 | 3 |
| CO5 | 3 | 2 | | 3 | 2 | | 2 | | 2 | | 3 | 2 |

| 20012300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 |
| CO2 | 2 | | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | | 2 | 2 | 3 | 2 |
| CO4 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |

| 20002100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | | 2 | 3 | | 2 | 2 | 2 | | 2 |
| CO2 | 2 | 2 | 3 | 2 | | 3 | 2 | | 3 | 3 | 2 | |
| CO3 | 3 | 3 | | | 2 | 2 | 3 | 3 | 3 | | 2 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 3 | | 2 | | 2 | 2 | 3 | 2 |
| CO5 | 2 | 3 | 2 | 3 | | 3 | 3 | 3 | 2 | | 2 | 2 |

| 20002200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | 2 | 2 | | 2 | 2 | | 2 | 2 | 2 | 3 | 2 |
| CO2 | 2 | 2 | 3 | | 3 | 3 | 2 | | | 3 | 2 | 2 |
| CO3 | 2 | 2 | | 2 | | 2 | 3 | 1 | 2 | 2 | 3 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | | 2 | |
| CO5 | 3 | 3 | 3 | 3 | | 2 | 3 | 2 | 3 | 3 | | 2 |

| 20012600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | | 2 | | 2 | 2 | 3 | 2 | 2 |
| CO2 | 3 | 2 | 3 | 2 | 2 | 2 | | | 2 | | 3 | |
| CO3 | 2 | 3 | 2 | 3 | | | 2 | 2 | | 2 | | 3 |
| CO4 | 3 | 2 | | | 3 | 2 | 2 | | 3 | 2 | 2 | |
| CO5 | 2 | 2 | 2 | | 3 | | 2 | 3 | 3 | | 2 | 3 |

| 20012700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | | 3 | | 3 |
| CO2 | 2 | 3 | | 3 | 2 | 3 | 2 | 2 | 3 | 3 | | 3 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 |
| CO4 | 2 | | 2 | 3 | | 3 | | 2 | | 2 | 2 | 3 |
| CO5 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | | 2 | 2 | 2 | 3 |

| 20012800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 1 | | | | 3 | 2 | 3 | 3 | | 2 | 3 | 3 |
| CO2 | 3 | 2 | 2 | | 3 | 2 | 3 | 3 | | 3 | 3 | 3 |
| CO3 | 3 | 2 | | 3 | 3 | | 3 | | | 2 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 2 | | 3 | 3 |

| 20012900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | | 3 | 2 | 2 | 3 | | 2 | 3 | 3 | 2 |
| CO2 | | 1 | 2 | 2 | 3 | | 3 | 2 | 3 | | 3 | 3 |
| CO3 | 2 | | | 2 | 2 | 3 | 2 | 1 | | 3 | | 3 |
| CO4 | 3 | 3 | 2 | | | 3 | | | 3 | | 3 | |
| CO5 | 2 | 2 | 3 | 3 | 3 | | 3 | 3 | | 3 | 3 | 2 |

| 20013000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 1 | 3 |
| CO2 | 3 | 1 | 2 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 2 | 3 |
| CO3 | 3 | 2 | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 2 | 2 | 1 |
| CO4 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO5 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 |

| 20013100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 |
| CO2 | 3 | 2 | 2 | 3 | 3 | 1 | 2 | 3 | 2 | 2 | 1 | 2 |
| CO3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 1 | 1 |
| CO4 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 1 | 3 | 1 | 1 | 1 |
| CO5 | 2 | 3 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 1 |

| 20013200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 2 |
| CO2 | 3 | 3 | 1 | 2 | 1 | 1 | 3 | 2 | 1 | 2 | 3 | 1 |
| CO3 | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| CO4 | 3 | 2 | 1 | 3 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 2 |
| CO5 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 |

| 20013300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 1 | 1 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 |
| CO3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 |
| CO4 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 1 |
| CO5 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 1 | 2 | 2 |

| 20025200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 3 |
| CO2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO4 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 |

| 20025800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | | 3 | 2 | 3 | 2 | 2 | 3 | 3 | | 3 |
| CO2 | | 3 | 3 | | 2 | 2 | | 3 | | | 3 | 3 |
| CO3 | 3 | | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| CO4 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 |
| CO5 | 3 | 3 | 3 | 3 | | 3 | 3 | | 3 | 3 | 3 | 3 |

| 20013800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | | | | 2 | | 2 | 2 | 2 | 3 | |
| CO2 | 2 | 3 | 3 | 3 | 2 | | | 2 | 2 | | 3 | 2 |
| CO3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | | 2 | 2 | 2 | 3 |
| CO4 | 2 | | 2 | 3 | | 3 | | 2 | | 2 | 2 | 3 |
| CO5 | 2 | | 2 | | 3 | 3 | 3 | 3 | 3 | | 3 | 3 |

| 20013900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 1 | | | | | 2 | | 2 | 2 | 2 | 3 | |
| CO2 | 2 | 1 | 2 | 3 | 2 | | | 2 | 1 | | 3 | 2 |
| CO3 | 2 | 2 | 1 | 2 | 1 | 3 | 2 | | 2 | 2 | 1 | |
| CO4 | 2 | | 2 | 3 | | 1 | | 2 | | 2 | 2 | 3 |
| CO5 | 2 | | 2 | | 3 | 3 | 3 | 3 | 3 | | | 3 |

| 20014100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 3 | | 3 | | 2 | 2 | 3 | 3 | 2 |
| CO2 | 2 | 2 | 3 | 3 | | 2 | | 2 | | 3 | 2 | 2 |
| CO3 | 2 | | | | 3 | 2 | | 3 | 2 | 3 | 2 | 2 |
| CO4 | 2 | | 2 | | 2 | | | 2 | | 3 | | 2 |
| CO5 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 |

## 8.3 Lesson Plan – Semester - III

**20012200 – Crop Production Technology – I (Kharif Crops)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | | | ppt |
| UNIT-I | Cultivation of Rice | C1 | ppt |
| UNIT-I | Cultivation of Maize | C2 | Lecture |
| UNIT-I | Cultivation of sorghum | C3 | Lecture |
| UNIT-I | Cultivation of pearl millet | C4 | lecture |
| UNIT-I | Cultivation of mung bean and urd bean | C5 | Lecture |
| UNIT-I | Cultivation of groundnut | C6 | Lecture |
| UNIT-I | Cultivation of Soybean | C7 | Lecture |
| UNIT-I | Cultivation of cotton | C8 | lecture |
| UNIT-I | Cultivation of jute | C9 | Lecture |
| UNIT-I | Presentation | C10 | Presentation |
| UNIT-I | Cultivation of forage sorghum | C11 | Lecture |
| UNIT-I | Cultivation of cowpea | C12 | Lecture |
| UNIT-I | Cultivation of cluster bean | C13 | Lecture |
| UNIT-I | Cultivation of naiper | C14 | Lecture |
| UNIT-I | Quiz | C15 | Quiz |

**20012300 – Crop Production Technology – I Lab (Kharif Crops)**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Rice nursery preparation, transplanting of rice | P1 | Practical |
| 2 | Sowing of soybean, pigeonpea and mung bean. Maize | P2 | Practical |
| 3 | Sowing of groundnut and cotton | P3 | Practical |
| 4 | Effect of seed size on germination and seedling vigour of kharif season crops | P4 | Practical |
| 5 | Effect of sowing depth on germination of kharif crops | P5 | Practical |
| 6 | Identification of weeds in kharif season crops | P6 | Practical |
| 7 | Identification of weeds in kharif season crops | P7 | Practical |
| 8 | Top dressing and foliar feeding of nutrients | P8 | Practical |
| 9 | study of yield contributing characters in kharif crops | P9 | Practical |
| 10 | study of yield calculation in kharif crops | P10 | Practical |
| 11 | study of crop varieties at experimental farm | P11 | Practical |
| 12 | study of important agronomic experiments at experimental farm | P12 | Practical |
| 13 | Study of forage experiments | P13 | Practical |
| 14 | Study of morphological description of kharif season crops | P14 | Practical |
| 15 | visit to research centres of related crops | P15 | Practical |

**20002100 – Fundamentals of Plant Breeding**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Historical development, concept, nature and role of plant breeding, objectives of plant breeding, major achievements and future prospects | C-1 | Lecture |
| 2 | Genetics in relation to plant breeding, modes of reproduction, pollination and apomixes, s | C-2 | Lecture |
| 3 | self – incompatibility and male sterility- genetic consequences, cultivar options. | C-3 | Lecture |
| 4 | Domestication, Acclimatization, introduction; Centre of origin/diversity. | C-4 | Lecture |
| 5 | Component of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops- mass and pure line selection, | C-5 | Lecture |
| 6 | pedigree, bullk, SSD and backcross methods, hybridization techniques and handling of segregating population; Multiline concept. | C-6 | Lecture |
| 7 | concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops | C-7 | Lecture |
| 8 | modes of selection; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; | C-8 | Lecture |
| 9 | Breeding methods in asexually propagated crops, clonal selection and hybridization; Wide hybridization and pre-breeding | C-9 | Lecture |
| 10 | Polyploidy in relation to plant breeding, mutation breeding-methods and uses; | C-10 | Lecture |
| 11 | Breeding for important biotic and abiotic stresses | C-11 | Lecture |
| 12 | Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Development and release of varieties | C-12 | Lecture |

**20002200– Fundamentals of Plant Breeding Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Plant Breeder's kit, Study of germplasm of various crops. | C-1 | Practical |
| 2 | Study of floral structure of self pollinated and cross pollinated crops. | C-2 | Practical |
| 3 | Emasculation and hybridization techniques in self & cross pollinated crops. | C-3 | Practical |
| 4 | Methods of calculating mean, range, variance, standard deviation, heritability. | C-4 | Practical |
| 5 | Designs used in plant breeding experiment, analysis of Randomized Block Design and components of genetic variance. | C-5 | Practical |

**20012600 – Agricultural Finance and Cooperation**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Agriculture Finance Meaning and Scope, credit needs | C1 | Lecture |
| 1 | credit needs roles and its role in Indian agriculture | C2 | Lecture |
| 1 | Agriculture credit- meaning and need | C3 | Lecture |
| 1 | Classification of Agri Credit and credit analysis | C3 | Lecture |
| 1 | 4 R's and 3 C's of credit | C5 | Lecture |
| 1 | 4 R's and 3 C's of credit | C6 | Presentation |
| 1 | Sources if agriculture finance - Institutional sources and non institutional finance and agriculture insurance | C7 | Lecture |
| 1 | Sources if agriculture finance - Institutional sources and non institutional finance and agriculture insurance | C8 | Lecture |
| 1 | Higher Financing Institutions - NABARD | C9 | Lecture |
| 1 | Higher Financing Institutions - NABARD | C10 | Lecture |
| I | Presentation of Students - NABARD, ADB and IMF | C11 | Presentation |
| II | Presentation of Students - NABARD, ADB and IMF | C12 | Presentation |
| II | Seminar Activity | C13 | Clarification Class |
| II | RBI Regulation and role of PACs | C14 | CRA |
| II | RBI Regulation and role of PACs | C15 | Clarification Class |
| II | SWOT Analysis and Financial Statements | C16 | Webinar |
| III | SWOT Analysis and Financial Statements | C17 | Lecture |
| III | Agriculture Cooperations- Meaning history and Objective and significance | C18 | Lecture |
| III | Agriculture Cooperations- Meaning history and Objective and significance | C19 | Lecture |
| III | ICA, NCUI, NCDC, NAFED | C20 | Presentation |
| III | ICA, NCUI, NCDC, NAFED | C21 | Lecture |
| IV | Agriculture Marketing | C22 | Guest Lecture |
| IV | Agriculture Marketing | C23 | Lecture |
| IV | Clarification Class | C24 | Lecture |
| IV | Clarification Class | C25 | Lecture |
| IV | Clarification Class | C26 | Lecture |

**20012700 – Agricultural Finance and Cooperation Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Determinants of most profitable level of capital | C1 | Practical |
| 2 | Optimum allocation of resources and limited capita | C2 | Practical |
| 3 | Analysis of progress and performance of cooperation using published data | C3 | Practical |
| 4 | Performance of commercial banks | C4 | Practical |
| 5 | Performance of Regional Rural banks | C5 | Practical |
| 6 | Commercial Banks Visit | C6 | Practical |
| 7 | Visit of cooperative bank and cooperative society | C7 | Practical |
| 8 | Various schemes of banks and cooperative society | C8 | Practical |
| 9 | Estimation of credit requirement of farm business | C9 | Practical |
| 10 | Case study - Analysis of balance sheet | C10 | Practical |
| 10 | Case study - Analysis of Income statement | C11 | Practical |
| 12 | Appraisal of loan policy | C12 | Practical |
| 13 | Project preparation - Technoeconomic parameters | C13 | Practical |
| 14 | Bank project preparation for bank projects | C14 | Practical |
| 15 | Value added products | C15 | Practical |

**20012800 – Agri- Informatics**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | | | |
| Unit I | Introduction to Computers, Operating Systems, definition and types | C1 | Lecture |
| Unit I | Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph Creation | C2 | Lecture |
| Unit I | Statistical analysis, mathematical expressions, Database, concepts and types | C3 | Lecture |
| Unit I | Uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components | C4 | Lecture |
| Unit I | Clarification Class | C5 | Clarification Class |
| Unit I | Take Home Assignments | | Home Assignments |
| Unit II | Introduction to computer programming languages, concepts and standard input/output operations e-Agriculture, concepts and applications | C6 | Lecture |
| Unit II | Use of ICT in Agriculture. Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops | C7 | Lecture |
| Unit II | Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc. | C8 | Lecture |
| Unit II | Clarification Class | C9 | Clarification Class |
| Unit II | Take Home Assignments | | Home Assignments |
| Unit III | Geospatial technology for generating valuable agri-information Decision support systems, concepts, components and applications in Agriculture | C10 | Lecture |
| Unit III | Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions | C11 | Lecture |
| Unit III | Preparation of contingent crop-planning using IT tools | C12 | Lecture |
| Unit III | Clarification Class | C13 | Clarification Class |
| Unit III | Class Room Assignment | C14 | Class Assignment |
| Unit III | Presentation | C15 | Presentation |

**20012900 – Agri- Informatics Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Study of Computer Components, accessories, practice of important DOS Commands. | P1 | Practical |
| 2 | Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document | P2 | Practical |
| 3 | Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document | P3 | Practical |
| 4 | Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document | P4 | Practical |
| 5 | MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. | P5 | Practical |
| 6 | MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. | P6 | Practical |
| 7 | MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri- information system. | P7 | Practical |
| 8 | Introduction to World Wide Web (WWW). | P8 | Practical |
| 9 | Introduction of programming languages. | P9 | Practical |
| 10 | Introduction of programming languages. | P10 | Practical |
| 11 | Hands on Crop Simulation Models (CSM) such as DSSAT/ Crop-Info/ Crop Syst/ Wofost | P11 | Practical |
| 12 | Computation of water and nutrient requirements of crop using CSM and IT tools. | P12 | Practical |
| 13 | Introduction of Geospatial Technology for generating valuable information for Agriculture | P13 | Practical |
| 14 | Hands on Decision Support System. | P14 | Practical |
| 15 | Preparation of contingent crop planning. | P15 | Practical |

**20013000 – Farm Machinery and Power**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit 1 | Status of Farm Power in India, Sources of Farm Power, | C-1 | Lecture |
| Unit 2 | I.C. engines, | C-2 | Lecture |
| Unit 2 | working principles of IC engines | C-3 | Lecture |
| Unit 2 | Study of different components of I.C. engine | C-4 | Lecture |
| Unit 2 | comparison of two stroke and four stroke cycle engines, | C-5 | Lecture |
| Unit 2 | I.C. engine terminology and solved problems, | C-6 | Lecture |
| Unit 3 | Familiarization with different systems of I.C. engines | C-7 | Lecture |
| Unit 3 | Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor | C-8 | Lecture |
| Unit 4 | Familiarization with Power transmission system: | C-9 | Lecture |
| Unit 4 | clutch, gear box, differential and final drive of a tractor, Tractor types, | C-10 | Lecture |
| Unit 4 | Cost analysis of tractor power and attached implement. | C-11 | Lecture |

**20013100 – Farm Machinery and Power Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Study of different components of I.C. engine. | P 1 | PPT and Video file |
| 2 | To study air cleaning and cooling system of engine, | P 2 | PPT and Video file |
| 3 | Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, | P 3 | PPT and Video file |
| 4 | Familiarization with brake, steering, hydraulic control system of engine, | P 4 | PPT and Video file |
| 5 | Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, | P 5 | PPT and Video file |
| 6 | Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow. | P 6 | PPT and Video file |
| 7 | Familiarization with seedcum- fertilizer drills their seed metering mechanism and calibration, planters and transplanter | P 7 | PPT and Video file |
| 8 | Familiarization with different types of sprayers and dusters Familiarization with different inter-cultivation equipment, Familiarization with harvesting and threshing machinery | P 8 | PPT and Video file |

**20013200 – Production Technology for Vegetables and Spices**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Importance of vegetables & spices in human nutrition and national economy, kitchen gardening | C1 | Lecture |
| 2 | Brief about origin, area, climate, soil, improved varieties; Solanaceae | C2 | Lecture |
| 3 | Cultivation practices; cucurbitaceae | C3 | Lecture |
| 4 | Class Room Assignment I | C4 | Class Room Assignment |
| 5 | Cultivation practices; Beans | C5 | Lecture |
| 6 | Home Assignments I | | Take Home Assignments |
| 7 | Cultivation practices; Cole crops | C6 | Lecture |
| 8 | Cultivation practices; Bulb crops | C7 | Lecture |
| 9 | Quiz I | C8 | Quiz |
| 10 | Cultivation practices; Root Crops | C9 | Lecture |
| 11 | Cultivation practices; Tuber Crops | C10 | Lecture |
| 12 | Presentation | C11 | Presentation |
| 13 | Cultivation practices; Leafy Vegetables | C12 | Lecture |
| 14 | Cultivation practices; Perennial vegetables | C13 | Presentation |
| 15 | Home Assignments II | | Take Home Assignments |
| 16 | Clarification Class | C14 | Clarification Class |
| 17 | Class Room Assignment II | C15 | Class Room Assignment |
| 18 | Quiz II | C16 | Quiz |

**20013300– Production Technology for Vegetables and Spices Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Identification of vegetables & spice crops and their seeds. | P1-P2 | Practical |
| 2 | Nursery raising. | P3-P4 | Practical |
| 3 | Direct seed sowing and transplanting | P5-P6 | Practical |
| 4 | Study of morphological characters of different vegetables & spices | P7-P8 | Practical |
| 5 | Study of morphological characters of different vegetables & spices | P9-P10 | Practical |
| 6 | Fertilizers applications. Harvesting & preparation for market | P11-P12 | Practical |
| 7 | Economics of vegetables and spices cultivation | P13-P14 | Practical |
| 8 | Clarification Class | C1 | Clarification Class |

**20025200 – Environmental Studies & Disaster Management**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit 1 | Multidisciplinary nature of environmental studies Definition, scope and importance | C1 | Lecture |
| Unit 2 | Natural Resources: Renewable and non-renewable resources. Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people | C2 | Lecture |
| Unit 2 | b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefitsh and problems | C3 | Lecture |
| Unit 2 | c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies | C4 | Lecture |
| Unit 2 | d)Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies | C5 | Lecture |
| Unit 2 | e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies | C6 | Lecture |
| Unit 2 | Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification | C7 | Lecture |
| Unit 2 | Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles | C8 | Lecture |
| Unit 3 | Ecosystems • Concept of an ecosystem | C9 | Lecture |
| | Home Assignment 1 | | Home Assignment |
| | Clarification Class 1 | C10 | Clarification Class |
| Unit 3 | Structure and function of an ecosystem. • Producers, consumers and decomposers. | C11 | Lecture |
| Unit 3 | Energy flow in the ecosystem. • Ecological succession | C12 | Lecture |
| Unit 3 | Food chains, food webs and ecological pyramids | C13 | Lecture |
| Unit 3 | Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem; b. Grassland ecosystem; c. Desert ecosystem; d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) | C14 | Lecture |
| Unit 4 | Biodiversity and its conservation:- Introduction, definition, genetic, species & ecosystem diversity | C15 | Lecture |
| Unit 4 | Biogeographical classification of India | C16 | Lecture |
| Unit 4 | Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values | C17 | Lecture |
| Unit 4 | Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts | C18 | Lecture |

| | | | |
|---|---|---|---|
| Unit 4 | Endangered and endemic species of India. Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity | C19 | Lecture |
| | Home Assignment 2 | | Home Assignment |
| | Quiz 1 | C20 | Quiz |
| Unit 5 | Environmental Pollution: definition, cause, effects and control measures of :a. Air pollution; b. Water pollution | C21 | Lecture |
| Unit 5 | c. Soil pollution; d. Marine pollution | C22 | Lecture |
| Unit 5 | e. Noise pollution; f. Thermal pollution; g. Nuclear hazards | C23 | Lecture |
| Unit 5 | Solid Waste Management: causes, effects and control measures of urban and industrial wastes | C24 | Lecture |
| Unit 5 | Role of an individual in prevention of pollution. Pollution case studies | C25 | Lecture |
| | Class Room Assignment 1 | C26 | Class Assignment |
| Unit 6 | Social Issues and the Environment: From Unsustainable to Sustainable development; Urban problems related to energy | C27 | Lecture |
| Unit 6 | Water conservation, rain water harvesting, watershed management | C28 | Lecture |
| Unit 6 | Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dyes. Wasteland reclamation | C29 | Lecture |
| Unit 6 | Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act | C30 | Lecture |
| | Power Point Presentation | C31 | Presentation |
| | Clarification Class 2 | C32 | Clarification Class |
| Unit 6 | Issues involved in enforcement of environmental legislation. Public awareness | C33 | Lecture |
| Unit 7 | Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. | C34 | Lecture |
| Unit 7 | Environment and human health: Human Rights, Value Education, HIV/AIDS | C35 | Lecture |
| Unit 7 | Women and Child Welfare | C36 | Lecture |
| Unit 7 | Role of Information Technology in Environment and human health | C37 | Lecture |
| | Clarification Class 3 | C38 | Clarification Class |
| Unit 1 | **Disaster Management** Natural Disasters- Meaning and nature of natural disasters, their types and effects | C39 | Lecture |
| Unit 1 | Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion | C40 | Lecture |
| Unit 2 | Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, | C41 | Lecture |

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| | deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents | | |
| Unit 3 | Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community – based organizations and media | C42 | Lecture |
| Unit 3 | Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations | C43 | Lecture |
| | Class Room Assignment 2, Quiz 2 | C44 | Class Assignment Quiz |
| | Clarification Class 4 | C45 | Clarification Class |

**20025800 – Statistical Methods**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-I | Introduction to Statistics | C1 | Lecture |
| Unit-I | its Applications in Agriculture | C2 | Lecture |
| Unit-I | Graphical Representation of Data, | C3 | Lecture |
| Unit-I | Measures of Central Tendency-Mean | C4 | Lecture |
| Unit-I | Measures of Central Tendency-Median Mode | C5-C7 | Lecture |
| Unit-I | Measures of Central Tendency-HM and GM | C8-C10 | Lecture |
| Unit-I | Dispersion, | C11-C12 | Lecture |
| Unit-I | Definition of Probability, Addition and Multiplication Theorem (without proof) | C13-C14 | Lecture |
| Unit-I | Simple Problems Based on Probability | C-15 | Lecture |
| Unit-I | Binomial & Poisson Distributions, | C16-17 | Lecture |
| | Clarification Class | C18 | Clarification Class |
| | Class Assignment | C19 | Class Assignment |
| Unit-II | Definition of Correlation | C20 | Lecture |
| Unit-II | Scatter Diagram, Karl Pearson's Coefficient of Correlation | C21 | Lecture |
| Unit-II | Linear Regression Equations. | C22 | Lecture |
| Unit-II | Introduction to Test of Significance, One sample & two sample test t for Means | C23 | Lecture |
| Unit-II | Chi- Square Test of Independence of Attributes in 2 ×2 Contingency Table | C-24-C27 | Lecture |
| | Clarification Class | C28 | Clarification Class |
| | Class Room Assignment | C29 | Class Assignment |
| | PPT Presentation | C30 | PPT Presentation |
| | Quiz | C31 | Quiz |
| | Webinar | C32 | Webinar |
| | Home Assignment | | Home Assignment |
| Unit-III | Introduction to Analysis of Variance Analysis of One Way Classification | C33-C35 | Lecture |
| Unit-III | Introduction to Sampling Methods, | C36-C38 | Lecture |
| Unit-III | Sampling versus Complete Enumeration | C39 | Lecture |
| Unit-III | Simple Random Sampling with and without replacement | C40-C41 | Lecture |
| Unit-III | Use of Random Number Tables for selection of Simple Random Sample | C42 | Lecture |
| | Quiz | C43 | Quiz |
| | Clarification Class | C44 | Clarification Class |
| | Clarification Class | C45 | Clarification Class |

**20013800 – Livestock and Poultry Management**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Role of the livestock in national economy | C-1 | Lecture |
| UNIT-I | Reproduction of farm animals | C-2 | Lecture |
| UNIT-I | Reproduction of poultry | C-3 | Lecture |
| | Clarification class | C-4 | Clarification class |
| UNIT-II | Housing of Livestock | C-5 | Lecture |
| UNIT-II | Housing of poultry | C-6 | Lecture |
| | Clarification class | C-7 | Clarification class |
| | Classroom assignment | C-8 | Classroom assignment |
| UNIT-III | Management of calves | C-9 | Lecture |
| UNIT-III | Management of growing heifers | C-10 | Lecture |
| UNIT-III | Management of milch animals | C-11 | Lecture |
| UNIT-III | Management of Sheep and goat | C-12 | Lecture |
| UNIT-III | Management of Swine | C-13 | Lecture |
| | Clarification class | C-14 | Clarification class |
| UNIT-IV | Incubation, Hatching and Brooding | C-15 | Lecture |
| UNIT-IV | Management of growers | C-16 | Lecture |
| | Home assignment | C-16 | Home assignment |
| UNIT-IV | Management of layers | C-17 | Lecture |
| | Classroom assignment | C-18 | Classroom assignment |
| UNIT-V | Breeds of cows | C-19 | Lecture |
| UNIT-V | Breeds of buffaloes | C-20 | Lecture |
| UNIT-V | Breeds of goat | C-21 | Lecture |
| UNIT-V | Breeds of sheep | C-22 | Lecture |
| UNIT-V | Breeds of Swine | C-23 | Lecture |
| UNIT-V | Breeds of poultry | C-24 | Lecture |
| | Clarification class | C-25 | Clarification class |
| | Presentation | C-26 | Presentation |
| UNIT-VI | Improvement of farm animals | C-27 | Lecture |
| UNIT-VI | Improvement of poultry | C-28 | Lecture |
| | Home assignment | C-28 | Home assignment |
| | Clarification class | C-29 | Clarification class |
| UNIT-VII | Digestion of Farm animals | C-30 | Lecture |
| UNIT-VII | Digestion of poultry | C-31 | Lecture |
| UNIT-VII | Classification of feedstuffs | C-32 | Lecture |
| | Webinar | C-33 | Webinar |
| | Classroom assignment | C-34 | Classroom assignment |
| UNIT-VII | Principles of animal ration | C-35 | Lecture |
| UNIT-VII | Feed ingredients for livestock ration | C-36 | Lecture |
| UNIT-VII | Feed ingredients for poultry ration | C-37 | Lecture |
| UNIT-VII | Feed supplements and additives | C-38 | Lecture |
| | Home assignment | C-38 | Home assignment |
| | Guest Lecture | C-39 | Guest Lecture |
| UNIT-VIII | Livestock diseases and their management | C-40 | Lecture |
| | Clarification class | C-41 | Clarification class |
| UNIT-VIII | Poultry disease and their management | C-42 | Lecture |
| | Clarification class | C-43 | Clarification class |
| | Quiz | C-44 | Quiz |
| | Presentation | C-45 | Presentation |

**20013900 – Livestock and Poultry Management Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | External body parts of cattle and buffalo | P-1,2 | Practical |
| 2 | External body parts of sheep and goat | P-3,4 | Practical |
| 3 | External body parts of swine | P-5 | Practical |
| 4 | External body parts of poultry | P-6 | Practical |
| 5 | Handling and restraining of farm animals | P-7 | Practical |
| 6 | Identification methods of animals and poultry | P-8 | Practical |
| 7 | Visit of IDF and IPF farm to know about the breeds of animals and poultry including the study of farm records | P-9,10 | Practical |
| 8 | Judging of cattle | P-11 | Practical |
| 9 | Judging of poultry | P-12 | Practical |
| 10 | Culling of livestock and poultry | P-13 | Practical |
| 11 | Housing of livestock and Computation of ration for animals | P-14,15 | Practical |
| 12 | Formulation of concentrate mixture, Clean milk production | P-16,17 | |
| 13 | Methods of milking, Hatching and incubation operations in poultry | P-18,19 | Practical |
| 14 | Management of chicks and growers, Management of layers and Debeaking | P-20,21,22,23 | Practical |
| 15 | Vaccination in livestock and poultry. Economics of livestock and poultry production | P-24,25 | Practical |

**20014100 – Ability and Skill Enhancement – III**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT I | What is Book Review, Purpose & Importance of Book Review Types of Book Review, Elements & Steps of Writing Book Review | C-1 | Lecture |
| UNIT I | Book Review Writing | C-2 | Lecture |
| UNIT I | What is Movie Review, Purpose & Importance of Movie Review Types of Movie Review, Elements & Steps of Writing Movie Review | C-3 | Lecture |
| UNIT I | Watch a movie | C-4 | Activity |
| UNIT I | Write the review of the movie shown in the class | C-5 | Activity |
| UNIT I | Clarification Class Unit 1 | C-6 | Clarification Class |
| UNITII | Reading Comprehension | C-7 | Lecture |
| UNITII | Debate | C-8 | Lecture |
| UNITII | Rewriting Mythology/Folklore | C-9 | Lecture |
| UNITII | Watch an international greek myth or indian folklore | C-10 | Activity |
| UNITII | Rewriting Mythology/Folklore watched in the class | | Home Assignments |
| UNITII | News Analysis | C-11 | Activity |
| UNITII | Role Plays | C-12 | Lecture |
| UNITII | Role Plays | C-13 | Class Assignment |
| UNIT III | What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence, | C-14 | Lecture |
| UNIT III | Emotions handling- identifying good and bad emotions | C-15 | Lecture |
| UNIT III | how to control emotions, how to manage negative emotions keeping balance of mental stability | C-16 | Lecture |
| UNIT III | stress and distress | C-17 | Class Assignment |
| UNIT III | Activity/Case Study | C-18 | Activity |
| UNIT III | Clarification Class III | C-19 | Clarification Class |
| UNIT IV | What is GD, Types of Group Discussions | C-20 | Lecture |
| UNIT IV | GD: Thinking, Structuring, Group Behaviour | C-21 | Class Assignment |
| UNIT IV | Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills | C-22 | Lecture |
| UNIT IV | Clarification Class | C-23 | Clarification Class |
| UNIT V | What is documentary, aims & objectives | C-24 | Lecture |
| UNIT V | Documentary/Movie Screening & Reviews | C-25 | Activity |
| UNIT V | documentary for social cause | C-26 | Presentation |
| UNIT V | documentary for social cause: Screening and Narration | C-27 | Presentation |
| UNIT V | preparing a documentary | | Home Assignments |
| | Guest Lecture | C-28 | Guest lecture |
| | Webinar | C-29 | Webinar |
| | Seminar | C-30 | Seminar |

| Course | Course outcomes: - After completion of these courses students should be able to |
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| **9.1 Semester – IV** | |
| 20014200 - Crop Production Technology –II (Rabi Crops) | **CO1:** Build the knowledge on the rabi season crops, its classification and importance in agriculture and national economy.<br>**CO2:** Examine the production techniques of rabi crops and their origin, economic importance, geographical distribution and botanical description.<br>**CO3:** Assess the sowing methods of rabi crops in the field and their management.<br>**CO4:** Discuss all rabi crops (wheat, barley, pea, chickpea, mustard, sugarcane etc.) with their cultivation practices.<br>**CO5:** Perceive the outcomes obtained by different breeding methods ensured for sustainable rabi crop production |
| 20014300 Crop Production Technology –II (Rabi Crops) Lab | **CO1:** To know the sowing methods of different rabi crops.<br>**CO2:** Discuss about morphological characteristics of rabi crops.<br>**CO3:** Determine yield attributing characteristics.<br>**CO4:** Examine sugar content of sugar crops.<br>**CO5:** Importance of oil producing, medicinal and forage crops. |
| 20014400 - Production Technology for Ornamental Crops, MAP and Landscaping | **CO1:** Identify different types of ornamental and medicinal crops.<br>**CO2:** Examine various principles of landscaping, uses of landscape trees, shrubs and climbers, production technology of important ornamental crops, etc.<br>**CO3:** Determine about Demonstrate various Package of practices for loose flowers and their transportation, storage house and required condition for cut and loose flower.<br>**CO4:** Construct about the various problems with the production technology of medicinal and aromatic plants.<br>**CO5:** Importance of Processing and value addition in ornamental crops and MAPs produce. |
| 20014500 Production Technology for Ornamental Crops, MAP and Landscaping Lab | **CO1:** Identify different types of ornamental, Aromatic and medicinal crops.<br>**CO2:** Explain Training and pruning of Ornamental plants<br>**CO3:** Plan and layout of garden.<br>**CO4:** Construct about the various problems with the production technology of medicinal and aromatic plants.<br>**CO5:** Explain Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers Processing of MAP. |
| 20014600 - Renewable Energy and Green Technology | **CO1:** Define the environmental aspects of non-conventional energy resources.<br>**CO2:** Explain the benefit from utilization the biomass, solar and wind energy. |

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| | **CO3:** Develop the skill in utilization of renewable energy recourses/gadgets.<br>**CO4:** Discover Ability to apply in renewable energy in the agricultural sector.<br>**CO5:** Imagine the renewable energy as ultimate source of power. |
| 20014700 Renewable Energy and Green Technology Lab | **CO1:** What are renewable energy gadgets.<br>**CO2:** Explain production process of biodiesel.<br>**CO3:** Make use of biogas plants.<br>**CO4:** Simplify the different solar energy gadgets.<br>**CO5:** Analyse the different renewable energy production units. |
| 20014800 - Problematic Soils and their Management | **CO1:** Define problematic soils, select a plan for their reclamation, and post-reclamation management in a manner that is sustainable.<br>**CO2:** Explain how to improve soil fertility and productivity by application of fertilizers, macro & micronutrients based on soil test.<br>**CO3:** Identify Multipurpose tree species for remediation of problematic soil.<br>**CO4:** Analyse the use of remote sensing and GIS application to categorize the problematic soil for their reclamation.<br>**CO5:** Determine the quality and standards of irrigation water. |
| 20014900 - Production Technology for Fruit and Plantation Crops | **CO1:** Find out the importance of different fruit crops and plantation crops.<br>**CO2:** Explain package of practices of the major crops like Mango, Banana, Guava, Citrus group, Date palm, papaya, Pineapple, Ber, Aonla, Bael, Apple, Pear, Peach Plum, Coffee, Coconut, Tea, Cocoa and Rubber.<br>**CO3:** Utilize various concepts of high-density planting, new techniques of high density planting, plant propagation, seed propagation, etc.<br>**CO4:** Examine canopy architecture for higher productive fruit plants.<br>**CO5:** To determine different propagation techniques in fruit and plantation crops. |
| 20015000 Production Technology for Fruit and Plantation Crops Lab | **CO1:** Show description and identification of fruit.<br>**CO2:** Demonstrate propagation method for fruit and plantation crops.<br>**CO3:** Make use of preparation of plant bio regulators and their uses,<br>**CO4:** Classify important pests, diseases and physiological disorders of fruit and plantation crops.<br>**CO5:** Explain seed propagation. Scarification and stratification of seeds. |
| 20015100 - Principles of Seed Technology | **CO1:** Explain scope and importance of seed technology in agriculture and the role of officials & legislation, seed act, seed order in quality seed production.<br>**CO2:** Develop an understanding of various seed production techniques for different field crops.<br>**CO3:** Analyze the factors related to genetic and physical purity of seed and its health status of seeds of a variety during seed processing.<br>**CO4:** Compare the various phases of seed certification, field inspection and seed purity testing. |

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| | **CO5:** Interpret the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also. |
| 20015200 Principles of Seed Technology lab | **CO1:** Define seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi.<br>**CO2:** Demonstrate seed sampling and testing: Physical purity, germination, viability, etc<br>**CO3:** Make use of seed certification: Procedure, Field inspection, Preparation of field inspection report.<br>**CO4:** Examine seed and seedling vigour test. Genetic purity test:<br>**CO5:** Recommend visit to seed production farms, seed testing laboratories and seed processing plant. |
| 20015500 - Agricultural Marketing Trade & Prices | **CO1:** Explain about the agriculture marketing, market structure, marketing mix, marketing segmentation, demand, supply and producer surplus.<br>**CO2:** classify the product life cycle and its different aspects, product, price, place, promotion, advertising, personal selling, sales promotion and publicity.<br>**CO3:** Simplify marketing process and functions: Marketing process-concentration, dispersion and equalization.<br>**CO4:** Discover understanding about role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions.<br>**CO5:** Measure the marketing efficiency obtained from different marketing channel using different methods. |
| 20015600 Agricultural Marketing Trade & Prices Lab | **CO1:** Identify of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class;<br>**CO2:** Interview to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning;<br>**CO3:** Construct of index numbers; Visit to a local market to study various marketing functions performed by different agencies<br>**CO4:** Apply of principles of comparative advantage of International Trade<br>**CO5:** Build and study of demand and supply curves and calculation of elasticities |
| 20026400 Introductory Agro-meteorology & Climate Change | **CO1:** Explain about earth atmosphere and it's composition.<br>**CO2:** Discuss about different forms and nature of solar radiation.<br>**CO3:** Analyze precipitation and its nature.<br>**CO4:** Develop knowledge about weather hazards.<br>**CO5:** Elaborate information about climate change like global warming. |
| 20026500 Introductory Agro-meteorology & Climate Change Lab | **CO1:** Acquaintance with agro meteorological lab and equipements.<br>**CO2:** Evaluation of albedo, maximum and minimum temperature.<br>**CO3:** Discuss method of soil temperature measurement. |

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| | **CO4:** Illustrate atmospheric pressure evaluation methods.<br>**CO5:** Analyze wind speed, direction and evaporation. |
| 20026800 Farming System & Sustainable Agriculture | **CO1:** Define Farming System-scope, importance, and concept.<br>**CO2:** Explain Farming system components and their maintenance.<br>**CO3:** Build efficient cropping system and their evaluation,<br>**CO4:** Compare HEIA, LEIA and LEISA.<br>**CO5:** Determine production and efficiencies in cropping and farming system. |
| 20014000 Agriculture Heritage & Human Values & Ethics | **CO1:** Explain the relevance of heritage in agriculture.<br>**CO2:** Interpret the scope of agriculture in future.<br>**CO3:** Develop the skills on philosophical and technical difference between historical and scientific agriculture.<br>**CO4:** Examine a balanced view about heritage of agriculture and knowledge with recent advances.<br>**CO5:** Information about Indian agricultural concerns and future prospects |
| 20015900 Ability and Skill Enhancement IV | **CO1:** Design the resume and know about different format<br>**CO2:** Know and classify the different types of interviews i.e. Mock Interview, HR Expert Mock Interview, Telephonic Interviews.<br>**CO3:** Examine the Company Specific Research and Presentation.<br>**CO4:** Build conversation skill<br>**CO5:** Find out Industry suitable for internship or job. |
| 20016000 Agribusiness Management | **CO1:** Explain the transformation of agriculture into agribusiness.<br>**CO2:** Importance of agribusiness in the Indian economy.<br>**CO3:** Define distinctive features of agribusiness management.<br>**CO4:** Discuss about management functions.<br>**CO5:** Classify marketing management. |
| 20016100 Agribusiness Management Lab | **CO1:** Identify about agri-input markets: Seed, fertilizers, pesticides.<br>**CO2:** Examine output markets: grains, fruits, vegetables, flowers.<br>**CO3:** Define product markets, retails trade commodity trading, and value added products.<br>**CO4:** Classify financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD<br>**CO5:** Analyse case study of agro-based industries. |
| 20016200 Agrochemicals | **CO1:** Explain the type and role of agrochemicals in agriculture, effect on environment, soil, human and animal health.<br>**CO2:** Outline the merits and demerits of agrochemicals uses in agriculture.<br>**CO3:** Identify the different agrochemicals based on their mode of action.<br>**CO4:** Classify the fertilizers based on soil, crops and their composition.<br>**CO5:** Measure the optimum dose of different agrochemicals at field level. |

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| 20016300 Agrochemicals Lab | **CO1:** How to use of different agrochemicals.<br>**CO2:** Classify the systemic and non- systemic insecticide.<br>**CO3:** Identify the different insecticides, fungicides and fertilizers.<br>**CO4:** Experiment with different fungicides and insecticides against different plant diseases.<br>**CO5:** Estimate the proper dose of different agrochemicals. |
| 20016400 Commercial Plant Breeding | **CO1:** Explain advances in hybrid seed production of different crops<br>**CO2:** Compare the breeding methods in self and cross pollinated crops<br>**CO3:** Contrast the production of quality seed vegetable crops under open and protected environment.<br>**CO4:** Discuss the modes of plant reproduction.<br>**CO5:** Conclude the tissue culture techniques. |
| 20016500 Commercial Plant Breeding Lab | **CO1:** Define the concept of rogueing in seed production plot.<br>**CO2:** Utilize the different seed production techniques in self and cross pollinated crops<br>**CO3:** Identify the difficulties in hybrid seed production.<br>**CO4:** Compare the screening techniques during seed processing viz., grading and packaging.<br>**CO5:** Discuss the sampling and analytical procedures for purity testing and detection of spurious seed. |
| 20016600 Landscaping | **CO1:** Tell Importance and scope of landscaping.<br>**CO2:** Interpret principles of landscaping, garden styles and types.<br>**CO3:** Identify different palms, ferns, grasses and cacti succulents. Pot plants:<br>**CO4:** Classify landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools,<br>**CO5:** principles and management, lawn establishment and maintenance. |
| 20016700 Landscaping Lab | **CO1:** Identification of trees, shrubs, annuals, pot plants.<br>**CO2:** Explain Propagation of trees, shrubs and annuals.<br>**CO3:** Plan Layout of formal gardens, informal gardens, special type of gardens<br>**CO4:** Compare formal gardens, informal gardens, special type of gardens.<br>**CO5:** Choose important gardens/ parks/ institutes to Visit. |

## 9.2 Mapping: Semester – IV

| 20014200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | 2 | 3 | 3 | 2 | | 2 | 2 | | 3 | 2 |
| CO2 | 3 | | | 2 | | 3 | 2 | 2 | | | | |
| CO3 | 3 | 2 | 2 | | 3 | 3 | 2 | | 2 | 3 | 3 | 3 |
| CO4 | 2 | 3 | 3 | 3 | 3 | | 3 | 3 | | 3 | 3 | 3 |
| CO5 | 2 | | 2 | 3 | | 1 | 2 | | 2 | | 2 | 2 |

| 20014300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 |
| CO4 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 |
| CO5 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 |

| 20014400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | | 2 | 3 |
| CO2 | 2 | 3 | 2 | | 3 | 2 | 2 | 2 | | 2 | 2 | 2 |
| CO3 | 2 | 2 | | 2 | 2 | 3 | | 2 | 2 | 2 | 2 | |
| CO4 | | 2 | 3 | 2 | | 2 | 2 | | 3 | | | 2 |
| CO5 | 2 | 3 | 2 | 3 | 3 | | 3 | 2 | | 3 | 2 | 2 |

| 20014500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 |
| CO2 | 3 | | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | | 3 | 2 | 2 | 3 |
| CO4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |

| 20014600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 3 | 2 |
| CO2 | 2 | 3 | 1 | 2 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 3 |
| CO3 | 3 | 1 | 3 | | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 |
| CO4 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |

| 20014700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | | 2 | 2 | | 2 | 1 | 2 | 2 | 1 | | 2 |
| CO2 | 2 | 3 | | 2 | 1 | | | 2 | | | 2 | |
| CO3 | | 1 | 3 | | 1 | 1 | 1 | | | 1 | | |
| CO4 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | | 2 | 1 |
| CO5 | | | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | |

| 20014800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | | 2 | 1 | 1 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO5 | 2 | 3 | 3 | 3 | 1 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |

| 20014900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |

| 20015000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 |
| CO2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 |
| CO4 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 |
| CO5 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |

| 20015100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |  | 2 |  | 3 | 2 |
| CO2 | 2 | 2 | 2 |  | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| CO3 | 3 | 2 |  |  |  |  | 3 | 3 | 2 | 3 |  | 2 |
| CO4 | 2 | 3 | 2 | 2 | 3 | 3 |  |  | 3 |  | 3 |  |
| CO5 | 3 | 2 | 3 | 3 |  | 2 | 2 | 2 | 3 | 2 | 3 | 3 |

| 20015200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| CO4 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO5 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 |

| 20015500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | 2 |  | 2 |  | 2 | 2 |  |  |
| CO2 | 3 | 3 |  | 2 |  | 2 |  | 2 | 2 |  | 2 |  |
| CO3 | 2 |  | 3 |  | 2 | 2 |  | 2 |  | 2 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 2 | 3 |  | 2 |  | 1 |  |  | 2 |
| CO5 | 3 | 2 |  | 2 | 3 | 3 | 2 | 2 |  | 3 | 2 | 3 |

| 20015600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 |
| CO2 | 2 | 3 | 2 | 3 | 2 | 2 |  |  |  | 1 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 1 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| CO4 | 2 | 2 | 3 | 3 | 2 | 2 |  |  | 3 | 1 | 3 | 3 |
| CO5 | 3 | 3 |  | 3 | 3 |  | 3 | 3 | 2 |  | 2 | 2 |

| 20026400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 |
| CO4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 |
| CO5 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 |

| 20026500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 |
| CO3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 |
| CO5 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 |

| 20026800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 |
| CO2 | 3 |  | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 2 |
| CO3 | 2 | 3 | 2 | 3 | 3 | 2 | 2 |  | 3 | 2 | 2 | 2 |
| CO4 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |

| 20014000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 |  | 2 |  |  |  | 2 |  |  |
| CO2 | 2 | 3 |  | 2 | 3 |  | 2 |  |  | 2 |  | 3 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |  |  |  |
| CO4 | 3 | 3 | 3 | 2 | 2 | 2 |  | 2 |  |  | 2 | 2 |
| CO5 | 2 |  |  | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

| 20015900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 |  | 3 | 2 | 2 |  | 3 | 3 | 3 |  | 2 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 2 |  | 2 | 2 | 3 | 3 | 2 |
| CO3 |  |  |  |  | 3 | 2 |  |  | 2 | 3 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 2 | 2 |  |  |  | 3 | 3 | 2 |
| CO5 | 3 | 3 |  | 3 | 3 |  | 3 | 3 | 2 |  | 2 | 2 |

| 20016000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 |
| CO2 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO3 | 3 | 2 | 3 | 2 | 2 |  | 3 | 2 | 2 | 2 | 2 | 2 |
| CO4 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |

| 20016100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 |
| CO3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 |
| CO4 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 |

| 20016200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 2 |
| CO2 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 |
| CO3 | 2 | 3 | 2 | 2 | 3 | 3 | 1 | 2 | 1 | 2 | 1 | 1 |
| CO4 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 |
| CO5 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |

| 20016300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 |
| CO2 | 2 | 2 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 3 | 1 | 2 |
| CO3 | 3 | 3 | 2 | 1 |  | 2 | 3 | 1 | 2 | 1 | 2 | 1 |
| CO4 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 |
| CO5 | 3 | 2 | 2 | 3 | 3 | 2 | 1 | 2 | 1 | 2 | 2 | 1 |

| 20016400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 |  | 2 | 2 | 2 |  | 2 | 3 | 3 | 2 |
| CO2 |  |  | 3 | 2 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 |
| CO3 | 2 | 2 |  | 2 |  | 2 | 3 | 1 | 2 | 2 | 3 | 3 |
| CO4 | 2 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 3 |  | 2 |  |
| CO5 | 3 | 3 | 2 | 3 | 3 |  | 3 | 2 | 3 | 3 |  | 2 |

| 20016500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 |  | 2 | 2 | 2 |  | 2 | 3 | 3 | 2 |
| CO2 | 2 |  | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 |
| CO3 | 1 | 3 |  | 2 |  | 2 | 2 | 1 | 2 | 2 | 2 | 3 |
| CO4 | 2 | 3 | 3 | 1 | 2 | 1 | 1 | 3 | 3 |  | 3 |  |
| CO5 | 3 | 2 | 2 | 3 | 3 |  | 3 | 2 | 3 | 3 |  | 2 |

| 20016600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 |
| CO3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 1 | 2 | 3 | 3 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |

| 20016700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 |
| CO2 | 3 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |

## 9.3 Lesson Plan – Semester – IV

**20014200 – Crop Production Technology –II (Rabi Crops)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | | | |
| UNIT-I | Cultivation of Wheat | C1 | Lecture |
| UNIT-I | Cultivation of Wheat | C2 | Lecture |
| UNIT-I | Cultivation of Wheat | C3 | Lecture |
| UNIT-I | Clarification Class | C4 | Clarification Class |
| UNIT-I | Cultivation of barely | C5 | Lecture |
| UNIT-I | Cultivation of forage crop | C6 | Lecture |
| UNIT-I | Cultivation of chickpea | C7 | Lecture |
| UNIT-I | Cultivation of medicinal crop | C8 | lecture |
| UNIT-I | Cultivation of lentil | C9 | Lecture |
| UNIT-I | Presentation | C10 | Presentation |
| UNIT-I | Cultivation of Pea | C11 | Lecture |
| UNIT-I | Cultivation of mustard | C12 | Lecture |
| UNIT-I | Cultivation of sunflower | C13 | Lecture |
| UNIT-I | Cultivation of sugarcane | C14 | Lecture |
| UNIT-I | Quiz | C15 | Clarification Class |

**20014300 – Crop Production Technology –II (Rabi Crops) Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops. | P1 | Practical |
| 2 | Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops. | P2 | Practical |
| 3 | Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops. | P3 | Practical |
| 4 | Study of morphological characteristics of rabi crops | P4 | Practical |
| 5 | Study of morphological characteristics of rabi crops | P5 | Practical |
| 6 | Presentation | P6 | Presentation |
| 7 | Clarification Class | P7 | Clarification Class |
| 8 | Study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, | P8 | Practical |
| 9 | Study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, | P9 | Practical |
| 10 | Study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, | P10 | Practical |
| 11 | Study of important agronomic experiments of rabi crops at experimental farms. | P11 | Practical |
| 12 | Study of important agronomic experiments of rabi crops at experimental farms. | P12 | Practical |
| 13 | Study of important agronomic experiments of rabi crops at experimental farms. | P13 | Practical |
| 14 | Study of important agronomic experiments of rabi crops at experimental farms. | P14 | Practical |
| 15 | Study of rabi forage experiments, oil extraction of medicinal crops, visit to research stations of related crops | P15 | Practical |

**20014400 – Production Technology for Ornamental Crops, MAP and Landscaping**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit 1 | Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. | C1 | Lecture |
| Unit 1 | Principles of landscaping. Landscape uses of trees, shrubs and climbers. | C2 | Lecture |
| Unit 1 | Home Assignment | | Home Assignment |
| Unit 1 | Class Room Assignment | C3 | Class Assignment |
| Unit 1 | Production technology of important cut flowers like tuberose, chrysanthemum under open conditions. | C4 | Lecture |
| Unit 1 | Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus | C5 | Lecture |
| Unit 1 | Home Assignment | | Home Assignment |
| Unit 1 | Quiz | C6 | Quiz |
| Unit 1 | Package of practices for loose flowers like marigold and jasmine under open conditions. | C7 | Lecture |
| Unit 1 | Home Assignment | | |
| Unit 1 | Class Room Assignment | C8 | Class Assignment |
| Unit 1 | Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus | C9 | Lecture |
| Unit 1 | Clarification Class | C10 | Clarification Class |
| Unit 1 | Production technology of important medicinal plants like Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. | C11 | Lecture |
| Unit 1 | Power Point Presentation | C12 | Presentation |
| Unit 1 | Processing and value addition in ornamental crops and MAPs produce. | C13 | Lecture |
| Unit 1 | Class Room Assignment | C14 | Class Assignment |
| Unit 1 | Power Point Presentation | C15 | Presentation |

**20014500 – Production Technology for Ornamental Crops, MAP and Landscaping Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to Practical | P1 | Practical |
| 2 | Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. | P2 | Practical |
| 3 | Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. | P3 | Practical |
| 4 | Clarification Class | P4 | Clarification Class |
| 5 | Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. | P5 | Practical |
| 6 | Training and pruning of Ornamental plants. Planning and layout of garden. | P6 | Practical |
| 7 | Training and pruning of Ornamental plants. Planning and layout of garden. | P7 | Practical |
| 8 | Clarification Class | P8 | Clarification Class |
| 9 | Training and pruning of Ornamental plants. Planning and layout of garden. | P9 | Practical |
| 10 | Bed preparation and planting of MAP. Protected structures – care and maintenance. | P10 | Practical |
| 11 | Power Point Presentation | P11 | Power Point Presentation |
| 12 | Bed preparation and planting of MAP. Protected structures – care and maintenance. | P12 | Practical |
| 13 | Bed preparation and planting of MAP. Protected structures – care and maintenance. | P13 | Practical |
| 14 | Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers. | P14 | Practical |
| 15 | Processing of MAP. Visit to commercial flower/MAP unit. | P15 | Practical |

**20014600 – Renewable Energy and Green Technology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Classification of energy sources, contribution of these of sources in agricultural sector | C-1 | Lecture |
| UNIT-I | Familiarization with biomass utilization for biofuel production and their application | C-2 | Lecture |
| UNIT-I | Familiarization with types of biogas plants and gasifiers, biogas, bio-alcohol, biodiesel and biooil production and their utilization as bioenergy resource | C-3 | Lecture |
| UNIT-I | Clarification Class | C-4 | Clarification Class |
| UNIT-I | Class Room Assignment | C-5 | Class Room Assignment |
| UNIT-I | Presentation | C-6 | Presentation |
| UNIT-I | Take Home Assignment | | |
| UNIT-I | Quiz | C-7 | Quiz |
| UNIT-II | Introduction of solar energy, collection and their application | C-8 | Lecture |
| UNIT-II | Familiarization with solar energy gadgets: solar cooker, solar water heater | C-9 | Lecture |
| UNIT-II | Application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application | C-10 | Lecture |
| UNIT-II | Introduction of wind energy and their application | C-11 | Lecture |
| UNIT-II | Clarification Class | C-12 | Clarification Class |
| UNIT-II | Class Room Assignment | C-13 | Class Room Assignment |
| UNIT-II | Take Home Assignment | | Home Assignments |
| UNIT-II | Presentation | C-14 | Presentation |
| UNIT-II | Class Room Assignment | C-15 | Class Room Assignment |
| UNIT-II | Take Home Assignment | | Home Assignments |

**20014700– Renewable Energy and Green Technology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Familiarization with renewable energy gadgets. | P1-P2 | Practical |
| 2 | To study biogas plants | P3-P4 | Practical |
| 3 | To study gasifier | P5-P6 | Practical |
| 4 | To study the production process of biodiesel | P7-P8 | Practical |
| 5 | To study briquetting machine | P9-P10 | Practical |
| 6 | To study the production process of bio-fuels | P11-P12 | Practical |
| 7 | Familiarization with different solar energy gadgets | P13-P14 | Practical |
| 8 | To study solar photovoltaic system: solar light, solar pumping, solar fencing | P15-P16 | Practical |
| 9 | To study solar cooker, To study solar drying system | P17-P18 | Practical |
| 10 | To study solar distillation and solar pond | P19-P20 | Practical |
| 11 | Familiarization with renewable energy gadgets. | p21-p22 | Practical |
| 12 | To study biogas plants | P22-P23 | Practical |
| 13 | To Study Nuclear Energy | p24-25 | Practical |
| 14 | SOLAR CELL | P25-26 | Practical |
| 15 | SOLAR COOKER | P27-28 | Practical |
| 16 | TO STUDY BRINQUET MACHINE | P28-29 | Practical |
| 17 | TO STUDY SOLAR HEATER | P30-31 | Practical |
| 18 | SOLAR POND AND DISTILLATION | P32-33 | Practical |

**20014800 – Problematic Soils and their Management**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit 1 | Soil quality and health, management | C-1 | Lecture |
| Unit 1 | Distribution of Waste land and problem soils in India. Their categorization based on properties. | C-2 | Lecture |
| Unit 1 | Reclamation and management of Saline and sodic soils | C-3 | Lecture |
| Unit 1 | Acid Soil | C-4 | Lecture |
| Unit 1 | Eroded and Compacted soils | C-5 | Lecture |
| Unit 1 | Flooded soils | C-6 | Lecture |
| Unit 1 | Categorization based on properties | C-7 | Lecture |
| Unit 1 | Compacted Soil | C-8 | Lecture |
| Unit 1 | Methods & management tools for soil quality | C-9 | Lecture |
| Unit 1 | Clarification Classes No.2 | C-10 | Clarification Class |
| Unit 1 | Home Assignment No.1 | | Home Assignments |
| | Quiz | C-11 | Quiz |
| Unit 1 | Water Irrigation-Quality & standard | C-12 | Lecture |
| Unit 1 | Polluted Soil | C-13 | Lecture |
| Unit 1 | Revision 1 to 5th topics | C-14 | Lecture |
| Unit 1 | Revision 6 to 10th topics | C-15 | Lecture |
| Unit 1 | Presentation No-1 | C-16 | Presentation |
| Unit 1 | Acid Sulphate Soil | C-17 | Lecture |
| Unit-1 | Remote sensing and GIS diagnosis and management problems soils | C-18 | Lecture |
| Unit-1 | Utilisation of saline water in agriculture | C-19 | Lecture |
| UNIT-2 | Bioremediation of mpts through soil | c-20 | Lecture |
| UNIT-2 | BIOFUELS AND BIOGAS | C-21 | Lecture |
| UNIT-2 | BIO OIL AND PYROLYSIS | C-22 | Lecture |
| UNIT-1 | BIOFUEL AND ITS PRODUCTION | C-23 | Lecture |

**20014900 – Production Technology for Fruit and Plantation Crops**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Importance and scope of fruit and plantation crop industry in India | C-1 | Lecture |
| Unit I | Importance of rootstocks; Production technologies for the cultivation of major fruits-mango | C-2 | Lecture |
| Unit I | Mango part -II | C-3 | Lecture |
| Unit I | Banana | C-4 | Lecture |
| Unit I | citrus | C-5 | Lecture |
| Unit I | grape | C-6 | Lecture |
| Unit I | guava | C-7 | Lecture |
| Unit I | litchi, papaya, sapota | C-8 | Lecture |
| Unit I | apple | C-9 | Lecture |
| Unit I | pear, peach, walnut, almond, Minor fruits | C-10 | Lecture |
| Unit I | coconut, arecanut, cashewnut | C-11 | Lecture |
| Unit I | tea and coffee, rubber | C-12 | Lecture |

**20015000– Production Technology for Fruit and Plantation Crop Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Seed propagation. Scarification and stratification of seeds. | P1 | Practical |
| 2 | Propagation methods for tropical and subtropical fruits. | P2 | Practical |
| 3 | Propagation methods for temperate and minor fruits. | P3 | Practical |
| 4 | Propagation methods for plantation crops. | P4 | Practical |
| 5 | Important pests of plantation crops | P5-P6 | Practical |
| 6 | Important pests of tropical and sub tropical fruits | P7-P8 | Practical |
| 7 | Important pests of temperate and minor fruits | P9-P10 | Practical |
| 8 | Important diseases of major fruit crops and temerate fruits | P11 | Practical |
| 9 | Important diseases of major fruit crops and temerate fruits | P12 | Practical |
| 10 | Important diseases of minor fruits and plantation crops | P13 | Practical |
| 11 | Important diseases of minor fruits and plantation crops | P14 | Practical |

**20015100 – Principles of Seed Technology**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Seed and seed technology: introduction, definition and importance | C-1 | Lecture |
| Unit-1 | Deterioration causes of crop varieties and their control | C-2 | Lecture |
| Unit-1 | Maintenance of genetic purity during seed production, | C-3 | Lecture |
| Unit-1 | Seed quality; Definition, Characters of good quality seed | C-4 | Lecture |
| Unit-1 | Different classes of seed. | C-5 | Lecture |
| Unit-1 | Foundation and certified seed production of important cereals, pulses | C-6 | Lecture |
| Unit-1 | Oilseeds, fodder and vegetables | C-7 | Lecture |
| | Clarification class No-1 | C-8 | Clarification Class |
| Unit-2 | Seed certification, phases of certification | C-9 | Lecture |
| Unit-2 | Procedure for seed certification, field inspection. | C-10 | Lecture |
| Unit-2 | Seed Act and Seed Act enforcement. | C-11 | Lecture |
| Unit-2 | Duty and powers of seed inspector, offences and penalties | C-12 | Lecture |
| Unit-2 | Seeds Control Order 1983 | C-13 | Lecture |
| Unit-2 | Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test | C-14 | Guest lecture |
| Unit-2 | Detection of genetically modified crops, Transgene contamination in non-GM crops, | C-15 | Lecture |
| Unit-2 | GM crops and organic seed production. | C-16 | Webinar |
| Unit-2 | Seed drying, processing and their steps, | C-17 | Lecture |
| | Home Assignment | | Take Home Assignments |
| Unit-2 | Seed treatment, its importance, method of application and seed packing | C-18 | Lecture |
| | Clarification class No-2 | C-19 | Clarification Class |
| | Presentation | C-20 | Presentation |
| | Quiz No-1 | C-21 | Quiz |
| | Class Room Assignment NO-1 | C-22 | Class Room Assignment |
| Unit-3 | Seed storage; general principles, stages and factors affecting seed longevity during storage. | C-23 | Lecture |
| Unit-3 | Measures for pest and disease control during storage | C-24 | Lecture |
| Unit-3 | Seed marketing: structure and organization, sales generation activities, promotional media | C-25 | Lecture |
| Unit-3 | Factors affecting seed marketing, Role of WTO and OECD in seed marketing | C-26 | Lecture |
| Unit-3 | Private and public sectors and their production and marketing strategies. | C-27 | Lecture |
| | Clarification class No-3 | C-28 | Clarification Class |
| | Class Room Assignment NO-2 | C-29 | Class Room Assignment |
| | Quiz No-2 | C-30 | Quiz |

**20015200– Principles of Seed Technology Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Seed production in major cereals | C1 | lecture |
| 2 | Seed production in major cereals | C2 | lecture |
| 3 | Seed production in major cereals | C3 | lecture |
| 4 | Seed production in major cereals | C4 | lecture |
| 5 | Seed production in major cereals | C5 | lecture |
| 6 | Seed production in major cereals | C6 | lecture |
| 7 | Seed and seeding vigour test. Genetic purity | C7 | lecture |
| 8 | Grow out test and electrophoresis | C8 | Practical |
| 9 | Sed certification: Procedure, Field inspection, Preparation of field inspection report. | C9 | Practical |
| 10 | EXAM CLASS | C10 | EXAM CLASS |
| 11 | PRESENTATION | C11 | PRESENTATION |
| 12 | REVISION ALL NOTES | C12 | REVISION ALL NOTES |

**20015500 – Agricultural Marketing Trade & Prices**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Introduction to the subject | C 1 | Lecture |
| Unit I | Agricultural Marketing: Concepts and definitions of market | C 2 | Lecture |
| Unit I | Agricultural marketing & market structure | C 3 | Lecture |
| Unit I | Marketing mix and market segmentation, classification and characteristics of agricultural markets | C 4 | Lecture |
| Unit I | Demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products | C 5 | Lecture |
| Unit I | Producer's surplus – meaning and its types, marketable and marketed surplus | C 6 | Lecture |
| | Importance of marketing in agriculture | C 7 | Class room Assignment |
| Unit I | Factors affecting marketable surplus of agri-commodities | C 8 | Lecture |
| Unit I | Clarification Class | C 9 | Clarification Class |
| Unit II | Meaning and stages in PLC; characteristics of PLC; | C 10 | Lecture |
| Unit II | PLC strategies in different stages of PLC pricing and promotion strategies: pricing considerations and approaches | C 11 | Lecture |
| | PLC of any agriculture product | C 12 | Presentation |
| | 4 P's of any agricultural product | C 13 | Presentation |
| Unit II | Cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits | C 14 | Lecture |
| Unit II | Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling | C 15 | Lecture |
| Unit II | Physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark) | C 16 | Lecture |
| Unit II | Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels | C 17 | Lecture |
| Unit II | Clarification Class | C 18 | Clarification Class |
| Unit II | Hedging | C 19 | Class room Assignment |
| Unit III | Marketing channels for different farm products; Integration, efficiency, costs and price spread | C 20 | Lecture |
| Unit III | Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs | C 21 | Lecture |
| Unit III | Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in | C 22 | Lecture |

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|---|---|---|---|
| | India | | |
| | Different marketing channels in agriculture marketing | C 23 | Presentation |
| | Role of Government in agricultural marketing | C 24 | Presentation |
| Unit III | Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading | C 25 | Lecture |
| Unit III | Agricultural prices and policy: Meaning and functions of price; ad ministered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage | C 26 | Lecture |
| | NCDEX | C 27 | Class room Assignment |
| Unit III | Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR | C 28 | Lecture |
| Unit III | Clarification Class | C 29 | Clarification Class |
| Unit III | Case Study | C 30 | Assignment |

**20015600 – Agricultural Marketing Trade & Prices Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to topic | C 1 | Lecture |
| 2 | Plotting and study of demand and supply curves and calculation of elasticities | C 2 | Practical |
| 3 | Plotting and study of demand and supply curves and calculation of elasticities | C 3 | Practical |
| 4 | Study of relationship between market arrivals and prices of some selected commodities | C 4 | Practical |
| 5 | Study of relationship between market arrivals and prices of some selected commodities | C 5 | Practical |
| 6 | Computation of marketable and marketed surplus of important commodities | C 6 | Practical |
| 7 | Computation of marketable and marketed surplus of important commodities | C 7 | Practical |
| 8 | Study of price behaviour over time for some selected commodities | C 8 | Practical |
| 9 | Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies | C 9 | Practical |
| 10 | Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies | C 10 | Practical |
| 11 | identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class | C 11 | Practical |
| 12 | identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class | C 12 | Practical |
| 13 | Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning | C 13 | Practical |
| 14 | Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning | C 14 | Practical |
| 15 | Application of principles of comparative advantage of International Trade | C 15 | Practical |

**20026400 – Introductory Agro-meteorology & Climate Change**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Meaning and scope of agricultural meteorology | C1 | Lecture |
| Unit-1 | Earth atmosphere- its composition, extent and structure | C2 | Lecture |
| Unit-1 | Atmospheric weather variables; Atmospheric pressure, its variation with height | C3 | Lecture |
| Unit-1 | Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze | C4 | Lecture |
| Unit-1 | Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo | C5 | Lecture |
| Unit-1 | Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature | C6 | Lecture |
| Unit-2 | Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud | C7 | Lecture |
| Unit-2 | Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification | C8 | Lecture |
| Unit-2 | Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture | C9 | Lecture |
| Unit-2 | Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations | C10 | Lecture |
| Unit-2 | Modifications of crop microclimate, climatic normals for crop and livestock production. Weather forecasting- types of weather forecast and their uses | C11 | Lecture |
| Unit-2 | Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture | C12 | Lecture |
| | Class Room Assignment | C13 | Class Room Assignment |
| | Class Room Assignment | C14 | Class Room Assignment |
| | Class Room Assignment | C15 | Class Room Assignment |

**20026500 – Introductory Agro-meteorology & Climate Change lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Visit of Agrometeorological Observatory | P1 | Practical |
| 2 | Site selection of observatory | P2 | Practical |
| 3 | Exposure of instruments | P3 | Practical |
| 4 | Weather data recording | P4 | Practical |
| 5 | Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law | P5 | Practical |
| 6 | Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS | P6 | Practical |
| 7 | Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis | P7 | Practical |
| 8 | Measurement of soil temperature and computation of soil heat flux | P8 | Practical |
| 9 | Determination of vapor pressure and relative humidity | P9 | Practical |
| 10 | Determination of dew point temperature | P10 | Practical |
| 11 | Measurement of atmospheric pressure and analysis of atmospheric condition | P11 | Practical |
| 12 | Measurement of wind speed and wind direction, preparation of windrose | P12 | Practical |
| 13 | Measurement, tabulation and analysis of rain. | P13 | Practical |
| 14 | Measurement of open pan evaporation and evapotranspiration | P14 | Practical |
| 15 | Computation of PET and AET | P15 | Practical |

**20026800 – Farming System & Sustainable Agriculture**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-I | Farming System-scope, importance, and concept | C-1 | Lecture |
| Unit-I | Types and systems of farming system and factors affecting types of farming | C-2 | Lecture |
| Unit-I | Farming system components and their maintenance | C-3 | Lecture |
| Unit-I | Cropping system and pattern, multiple cropping system | C-4 | Lecture |
| | Classroom Assignment-I | C-5 | Class Assignment |
| Unit-I | Cropping system and pattern, multiple cropping system | C-6 | Lecture |
| Unit-I | Efficient cropping system and their evaluation | C-7 | Lecture |
| Unit-I | Efficient cropping system and their evaluation | C-8 | Lecture |
| | Classroom Assignment-II | C-9 | Class Assignment |
| Unit-I | Allied enterprises and their importance | C-10 | Lecture |
| Unit-I | Allied enterprises and their importance | C-11 | Lecture |
| Unit-I | Tools for determining production and efficiencies in cropping and farming system | C-12 | Lecture |
| | PPT-I | C-13 | Presentation |
| Unit-I | Tools for determining production and efficiencies in cropping and farming system | C-14 | Lecture |
| | Home Assignment-I | | Home Assignment |
| Unit-II | Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability | C-15 | Lecture |
| Unit-II | Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability | C-16 | Lecture |
| | Quiz-I | C-17 | Quiz |
| Unit-II | Clarification Class | C-18 | Clarification Class |
| Unit-II | adaptation and mitigation, conservation agriculture strategies in agriculture | C-19 | Lecture |
| Unit-II | HEIA, LEIA and LEISA and its techniques for sustainability | C-20 | Lecture |
| | PPT-II | C-21 | Presentation |
| | Classroom Assignment-III | C-22 | Class Assignment |
| Unit-II | Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantage | C-23 | Lecture |
| Unit-II | Site specific development of IFS model for different agro-climatic zones | C-24 | Lecture |
| Unit-II | resource use efficiency and optimization techniques | C-25 | Lecture |
| Unit-II | Resource cycling and flow of energy in different farming system, farming system and environment | C-26 | Lecture |
| Unit-II | Visit of IFS model in different agroclimatic zones of nearby states University/ institutes and farmers field | C-27 | Lecture |
| | Home Assignment-II | | Home Assignment |
| | PPT-III | C-28 | Presentation |
| | Classroom Assignment IV | C-29 | Class Assignment |
| Unit-II | Clarification Class | C-30 | Clarification Class |

**20014000 – Agriculture Heritage & Human Values & Ethics**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT-I | Agriculture Heritage | | |
| UNIT-I | Introduction of Indian Agriculture Heritage | C-1,2 | Lecture |
| UNIT-I | Ancient Agricultural Practices | C-3 | Lecture |
| UNIT-I | Relevance of heritage to present day agriculture | C-4,5 | Lecture |
| | Assignment-I | C-6 | Class Room Assignment |
| UNIT-I | Past ant present status of Agriculture and Farmers in society | C-7 | Lecture |
| UNIT-I | Journey of Indian agriculture and its development from past to modern era | C-8,9 | Lecture |
| | CLARIFICATION CLASS I | C-10 | Clarification Class |
| | Assignment-II | | Home Assignments |
| UNIT-II | Plant production and Protection through indigenous traditional knowledge | C-11,12 | Lecture |
| UNIT-II | Crop Voyage in India and World | C-13 | Lecture |
| | Guest Lecture | C-14 | Guest lecture |
| UNIT-II | Agriculture Scope, Importance of agriculture and agricultural resources available in India | C-15,16 | Lecture |
| | Assignment III | C-17 | Class Room Assignment |
| UNIT-II | Crop significance and Classification | C-18 | Lecture |
| | Clarification Class II | C-19 | Clarification Class |
| | Presentation I | C-20 | Presentation |
| | Assignment IV | | Home Assignments |
| UNIT-III | National Agriculture setup in India | C-21 | Lecture |
| | Webinar | C-22 | Webinar |
| UNIT-III | Current scenario of Indian agriculture | C-23,24 | Lecture |
| | Assignment V | C-25 | Class Room Assignment |
| | Seminar | C-26 | Seminar |
| UNIT-III | Indian Agriculture concerns and future prospects | C-27 | Lecture |
| | Presentation II | C-28 | Presentation |
| | Quiz | C-29 | Quiz |
| | Clarification Class III | C-30 | Clarification Class |
| | Assignment VI | | Home Assignments |

**20015900 – Ability and Skill Enhancement IV**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT 1 | Tele etiquettes Receiving Calls, Placing a call, Ending Calls, Transferring calls, Taking Message | C-1 | Lecture |
| UNIT-1 | Tele etiquettes Placing Call on Hold and Handling Complaints | C-2 | Lecture |
| UNIT -1 | Telephonic etiquettes | C-3 | Lecture |
| UNIT -1 | Voice Calls | C-4 | Activity |
| UNIT -1 | Clarification class-I | C-5 | clarification class |
| UNIT -1 | Classroom Assignment -1 | C-6 | class Assignment |
| UNIT -II | How to Build Confidence By Positive Thinking | C-7 | Lecture |
| Unit II | Take Home Assignment No1 | | Home Assignments |
| Unit II | Identifying Negative thoughts and How to control it | C-8 | Lecture |
| | Class Room Assignment No -2 | C-9 | Class Assignment |
| Unit II | How to Build Confidence By Positive Thinking/Identify negative thoughts | C-10 | Lecture |
| Unit-II | Identifying Personal Talent | C-11 | Activity |
| Unit-II | Activity | C-12 | Activity |
| | Presentation No 1 | C-13 | Presentation |
| Unit-II | what is brain storming | C-14 | Activity |
| Unit -II | How to develop Good Habits and Principles to follow them and Learn New Things | C-15 | Lecture |
| | Webinar | | |
| Unit-II | What is Brainstorming Exercise | C-16 | Activity |
| Unit-II | Different ways of Brain Storming Exercise Through Logic and Reasoning | C-17 | Activity |
| Unit-II | Activity | C-18 | Activity |
| | Seminar | C-19 | Seminar |
| | Home Assignment No -3 | C-20 | Home Assignment |
| | Clarification Class No 2 | C-21 | Clarification class |
| Unit III | Resume/CV | C-22 | Lecture |
| UNIT III | What is Resume how prepare resume CV | C-23 | Lecture |
| UNIT III | Covering Letter /PI kit | C-24 | Lecture |
| UNIT IV | Interview Skills Mastering the art of giving interviews in-selection or placement interviews, web /video conferencing, Mock Interview | C-25 | Activity |
| UNIT IV | Interview Skills Mastering the art of giving interviews in-selection or placement interviews, web /video conferencing, Mock Interview | C-26 | Activity |
| UNIT V | HR Expert interview questions | C-27 | Lecture |
| UNIT V | Internship Preparation: Company Specific Research and Presentation Identifying domain specific industries, researching | C-28 | Activity |
| UNIT V | Clarification Class | C-29 | clarification class |
| UNIT V | Guest Lecture | C-30 | Guest lecture |

**20016000 – Agribusiness Management (Electives)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| UNIT I | Transformation of agriculture into agribusiness | C-1 | Lecture |
| UNIT I | Various stakeholders and components of agribusiness systems | C-2 | Lecture |
| UNIT I | Importance of agribusiness in the Indian economy and New Agricultural Policy | C-3 | Lecture |
| UNIT I | Distinctive features of Agribusiness Management | C-4 | Lecture |
| UNIT I | Importance and needs of agro-based industries, | C-5 | Lecture |
| UNIT I | Classification of industries and types of agro based industries | C-6 | Lecture |
| UNIT I | Institutional arrangement, procedures to set up agro based industries. | C-7 | Lecture |
| UNIT I | Constraints in establishing agro-based industries | | Lecture |
| UNIT I | Agri-value chain; understanding primary and support activities and their linkages | C-8 | Lecture |
| UNIT I | Business environment; PEST & SWOT analysis | C-9 | Lecture |
| UNIT I | Management functions; roles and activities, organization culture | C-10 | Lecture |
| UNIT I | Clarification class | C-11 | Clarification class |
| UNIT I | Class assignment | C-12 | Class assignment |
| UNIT I | Activity | C-13 | Activity |
| Unit II | Planning, meaning, definition, types of plans. | C-14 | Lecture |
| Unit II | Purpose or mission, goals or objectives, Strategies, polices, procedures, rules, programs and budget | C-15 | Lecture |
| Unit II | Components of a business plan, Steps in planning and implementation | C-16 | Lecture |
| Unit II | Organization setup; staffing, direction and motivation | C-17 | Lecture |
| Unit II | Ordering, leading, supervision, communications, control | C-18 | Lecture |
| Unit II | Capital Management and Financial management of Agribusiness | C-19 | Lecture |
| Unit II | Financial statements and their importance | C-20 | Lecture |
| Unit II | Marketing management: Segmentation, targeting & positioning | C-21 | Lecture |
| Unit II | Marketing mix and marketing strategies. | C-22 | Lecture |
| Unit II | Product life cycle (plc). | C-23 | Lecture |
| Unit II | Sales & distribution management. | C-24 | Lecture |
| Unit II | Pricing policy, various pricing methods. | C-25 | Lecture |
| Unit II | Project management; definition, project cycle | C-26 | Lecture |
| Unit II | Identification, formulation, appraisal, implementation, monitoring and evaluation | C-27 | Lecture |
| Unit II | Project Appraisal and evaluation techniques | C-28 | Lecture |
| Unit II | Presentation | C-29 | Presentations |
| Unit II | Clarification class | C-30 | Clarification |

**20016100 – Agribusiness Management Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Study of agri-input markets: Seed, fertilizers, pesticides. | C-1, C-2 | Practical |
| 2 | Study of output markets: grains, fruits, vegetables, flowers | C-2, C3 | Practical |
| 3 | Study of product markets, retails trade commodity trading, and value added products. | C-4, C-5 | Practical |
| 4 | Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD. | C-6, C-7 | Practical |
| 5 | Preparations of projects and Feasibility reports for agribusiness entrepreneur. | C-8, C-9 | Practical |
| 6 | Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques. | C-10, C-11 | Practical |
| 7 | Case study of agro-based industries. | C-12 | Practical |
| 8 | Trend and growth rate of prices of agricultural commodities | C-13 | Practical |
| 9 | Net present worth technique for selection of viable project. Internal rate of return | C-14, C-15 | Practical |

**20016200 – Agrochemicals**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to the subject. | C 1 | Lecture |
| 2 | Type of agrichemicals and their role in agriculture. | C 2 | Lecture |
| 3 | Effect of agrichemicals on Environmental factors. | C 3 | Lecture |
| 4 | Merits, Demerits, and management of agrochemicals for Sustainable agriculture. | C 4 | Lecture |
| 5 | Herbicides general overview and major classes. | C 5 | Lecture |
| 6 | Properties and importance, the fate of herbicides. | C 6 | Lecture |
| 7 | Classification of fungicide inorganic fungicide and characteristics. | C 7 | Classroom Assignment |
| 8 | Sulfur and copper-based fungicide Mode of the action-Bordeaux mixture and copper oxychloride. | C 8 | Lecture |
| 9 | Clarification Class | C 9 | Clarification Class |
| 10 | Organic fungicides- Mode of action-Dithiocarbonates-characteristics, preparation, and use of zineb and maneb. | C 10 | Lecture |
| 11 | Systemic fungicides- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics, and use. | C 11 | Lecture |
| 12 | Introduction and classification of herbicides: | C 12 | Presentation |
| 13 | Inorganic and organic Fungicides Classification. | C 13 | Presentation |
| 14 | inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, | C 14 | Lecture |
| 15 | Introduction and classification of insecticides: | C 15 | Lecture |
| 16 | insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. | C 16 | Lecture |
| 17 | IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses. | C 17 | Lecture |
| 18 | Clarification Class | C 18 | Clarification Class |
| 19 | Classification of Insecticide with examples. | C 19 | Class room Assignment |
| 20 | Fertilizers and their importance. | C 20 | Lecture |
| 21 | Nitrogenous fertilizers: Feedstocks and Manufacturing of ammonium sulfate, ammonium nitrate, ammonium chloride, urea. Slow-release N-fertilizers. | C 21 | Lecture |
| 22 | Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. | C 22 | Lecture |
| 23 | Nitrogenous Fertilizers | C 23 | Presentation |
| 24 | Effect of insecticides and fertilizer on the environment. | C 24 | Presentation |
| 25 | Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulfate and | C 25 | Lecture |

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|---|---|---|---|
| | potassium nitrate. | | |
| 26 | Mixed and complex fertilizers, Complex fertilizers: | C 26 | Lecture |
| 27 | Type of fertilizer and their application. | C 27 | Class room Assignment |
| 28 | Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent. | C 28 | Lecture |
| 29 | Clarification Class | C 29 | Clarification Class |
| 30 | Case study of overuse of fertilizer and agrochemicals. | C 30 | Assignment |

**20016300 – Agrochemicals Lab.**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to the Lab | C 1 | Lecture |
| 2 | A sampling of fertilizers and pesticides. | C 2, C-3 | Practical |
| 3 | Pesticides application technology to study various pesticide appliances. Quick tests for identification of common fertilizers. | C 4, C-5 | Practical |
| 4 | Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used. | C 6, C-7 | Practical |
| 5 | To study and identify various formulations of insecticide available kin market. Estimation of nitrogen in Urea. | C -8, C-9 | Practical |
| 6 | Estimation of water-soluble P2O5 and citrate soluble P2O5 in single super phosphate. Estimation of potassium in Murate of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxychloride. | C -10, C-11 | Practical |
| 7 | Estimation of water-soluble P2O5 and citrate soluble P2O5 in single super phosphate. Estimation of potassium in Murate of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxychloride. | C -12. C-13 | Practical |
| 8 | Determination of sulfur content in Sulphur fungicide. Determination of thiram. Determination of ziram content. | C-14, C-15 | Practical |

**20016400 – Commercial Plant Breeding**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Types of crops and modes of plant reproduction | 1 | Lecture |
| Unit I | Types of crops and modes of plant reproduction | 2 | Lecture |
| Unit I | Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production | 3 | Lecture |
| Unit I | Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production | 4 | Lecture |
| Unit I | Genetic purity test of commercial hybrids | 5 | Lecture |
| Unit I | Advances in hybrid seed production of maize, rice, sorghum, pearl millet | 6 | Lecture |
| Unit I | Advances in hybrid seed production of maize, rice, sorghum, pearl millet | 7 | Lecture |
| Unit I | Advances in hybrid seed production of castor, sunflower | 8 | Lecture |
| Unit I | Advances in hybrid seed production of cotton, pigeon pea, brassica | 9 | Lecture |
| Unit I | Advances in hybrid seed production of cotton, pigeon pea, brassica | 10 | Lecture |
| Unit I | Quality seed production of vegetable crops under open and protected environment | 11 | Lecture |
| Unit I | Quality seed production of vegetable crops under open and protected environment | 12 | Lecture |
| Unit I | Alternative strategies for the development of the line and cultivars: haploid inducer | 13 | Lecture |
| Unit I | Alternative strategies for the development of the line and cultivars: haploid inducer | 14 | Lecture |
| Unit I | Tissue culture techniques | 15 | Lecture |
| Unit I | Biotechnological tools | 16 | Lecture |
| Unit II | IPR issues in commercial plant breeding | 17 | Lecture |
| Unit II | DUS testing and registration of varieties under PPV & FR Act | 18 | Lecture |
| Unit II | DUS testing and registration of varieties under PPV & FR Act | 19 | Lecture |
| Unit II | Variety testing, release and notification systems in India | 20 | Lecture |
| Unit II | Variety testing, release and notification systems in India | 21 | Lecture |
| Unit II | Principles and techniques of seed production | 22 | Lecture |
| Unit II | Types of seeds | 23 | Lecture |
| Unit II | Quality testing in self and cross pollinated crops | 24 | Lecture |
| Unit II | Class Assignment | 25 | Class Assignment |
| Unit II | Class Assignment | 26 | Class Assignment |
| Unit II | Class Assignment | 27 | Class Assignment |
| Unit II | PPT | 28 | PPT |
| Unit II | PPT | 29 | PPT |
| Unit II | Quiz | 30 | Quiz |

**20016500 – Commercial Plant Breeding Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Floral biology in self- and cross-pollinated species, selfing and crossing techniques. Techniques of seed production in self- and cross-pollinated crops using A/B/R and two line system. | 1 | Practical |
| 2 | Floral biology in self- and cross-pollinated species, selfing and crossing techniques. Techniques of seed production in self- and cross-pollinated crops using A/B/R and two line system. | 2 | Practical |
| 3 | Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production | 3 | Practical |
| 4 | Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production | 4 | Practical |
| 5 | Tools and techniques for optimizing hybrid seed production. | 5 | Practical |
| 6 | Concept of rouging in seed production plot. | 6 | Practical |
| 7 | Concept of line its multiplication and purification in hybrid seed production. | 7 | Practical |
| 8 | Concept of line its multiplication and purification in hybrid seed production. | 8 | Practical |
| 9 | Role of pollinators in hybrid seed production. | 9 | Practical |
| 10 | Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed- mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. | 10 | Practical |
| 11 | Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed- mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. | 11 | Practical |
| 12 | Sampling and analytical procedures for purity testing and detection of spurious seed. | 12 | Practical |
| 13 | Sampling and analytical procedures for purity testing and detection of spurious seed. | 13 | Practical |
| 14 | Seed drying and storage structure in quality seed management. | 14 | Practical |
| 15 | Screening techniques during seed process. | 15 | Practical |

**20016600 – Landscaping**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Importance and scope of Landscaping | C 1 | Lecture |
| Unit I | Principles of Landscaping | C 2 | Lecture |
| Unit I | Garden styles- terrace gardening, vertical gardening | C 3 | Lecture |
| Unit I | Garden styles- garden components, adornments, | C 4 | Lecture |
| Unit I | Lawn making, rockery, water garden, walk-paths, bridges, other constructed features | C 5 | Lecture |
| Unit I | Gardens for special purposes | C 6 | Lecture |
| | Evaluate any garden in your neighborhood and analyses its style. | C 7 | Class Assignment |
| Unit I | Trees: selection for establishment of Landscape | C 8 | Lecture |
| Unit I | Clarification Class | C 9 | Clarification Class |
| Unit I | Propagation, planting schemes and canopy management | C 10 | Lecture |
| Unit I | Selection and propagation of shrubs and herbaceous perennials | C 11 | Lecture |
| | Mughal gardens | C 12 | Presentation |
| | Landscaping in arid region | C 13 | Presentation |
| Unit I | Planting schemes and architecture for use of shrubs and herbaceous perennials | C 14 | Lecture |
| Unit I | Planting schemes and architecture of climbers and creepers | C 15 | Lecture |
| Unit I | Annuals: selection, propagation and planting scheme | C 16 | Lecture |
| Unit II | Use of palms, ferns, grasses and cacti succulents in developing landscape | C 17 | Lecture |
| Unit II | Clarification Class | C 18 | Clarification Class |
| Unit II | Identify the plants for developing Landscape of RNB Global University | C 19 | Class Assignment |
| Unit II | Pot plants: selection, arrangement, management | C 20 | Lecture |
| Unit II | Bio-aesthetic planning: definition, need, planning | C 21 | Lecture |
| Unit II | Landscaping of urban and peri-urban areas | C 22 | Lecture |
| Unit II | Develop the landscape of hotel in your vicinity | C 23 | Presentation |
| Unit II | How you can develop landscape of your house using annuals | C 24 | Presentation |
| Unit II | Landscaping of rural areas | C 25 | Lecture |
| Unit II | Landscaping of schools, bus stand and railway station, and other public places | C 26 | Lecture |
| Unit II | Development of landscape of hospitals | C 27 | Class Assignment |
| Unit II | Bonsai: principles and management | C 28 | Lecture |
| Unit II | Clarification Class | C 29 | Clarification Class |
| Unit II | CAD application | C 30 | Lecture |

**20016700 – Landscaping Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to topic | C 1 | Lecture |
| 2 | Identification of trees | C 2 | Practical |
| 3 | Propagation of trees | C 3 | Practical |
| 4 | Propagation of shrubs | C 4 | Practical |
| 5 | Care and maintenance of plants | C 5 | Practical |
| 6 | identification of tools and implements used in landscape | C 6 | Practical |
| 7 | Training and pruning of plants for special effects | C 7 | Practical |
| 8 | Lawn establishment and maintenance | C 8 | Practical |
| 9 | Layout of formal gardens, informal gardens | C 9 | Practical |
| 10 | Layout of special type of gardens | C 10 | Practical |
| 11 | Designing of conservatory | C 11 | Practical |
| 12 | Designing of lathe house | C 12 | Practical |
| 13 | Visit of CIAH, Bikaner and SKRAU, Bikaner to study landscaping | C 13 | Practical |
| 14 | Visit to NRC Camel, NRC Equines, local parks to study their designing of Landscape. | C 14 | Practical |
| 15 | Use of computer software for preparation of Landscape plan | C 15 | Practical |

| Course | Course outcomes: - After completion of these courses students should be able to |
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| **10.1 Semester - V** | |
| 20016800 - Principles of Integrated Pest and Disease Management | **CO1:** Demonstrate skills about methods of detection and diagnosis of insect pest and diseases and application of different pest and disease control techniques.<br>**CO2:** Identify the understanding about the role of IPM in sustainable agriculture as the future of modern plant protection in pest and disease control strategy.<br>**CO3:** Analyse prevention and control measures during the disease spread, disease cycle and integrated pest managements in cereal, millet, major oil crops and legumes.<br>**CO4:** Evaluate economic injury level and economic threshold level for timely application of control measures for pest management.<br>**CO5:** About development and validation of IPM module. |
| 20016900 Principles of Integrated Pest and Disease Management Lab | **CO1:** How to diagnosis and detection of various insect pests, and plant diseases.<br>**CO2:** Outline the methods of insect pests and plant disease measurement.<br>**CO3:** Identification of biocontrol agents, different predators and natural enemies.<br>**CO4:** Take Part in mass multiplication of Trichoderma, Pseudomonas, Trichogramma, NPV etc.<br>**CO5:** Recommend the best methods of disease and pest management at farmer field level. |
| 20017000 - Manures, Fertilizers and Soil Fertility Management | **CO1:** Recall the manures, its applications, composition and different methods for its preparation.<br>**CO2:** Explain the concept of soil fertility, productivity and how it can be enhanced.<br>**CO3:** Identify the mechanisms of nutrient transport to plants and factors affecting nutrient availability to plants.<br>**CO4:** Analyse critical levels of different nutrients in soil, Classify different forms of nutrients in soil and Take part in plant analysis & rapid plant tissue tests.<br>**CO5:** Recommend the methods of fertilizer application in different conditions for maximum Nutrient Use Efficiency (NUE) |
| 20017100 Manures, Fertilizers and Soil Fertility Management lab | **CO1:** Recall the analytical instruments and their principles, calibration and applications.<br>**CO2:** Explain how colorimetry and flame photometry works.<br>**CO3:** Explain the procedure of determination of N, P, K and S in plants.<br>**CO4:** Demonstrate how to estimate soil organic carbon.<br>**CO5:** Demonstrate how to estimate exchangeable K, Ca, and Mg in soil. |
| 20017200 - Pests of Crops and Stored | **CO1:** Explain the identification, taxonomy, host range, biology and bionomics, nature of the damage and preventive and curative control |

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| Grain and their Management | measures of crop and stored grain pests.<br>**CO2:** Apply the ecological approach to insect pest management.<br>**CO3:** Explain the technique to operate various pesticide appliances as a knap-sack sprayer, foot sprayer, aerosol, fumigators, etc, for pesticide application.<br>**CO4:** Build crop-wise IPM modules for sustainable agriculture and Storage structure and methods of grain storage to minimize the risk of food security.<br>**CO5:** Importance of Storage structure and methods of grain storage and fundamental principles of grain store management. |
| 20017300<br>Pests of Crops and Stored Grain and their Management Lab | **CO1:** Name of different insect pests and Mites associated with stored grain<br>**CO2:** Classify various insect pests attacking crops and their produce<br>**CO3:** Identify of different types of damage.<br>**CO4:** Analyse of moisture content of grain.<br>**CO5:** Choose the different Methods of grain sampling under storage condition. |
| 20017400 - Diseases of Field and Horticultural Crops and their Management -I | **CO1:** Find the common pathogens of different diseases in the crops.<br>**CO2:** Explain about etiology and symptoms of these diseases which helps in diagnosis of the diseases of field and horticultural crops<br>**CO3:** Identify the different culture, techniques and biology of pathogens in the laboratory.<br>**CO4:** Apply Eco-friendly and economically suitable management practices.<br>**CO5:** Elaborate of disease cycle and management of major diseases of field and horticulture crops. |
| 20017500<br>Diseases of Field and Horticultural Crops and their Management -I Lab | **CO1:** How to identification of diseases of field crops.<br>**CO2:** Explain histopathological studies of selected diseases of horticultural crops.<br>**CO3:** Examine histopathological studies of selected diseases of field crops.<br>**CO4:** Develop a herbarium collection and preservation of plant diseased specimens.<br>**CO5:** Identify of selected diseases of horticultural crops. |
| 20017600 - Crop Improvement-I *(Kharif Crops)* | **CO1:** Recall the evolutionary history of important field crops along with their centre of origin, its wild species and wild relatives that can be utilized in crop improvement.<br>**CO2:** Identify Genetic basis and methods of breeding in cross pollinated crops and modes of selection.<br>**CO3:** Build the understanding of germplasm conservation, utilization, and genetics of qualitative and quantitative characters, and their inheritance.<br>**CO4:** Elaborate breeding procedures, methods and breeding objectives in different crop which is important for the development of improved varieties. |

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| | **CO5:** Interpret Gene preservation method for further use to improve kharif crops. |
| 20017700<br>Crop Improvement-I Lab (Kharif Crops) | **CO1:** Define important agronomic experiments of *Kharif* crops at experimental farms.<br>**CO2:** Explain morphological characteristics of kharif crops.<br>**CO3:** Experiment with study of yield contributing characters of *kharif* season crops,<br>**CO4:** Analyse sowing methods kharif crops, identifications of weed in kharif season.<br>**CO5:** Recommend visit to research stations of related crops. |
| 20017800 - Food Safety & standards | **CO1:** Tell about the food safety, hazards, risks, types of hazards - biological, chemical, physical hazards.<br>**CO2:** Explain food laws and standards of Indian food regulatory regime.<br>**CO3:** Identify the importance of Food Safety Management, Packaging, Product, Nutritional labelling and Scope of food safety.<br>**CO4:** Test for safe practices: surface sanitation, personal hygiene and newer approaches to food safety.<br>**CO5:** Prioritize safe practices: surface sanitation, personal hygiene and newer approaches to food safety. |
| 20017900<br>Food Safety & standards Lab | **CO1:** How to prepare different types of media.<br>**CO2:** List the scheme for the detection of food borne pathogens.<br>**CO3:** Recall the biochemical tests for identification of food borne pathogens.<br>**CO4:** Explain the water quality analysis physio-chemical and microbiological.<br>**CO5:** Develop awareness about personal hygiene. |
| 20018200 -Practical Crop Production – I (Kharif Crops) | **CO1:** Summarize how to prepare field, seed treatment, nursery raising, sowing, nutrient management, water management and weed management.<br>**CO2:** Plan the management of insect pests and diseases of crops also describe about harvesting, threshing, drying, winnowing, storage and marketing of produce from kharif crops.<br>**CO3:** Categorize and Develop knowledge about preparation of balance sheet including cost of cultivation, net returns per student as well as per team of a group of students.<br>**CO4:** Explain production techniques of major Kharif season crops according to resources available in the field.<br>**CO5:** Determination of fertilizer requirement |
| 20018300 - Intellectual Property Rights | **CO1:** Memorize the history of IPR development with various treaties and conventions, laws of IPR, various forms of IPR property and their importance in research.<br>**CO2:** Explain about traditional knowledge-meaning and rights of TK holders.<br>**CO3:** Apply the principles of intellectual property law (including copyright, |

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| | patents, designs, and trademarks) to solve real problems and analyse the social impact of intellectual property law and policy.<br>**CO4:** Impart UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India.<br>**CO5:** Explain the various rules and regulations regarding Patent and copyright. |
| 20018400 - Ability and Skill Enhancement -V | **CO1:** Express and build leadership quality<br>**CO2:** Recall the traits of Successful Entrepreneurs, and Entrepreneurial qualities<br>**CO3:** Classify the differences between organizational decision making process, entrepreneurial decision making process<br>**CO4:** Create work related skills and prepare effective interview questions to conduct effective interviews.<br>**CO5:** Enhance employability skills |
| 20018500 - Summer Internship and Report | **CO1:** Understand the real-time working of organizations.<br>**CO2:** Demonstrate professional knowledge, skills and attitude along with the experience needed to constitute a successful career.<br>**CO3:** Analyse career opportunities in their areas of interest.<br>**CO4:** Build aptitude for gaining supervised professional experiences.<br>**CO5:** Create a clear understanding of industry trends and advancements |
| 20018600 Geoinformatics and Nano-technology and Precision Farming | **CO1:** Define precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture.<br>**CO2:** Explain Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture.<br>**CO3:** Develop remote sensing concepts and application in agriculture.<br>**CO4:** Analyse crop Simulation Models and their uses for optimization of Agricultural Inputs.<br>**CO5:** Importance of nano-particles, nano-pesticides, nano-fertilizers, nano-sensors |
| 20018700 Geoinformatics and Nano-technology and Precision Farming Lab | **CO1:** Define GIS software, spatial data creation and editing.<br>**CO2:** Explain Introduction to image processing software.<br>**CO3:** Develop Visual and digital interpretation of remote sensing images.<br>**CO4:** Analyse Generation of spectral profiles of different objects.<br>**CO5:** Importance of Multispectral remote sensing for soil mapping. |
| 20018900 Weed Management | **CO1:** Introduction to weeds and their classification.<br>**CO2:** Acquaintance with herbicide classification and formulation, mode of action of herbicide<br>**CO3:** Understand herbicide selectivity, allelopathy and its application in weed management.<br>**CO4:** Discuss about bio-herbicide, herbicide mixture and utility in agriculture. |

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| | **CO5:** Information about herbicide resistance and management. |
| 20019000<br>Weed Management Lab | **CO1:** Identification of common weeds.<br>**CO2:** Introduction to weed preservation techniques.<br>**CO3:** Study about biology of weeds, weed flora in long term experiments.<br>**CO4:** Analyze herbicide formulation, mixture of herbicide, weed control efficiency.<br>**CO5:** Study about herbicide application methods, spraying equipments. |
| 20019100<br>Micro propagation Technologies | **CO1:** Define and explain the concept of micro propagation and its importance in agriculture.<br>**CO2:** Explain the importance of growing media use in tissue culture.<br>**CO3:** Make use roles of the major and minor nutrients in tissue culture.<br>**CO4:** Examine demonstrate basic micro propagation and nursery techniques<br>**CO5:** Explain stages of plant growth during micro propagation of a selected plant |
| 20019200<br>Micro propagation Technologies Lab | **CO1:** Define learning important milestones in the plant tissue culture.<br>**CO2:** Explain techniques of sterilization and monitoring method of sterilization.<br>**CO3:** Understanding the concepts and principles of Plant tissue culture.<br>**CO4:** Experiment with performing procedures for micropropagation techniques in different crops.<br>**CO5:** Determine learning methods to conserve germplasm under In vitro. |
| 20018000 - Bio pesticides & Bio fertilizers | **CO1:** Tell about the bio pesticides: importance, scope and potential of bio pesticides.<br>**CO2:** Demonstrate bio fertilizers its status and scope and characteristic features of various bacterial bio fertilizers.<br>**CO3:** Experiment with the storage, shelf life, quality control, marketing and factors influencing the efficacy of Bio-pesticides & Bio-fertilizers.<br>**CO4:** Analyse mechanism of Production technology of Bio-pesticides & Bio-fertilizers.<br>**CO5:** Determine mechanism of Production technology of Bio-pesticides & Bio-fertilizers. |
| 20018100<br>Bio pesticides & Bio fertilizers | **CO1:** Describe about bio pesticides: importance, scope and potential of bio pesticides.<br>**CO2:** Describe about bio fertilizers its status and scope and characteristic features of various bacterial bio fertilizers.<br>**CO3:** Interpret storage, shelf life, quality control, marketing and factors influencing the efficacy of Bio-pesticides & Bio-fertilizers.<br>**CO4:** Describe mechanism of Production technology of Bio-pesticides & Bio-fertilizers.<br>**CO5:** Choose the best fertilizers and bio-pesticide for maximize the crop production. |

## 10.2 Mapping: Semester – V

| 20016800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | 2 | 3 | 3 | 2 | | 2 | 2 | | 3 | 2 |
| CO2 | 3 | | | 2 | | 3 | 2 | 2 | | | | |
| CO3 | 3 | 2 | 2 | | 3 | 3 | 2 | | 2 | 3 | 3 | 3 |
| CO4 | 2 | 3 | 3 | 3 | 3 | | 3 | 3 | | 3 | 3 | 3 |
| CO5 | 2 | 3 | 3 | | 2 | | 2 | 2 | 3 | | | 2 |

| 20016900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | | 2 | | | 2 |
| CO2 | 2 | 3 | 3 | 2 | 3 | 1 | 2 | 1 | | 1 | | 1 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | | | | | |
| CO4 | 3 | 2 | 3 | 3 | 3 | 1 | | | | | | |
| CO5 | 3 | 3 | 2 | 2 | 2 | | | | | | | |

| 20017000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 3 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | | 2 | 3 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 1 | 3 | 3 | 1 | 2 | 2 | 3 | 2 | 3 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 1 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |

| 20017100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| CO3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |
| CO5 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |

| 20017200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | | 2 | | 2 | | 2 | 2 | | 3 |
| CO2 | 3 | 3 | | 2 | | 2 | | 2 | 2 | | 2 | |
| CO3 | 2 | | 3 | | 2 | 2 | | 2 | | 2 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 2 | 3 | | 2 | | 2 | | | 2 |
| CO5 | 3 | 2 | 3 | 3 | 2 | | 3 | 3 | 3 | 3 | | 3 |

| 20017300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | | 2 | | 2 | | 2 | 2 | | 3 |
| CO2 | | | | 2 | | | 1 | 2 | 2 | | 2 | |
| CO3 | 1 | | 1 | | | 2 | | | | 2 | 1 | 2 |
| CO4 | | 3 | 2 | 2 | 1 | | 2 | | 2 | | | 1 |
| CO5 | 3 | 2 | 3 | 1 | 2 | 1 | | 3 | 3 | 3 | | |

| 20017400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | | 3 | | 2 | 2 | | | | 2 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 2 | | 2 | 3 | 3 | 3 | | |
| CO3 | 3 | 3 | 3 | 2 | 2 | 2 | | 2 | 2 | | | |
| CO4 | 3 | | 2 | | 3 | | | | 3 | 3 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 3 | 2 | | 3 | 2 | 3 | 2 | 3 | 3 |

| 20017500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | | 2 | 2 | 2 | | 3 | 2 | | 2 | 3 |
| CO2 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | | 3 | | 3 |
| CO3 | 3 | | | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| CO4 | 2 | 2 | 2 | | 2 | 3 | 2 | | | 3 | 2 | 3 |
| CO5 | 3 | 3 | | 3 | | 2 | 3 | | 3 | | 3 | 3 |

| 20017600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | | 2 | 3 | 2 | 2 |
| CO2 | 2 | 3 | | | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 |
| CO3 | 2 | 3 | 2 | 3 | 3 | | | 2 | 2 | | 2 | 3 |
| CO4 | 3 | 3 | 2 | | | 3 | 2 | 3 | 3 | 2 | 3 | 2 |
| CO5 | 2 | 2 | 3 | 3 | | 2 | 3 | | 2 | | | |

| 20017700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 |
| CO3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 |
| CO4 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 |
| CO5 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |

| 20017800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO4 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 |

| 20017900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO4 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO5 | 1 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 |

| 20018200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | | 3 | 3 | | 2 | 2 | 2 | 3 | 3 | 3 |
| CO2 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | | | 2 | 3 | 3 |
| CO3 | 3 | | | 2 | 2 | | | | 3 | 2 | 3 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | | 2 | 3 |
| CO5 | 2 | 3 | | 3 | 3 | | 3 | 3 | 3 | | 3 | 2 |

| 20018300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | | 2 | 2 | 2 | 2 | 3 | | 3 | 3 | 2 |
| CO2 | 2 | 3 | 3 | 2 | | 2 | 2 | | 3 | 3 | 2 | 3 |
| CO3 | 3 | 2 | | | 2 | | | 2 | 2 | 2 | | 3 |
| CO4 | 3 | 2 | 2 | | | | 2 | 2 | 3 | | 3 | 2 |
| CO5 | 3 | | 3 | | 3 | 3 | | 3 | | 3 | 3 | 3 |

| 20018400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 2 | | | | | 3 | 2 | 2 |
| CO2 | 2 | | | 3 | 2 | 2 | | 2 | | 3 | | 2 |
| CO3 | 3 | 3 | | | | 2 | | 3 | 2 | 3 | 3 | 2 |
| CO4 | | 2 | 3 | 3 | 2 | 3 | | 3 | 2 | 3 | | 2 |
| CO5 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 |

| 20018500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | | 2 | 3 | | | 2 | | 3 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 3 | | | | | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | 2 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | 2 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | 3 | 3 |

| 20018600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 2 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 |
| CO5 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 |

| 20018700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 2 | 1 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |

| 20018900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 |
| CO4 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 |
| CO5 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |

| 20019000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| CO3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |
| CO4 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 |

| 20019100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 |
| CO5 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 |

| 20019200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 |
| CO2 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 |
| CO4 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 |
| CO5 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 |

| 20018000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 |  | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO4 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 |
| CO5 | 3 | 3 |  | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 |

| 20018100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 |  |  | 2 | 2 | 3 | 2 | 2 | 3 | 3 |  |
| CO2 |  |  | 3 | 2 |  |  |  | 1 |  |  |  | 1 |
| CO3 | 2 | 3 | 1 | 1 | 2 |  |  |  | 3 | 2 |  |  |
| CO4 |  |  |  |  |  |  | 2 |  |  |  | 3 | 2 |
| CO5 | 3 | 3 |  |  |  | 2 |  |  | 2 | 3 | 3 |  |

## 10.3 Lesson Plan: Semester – V

### 20016800 – Principles of Integrated Pest and Disease Management

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Categories of insect pests | C1 | Lecture |
| Unit I | Categories of insect pests and diseases | C2 | Lecture |
| Unit I | IPM: Introduction, history, importance | C3 | Lecture |
| Unit I | Principles and tools of IPM | C4 | Lecture |
| Unit I | Economic importance of insect pests | C5 | Lecture |
| Unit I | History of IPM | C6 | Lecture |
| | Clarification Class-1 | C7 | Clarification Class |
| Unit I | Methods of detection and diagnosis of insect pest and diseases | C8 | Lecture |
| Unit I | Dynamics of economic injury level | C9 | Lecture |
| Unit I | Importance of Economic threshold level | C10 | Lecture |
| Unit I | Biological and chemical methods of pest control | C11 | Lecture |
| | Clarification Class-2 | C12 | Clarification Class |
| | Guest Lecture | C13 | Guest lecture |
| | Quiz-1 | C14 | Quiz |
| Unit I | Cultural and mechanical methods of pest control | C15 | Lecture |
| Unit I | Physical methods of pest control | C16 | Lecture |
| Unit I | Survey surveillance of insect pest | C17 | Lecture |
| Unit I | Forecasting of Insect pest and diseases | C18 | Lecture |
| | Clarification Class-3 | C19 | Clarification Class |
| | Webinar-1 | C20 | Webinar |
| | Home Assignment-1 | | Home Assignments |
| | Class Room Assignment 1 | C21 | Class Assignment |
| | Presentation-1 | C22-C23 | Presentation |
| | Quiz-2 | C24 | Quiz |
| Unit-I | Development and validation of IPM module | C25 | Lecture |
| Unit-I | Safety issues in pesticides uses | C26 | Lecture |
| Unit-I | Political, social and legal implication of IP | C27 | Lecture |
| Unit-I | Diseases and pest risk analysis | C28 | Lecture |
| Unit-I | conventional pesticides for the insect pests and disease management | C29 | Lecture |
| | Clarification Class-4 | C30 | Clarification Class |

**20016900 – Principles of Integrated Pest and Disease Management Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Methods of diagnosis and detection of various insect pests, and plant diseases | P1-P2 | Practical |
| 2 | Methods of insect pests and plant disease measurement, Assessment of crop yield | P3-P4 | Practical |
| 3 | Losses, calculations based on economics of IPM, | P5-P6 | Practical |
| 4 | Identification of biocontrol agents, different predators and natural enemies. Mass | P7-P8 | Practical |
| 5 | Multiplication of Trichoderma, Pseudomonas, Trichogramma, NPV etc. | P9-P10 | Practical |
| 6 | Plan & assess preventive strategies (IPM module) and decision making | P9-P11 | Practical- 5 |

**20017000 – Manures, Fertilizers and Soil Fertility Management**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. | 1,2 | Lecture |
| 1 | Fertilizer recommendation approaches. Integrated nutrient management. | 3,4 | Lecture |
| 1 | Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, | 5,6 | Lecture |
| 2 | secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil | 7,8 | Lecture |
| 2 | amendments, Fertilizer Storage, Fertilizer Control Order. History | 8,9 | Lecture |
| 2 | History of soil fertility and plant nutrition. criteria of essentiality. | 10,11 | Lecture |
| 3 | role, deficiency and toxicity, symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. | 12,13,14 | Lecture |
| 3 | Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. | 15,16,17 | Lecture |
| 4 | Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. | 18 | Lecture |
| 4 | Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions | 19 | Lecture |
| | PPT | | Presentation |
| | Quiz | 20 | Quiz |
| | Clarification | 21 | Lecture |
| | Home assign. | 22 | Presentation |
| | REVISION | 22 | Activity |
| | FERTILIZZER STORAGE | 23 | Lecture |

**20017100 – Manures, Fertilizers and Soil Fertility Management Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction of analytical instruments and their principles | P1 | Practical |
| 2 | Calibration and its applications | P2 | Practical |
| 3 | CALORIMETER & ITS APPLICATIONS | P3 | Lecture |
| 4 | Estimation of alkaline hydrolysable N in soils | P4 | Practical |
| 5 | Estimation of soil extractable P in soils | P5 | Practical |
| 6 | Estimation of exchangeable K; Ca and Mg in soils. | P9 | Practical |
| 7 | Estimation of soil extractable S in soils. | P9 | Practical |
| 8 | Estimation of DTPA extractable Zn in soils | P10 | Practical |
| 9 | Estimation of N in plants. Estimation of P in plants. | P10 | Practical |
| 10 | Estimation of K in plants. Estimation of S in plants. | P10 | Practical |
| 11 | CLARIFICATION CLASS | P11 | Clarification Class |
| 12 | QUIZ | P12 | Quiz |
| 13 | HOME ASSIGNMENT | P13 | Home Assignments |
| 14 | ESTIMATION OF SOIL ORGANIC CARBON | P14 | Practical |
| 15 | Practical revsion organic carbon estimation | P15 | Practical |

**20017200 –Pests of Crops and Stored Grain and their Management**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | General account on nature and type of damage by different arthropods pests | C-1 | Theory class |
| 2 | nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crops | C-2 | Theory class |
| 3 | nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop, vegetable crop | C-3 | Theory class |
| 4 | Scientific name, order, family, host range, distribution, biology and bionomics, fruit crops | C-4 | Theory class |
| 5 | Scientific name, order, family, host range, distribution, biology and bionomics plantation crops | C-5 | Theory class |
| 6 | Scientific name, order, family, host range, distribution, biology and bionomics pulse crops | C-6 | Theory class |
| 7 | Scientific name, order, family, host range, distribution, biology and bionomics spices of oilseed crops | C-7 | Theory class |
| 8 | Scientific name, order, family, host range, distribution, biology and bionomics fiber crops | C-8 | Theory class |
| 9 | Scientific name, order, family, host range, distribution, biology and bionomics condiments | C-9 | Theory class |
| 10 | Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain. | C-10 | Theory class |
| 11 | Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management | C-11 | Theory class |
| 12 | Storage structure and methods of grain storage | C-12 | Theory class |
| 13 | fundamental principles of grain store management. | C-13 | Theory class |

**20017300 – Pests of Crops and Stored Grain and their Management Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Identification of different types of damage. | P1 | Practical |
| 2 | Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. | P2 | Practical |
| 3 | Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. | P3 | Practical |
| 4 | Fumigation of grain store / go-down. Identification of rodents and rodent control operations in go-downs. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition. | P4 | Practical |
| 5 | Visit to Indian Storage Management and Research Institute, Hapur and Quality Laboratory, | P5 | Practical |
| 6 | Department of Food, Delhi Visit to nearest FCI godowns. | P6 | Practical |

**20017400 –Diseases of Field and Horticultural Crops and their Management -I**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Introduction of Diseases | C1 | Lecture |
| I | rice diseases | C2 | Lecture |
| I | maize diseases | C3 | Lecture |
| I | sorghum diseases | C4 | Lecture |
| I | bajra diseases | C5 | Lecture |
| I | pulse diseases | C6 | Lecture |
| I | Assignment 1 | C7 | |
| I | groundnut diseases | C8 | Presentation |
| I | minor millet diseases | C9 | |
| I | tobacco diseases | C10 | Lecture |
| | guava diseases | C11 | Class Assignment |
| | banana diseases | C12 | Clarification Class |
| I | pomegranate diseases | C13 | Lecture |
| I | crucifers diseases | C14 | Lecture |
| | tomato diseases | C15 | Class Assignment |
| I | onion diseases | C16 | Lecture |
| | assignment 2 | | Home Assignments |
| I | Ginger diseases | C17 | Lecture |
| I | coconut diseases | C18 | Lecture |
| | assignment 3 | C19 | Presentation |
| I | turmeric diseases | C20 | Quiz |
| | coffee diseases | C21 | Class Assignment |
| I | colocasia diseases | C22 | Lecture |
| I | plantations diseases | C23 | Lecture |
| | plantations diseases | | Home Assignments |
| I | plantations diseases | C24 | Lecture |
| I | plantations diseases | C25 | Lecture |
| I | plantations diseases | C26 | Lecture |
| | Presentation | C27 | Presentation |
| | Quiz 2 | C28 | Quiz |
| | Class Room Assignment No.4 | C29 | Class Assignment |
| | Clarification Class No.2 | C-30 | Clarification Class |

**20017500 – Diseases of Field and Horticultural Crops and their Management -I Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction of Diseases- LAB | C1 | Lecture |
| 2 | ISOLATION OF PLANT PATHOGENS | C2 | Lecture |
| 3 | STRUCTURE OF PLANT PATHOGENS | C3 | Lecture |
| 4 | STUDY ON FUSARIUM LIFE CYCLE | C4 | Lecture |
| 5 | STUDY ON BACTERIAL LIFE CYCLE | C5 | Lecture |
| 6 | STUDY ON FUNGAL LIFE CYCLE | C6 | Lecture |
| 7 | TAXONOMY | C7 | Practical |
| 8 | SYSTEMATIC POSITION | C8 | Presentation |
| 9 | banana diseases | C9 | Practical |
| 10 | ginger diseases | C10 | Lecture |
| 11 | pomegranate diseases | C11 | Class Assignment |
| 12 | coffee diseases | C12 | Clarification Class |
| 13 | Strawberry diseases | C13 | Lecture |
| 14 | Potato diseases | C14 | Lecture |
| 15 | cucurbits diseases | C15 | Class Assignment |
| 16 | crucifers diseases | C16 | Lecture |
| 17 | assignment 2 | | Home Assignments |
| 18 | vegetable diseases | C17 | Lecture |
| 19 | disease cycle | C18 | Lecture |
| 20 | assignment 3 | C19 | Presentation |
| 21 | turmeric diseases | C20 | Quiz |
| 22 | tomato diseases | C21 | Class Assignment |
| 23 | colocasia diseases | C22 | Lecture |
| 24 | coconut diseases | C23 | Lecture |
| 25 | Home Assignments | | Home Assignments |
| 26 | Collection and preservation of diseased | C24 | Lecture |
| 27 | specimens for herbarium | C25 | Lecture |
| 28 | specimens for herbarium | C26 | Lecture |
| 29 | Presentation | C27 | Presentation |
| 30 | Quiz 2 | C28 | Quiz |
| 31 | Class Room Assignment No.4 | C29 | Class Room Assignment |
| 32 | Clarification Class No.2 | C-30 | Clarification Class |

**20017600 – Crop Improvement-I (Kharif Crops)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibers; fodders and cash crops; vegetable and horticultural crops | C1 | Lecture |
| I | Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters | C2 | Lecture |
| I | Class Room Assignment No.1 | C3 | Class Assignment |
| I | Important concepts of breeding self-pollinated, cross pollinated and vegetatively propagated crops | C4 | Lecture |
| I | Clarification Class No.1 | C5 | Clarification Class |
| I | Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield | C6 | Lecture |
| | Take Home Assignment No.1 | | Home Assignments |
| | Presentation 1 | C7 | Presentation |
| I | adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional) | C8 | Lecture |
| | Class Room Assignment No.2 | C9 | Class Assignment |
| I | Hybrid seed production technology in Maize | C10 | Lecture |
| I | Hybrid seed production technology in Rice, Sorghum | C11 | Lecture |
| | Take Home Assignment No.2 | | Home Assignments |
| I | Hybrid seed production technology in Pearl millet and Pigeonpea, etc. | C12 | Lecture |
| I | Ideotype concept and climate resilient crop varieties for future | C13 | Lecture |
| | Quiz 1 | C14 | Quiz |
| | Clarification Class No.2 | C15 | Clarification Class |

**20017700 – Crop Improvement-I Lab (Kharif Crops)**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | emasculation and hybridization techniques | P1-P2 | Practical |
| 2 | Maintenance breeding of different kharif crops | P3-P4 | Practical |
| 3 | Layout of field experiments | P5-P6 | Practical |
| 4 | Study of field techniques for seed production and hybrid seeds production in Kharif crops | P7-P8 | Practical |
| 5 | Estimation of heterosis, inbreeding depression and heritability | P9-P10 | Practical |

**20017800 –Food Safety & standards**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Food Safety – Definition, Importance, Scope and Factors affecting Food Safety | C-1 | Lecture |
| Unit-1 | Hazards and Risks, Types of hazards - Biological, Chemical, Physical hazards | C-2 | Lecture |
| Unit-1 | Hazards and Risks, Types of hazards - Biological, Chemical, Physical hazards | C-3 | Lecture |
| Unit-1 | Management of hazards - Need and Control of parameters | C-4 | Lecture |
| Unit-1 | Temperature control | C-5 | Lecture |
| Unit-1 | Food storage, Product design | C-6 | Lecture |
| Unit-1 | Hygiene and Sanitation in Food Service Establishments- Introduction | C-7 | Lecture |
| Unit-1 | Sources of contamination and their control | C-8 | Lecture |
| Unit-1 | Waste Disposal. Pest and Rodent Control. Personnel Hygiene. | C-9 | Lecture |
| Unit-1 | Food Safety Measures. Food Safety Management Tools- Basic concepts | C-10 | Lecture |
| Unit-1 | Clarification Class-I | C-11 | Clarification Class |
| Unit-1 | Presentation-I | C-12 | Presentation |
| Unit-1 | Class Room Assignment-I | C-13 | Class Room Assignment |
| Unit-1 | PRPs, GHPs, GMPs, SSOPs etc. HACCP. ISO series. | C-14 | Lecture |
| Unit-1 | TQM - concept and need for quality, components of TQM, Kaizen. | C-15 | Lecture |
| Unit-1 | Risk Analysis. Accreditation and Auditing, Water Analysis, Surface Sanitation and Personal Hygiene | C-16 | Lecture |
| Unit-1 | Risk Analysis. Accreditation and Auditing, Water Analysis, Surface Sanitation and Personal Hygiene | C-17 | Lecture |
| Unit-1 | Activity- I | C-18 | Activity |
| Unit-1 | Take Home Assignments-I | | Home Assignments |
| Unit-1 | Food laws and Standards- Indian Food Regulatory Regime, FSSA | C-19 | Lecture |
| Unit-1 | Global Scenario CAC. Other laws and standards related to food | C-20 | Lecture |
| Unit-1 | Recent concerns- New and Emerging Pathogens | C-21 | Lecture |
| Unit-1 | Webinar | C-22 | Webinar |
| Unit-1 | Clarification Class-II | C-23 | Clarification Class |
| Unit-1 | Class Room Assignment-II | C-24 | Class Assignment |
| Unit-1 | Packaging, Product labeling and Nutritional labeling, Genetically modified foods\ transgenics, Organic foods | C-25 | Lecture |
| Unit-1 | Newer approaches to food safety. Recent Outbreaks. Indian and International Standards for food products. | C-26 | Lecture |
| Unit-1 | Newer approaches to food safety. Recent Outbreaks. Indian and International Standards for food products. | C-27 | Lecture |
| Unit-1 | Activity- II | C-28 | Activity |
| Unit-1 | Clarification Class-III | C-29 | Clarification Class |
| Unit-1 | Class Room Assignment-III | C-30 | Class Assignment |

**20017900– Food Safety & standards Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Water quality analysis physico-chemical and microbiological | P1- P2 | Practical |
| 2 | Preparation of different types of media | P3- P4 | Practical |
| 3 | Microbiological Examination of different food samples | P 5-P6 | Practical |
| 4 | Microbiological Examination of different food samples | P7 | Practical |
| 5 | Activity | P 8 | Activity |
| 6 | Assessment of surface sanitation by swab/rinse method | P 9-P10 | Practical |
| 7 | Assessment of personal hygiene. Biochemical tests for identification of bacteria | P11-P12 | Practical |
| 8 | Scheme for the detection of food borne pathogens | P13- P14 | Practical |
| 9 | Activity | P15 | Activity |

**20018200 – Practical Crop Production – I (Kharif crops)**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Crop planning, raising field crops in multiple cropping systems | C-1 | Lecture |
| 2 | Field preparation, seed, treatment, nursery raising, sowing, nutrient, | C-2 | Lecture |
| 3 | . harvesting, threshing, drying winnowing | C-3 | Class assignment |
| 4 | storage and marketing of produce. | C-4 | Lecture |
| 5 | The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management | C-5 | Lecture |
| 6 | Preparation of balance sheet including cost of cultivation, net returns per student | C-6 | Lecture |
| 7 | cultivation and management of pearlmillet | C-7 | Lecture |
| 8 | cultivation and management of wheat | C-8 | Lecture |
| 9 | cultivation and management of barley | C-9 | Lecture |
| 10 | cultivation and management of mothbean | C-10 | Lecture |
| 11 | cultivation and management of moongbean | C-11 | Lecture |
| 12 | cultivation and management of chickpea | C-12 | Lecture |
| 13 | cultivation and management of mustard | C-13 | Lecture |
| 14 | cultivation and management of groundnut | C-14 | Lecture |
| 15 | cultivation and management of fenugreek | C-15 | Lecture |
| 16 | cultivation and management of cumin | C-16 | Lecture + Clarification |
| 17 | cultivation and management of isabgol | C-17 | Lecture + Clarification |
| 18 | cultivation and management of cotton | C-18 | Quiz |
| 19 | cultivation and management of date palm | C-19 | Quiz |
| 20 | cultivation and management of tomato | C-20 | Classroom assignment |

**20018300 – Intellectual Property Rights**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction and meaning of intellectual property | C-1 | Theory class |
| 2 | Types of Intellectual Property and legislations covering IPR in India:-Patents | C-2 | Theory class |
| 3 | Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database. | C-3 | Theory class |
| 4 | Copyrights, Trademark, Trade secrets | C-4 | Theory class |
| 5 | Industrial design, Integrated circuits, | C-5 | Theory class |
| 6 | Geographical indications, | C-6 | Theory class |
| 7 | brief introduction to GATT, WTO, TRIPs and WIPO, Assignment 1 | C-7 | Theory class |
| 8 | brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV | C-8 | Theory class |
| 9 | and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights | C-9 | Theory class |
| 10 | Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA) Assignment 2 | C-10 | Theory class |
| 11 | Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing | C-11 | Theory class |
| 12 | Traditional knowledge-meaning and rights of TK holders | C-12 | Theory class |
| 13 | Topic clarifications | C-13 | Theory class |

**20018400 – Ability and Skill Enhancement -V**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | What is leadership & Traits of Leadership | C 1 | Lecture |
| Unit I | Movie/ Story/ Interviews of leaders | C 2 | Lecture |
| Unit I | identifying leaders & Identify leadership qualities | C 3 | Lecture |
| Unit I | Debate/ Discussion/ Presentations on leaders | C 4 | Presentation |
| Unit I | Class Assignment | C 5 | Class Assignment |
| Unit I | Clarification Class | C 6 | Clarification Class |
| Unit II | What is Entrepreneurship, Traits of Successful Entrepreneurs | C 7 | Lecture |
| Unit II | Movie/ Story of Entrepreneurs | C 8 | Lecture |
| Unit II | Identify Entrepreneurial qualities | C 9 | Lecture |
| Unit II | Debate/ Discussion/Presentation on Entrepreneurs | C 10 | Presentation |
| Unit II | Class Assignment | C 11 | Class Assignment |
| Unit II | Clarification Class | C 12 | clarification Class |
| Unit III | What are organizational skills, how to develop them | C 13 | Lecture |
| Unit III | the skills needed to become a successful entrepreneur/administrator | C 14 | Lecture |
| Unit III | good communication, ambition, courage, hard work, planning, accountability | C 15 | Lecture |
| Unit III | Organizational skills can be developed by discipline making a system, rules | C 16 | Lecture |
| Unit III | delegation of power at workplace, | C 17 | Lecture |
| Unit III | PPT | C 18 | Presentation |
| Unit III | How to enhance employability; skills, why do we need them, | C 19 | Lecture |
| Unit III | different workplaces, having different needs, different skills, how to recognize different work skills | C 20 | Lecture |
| Unit III | Class Assignment | C 21 | Class Assignment |
| Unit III | Clarification Class | C 22 | Clarification Class |
| Unit IV | The process of decision making, its steps, what are its basics, | C 23 | Lecture |
| Unit IV | what are the basics of organizational decision-making process | C 24 | Lecture |
| Unit IV | entrepreneurial decision making, how to make a right decision at right time, dilemma | C 25 | Lecture |
| Unit IV | Class Assignment | C 26 | Class Assignment |
| Unit IV | Clarification Class | | Clarification Class |
| Unit V | Conducting Interviews with Leaders/ Entrepreneurs | C 28 | Lecture |
| Unit V | Preparing Questions, Interviewing the fellow person, do's & don'ts while taking interview | C 29 | Lecture |
| Unit V | Clarification Class | C 30 | Clarification Class |

**20018600 Geoinformatics and Nano-technology and Precision Farming (Elective)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-I | Precision agriculture: concepts and techniques | C-1 | Lecture |
| Unit-I | Precision agriculture: concepts and techniques | C-2 | Lecture |
| Unit-I | their issues and concerns for Indian agriculture | C-3 | Lecture |
| Unit-I | their issues and concerns for Indian agriculture | C-4 | Lecture |
| | Classroom Assignment-I | C-5 | Class Assignment |
| Unit-I | Geo-informatics- definition, concepts, tool and techniques | C-6 | Lecture |
| Unit-I | Geo-informatics- definition, concepts, tool and techniques | C-7 | Lecture |
| Unit-I | their use in Precision Agriculture | C-8 | Lecture |
| | Classroom Assignment-II | C-9 | Class Assignment |
| Unit-I | Crop discrimination and Yield monitoring, soil mapping | C-10 | Lecture |
| Unit-I | Crop discrimination and Yield monitoring, soil mapping | C-11 | Lecture |
| Unit-I | fertilizer recommendation using geospatial technologies | C-12 | Lecture |
| | PPT-I | C-13 | Presentation |
| Unit-I | Spatial data and their management in GIS | C-14 | Lecture |
| | Home Assignment-I | | Home Assignment |
| Unit-I | Remote sensing concepts and application in agriculture | C-15 | Lecture |
| Unit-I | Remote sensing concepts and application in agriculture | C-16 | Lecture |
| | Quiz-I | C-17 | Quiz |
| Unit-I | Clarification Class | C-18 | Clarification Class |
| Unit-II | Image processing and interpretation | C-19 | Lecture |
| Unit-II | Global positioning system (GPS), components and its functions | C-20 | Lecture |
| | PPT-II | C-21 | Presentation |
| | Classroom Assignment-III | C-22 | Class Assignment |
| Unit-II | Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs | C-23 | Lecture |
| Unit-II | Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs | C-24 | Lecture |
| Unit-II | STCR approach for precision agriculture | C-25 | Lecture |
| Unit-II | Nanotechnology, definition, concepts and techniques | C-26 | Lecture |
| Unit-II | brief introduction about nanoscale effects, nano-particles, nanopesticides, nano-fertilizers, nano-sensors | C-27 | Lecture |
| | Home Assignment-II | | Home Assignment |
| | PPT-III | C-28 | Presentation |
| | Classroom Assignment IV | C-29 | Class Assignment |
| Unit-II | Clarification Class | C-30 | Clarification Class |

**20018700 Geoinformatics and Nano-technology and Precision Farming Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to GIS software, spatial data creation and editing | C-1 | Practical |
| 2 | Introduction to GIS software, spatial data creation and editing | C-2 | Practical |
| 3 | Introduction to image processing software. Visual and digital interpretation of remote sensing images | C-3 | Practical |
| 4 | Introduction to image processing software. Visual and digital interpretation of remote sensing images | C-4 | Practical |
| 5 | Generation of spectra profiles of different objects. Supervised and unsupervised classification and acreage estimation | C-5 | Practical |
| 6 | Generation of spectra profiles of different objects. Supervised and unsupervised classification and acreage estimation | C-6 | Practical |
| 7 | Multispectral remote sensing for soil mapping | C-7 | Practical |
| 8 | Multispectral remote sensing for soil mapping | C-8 | Practical |
| 9 | Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. | C-9 | Practical |
| 10 | Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. | C-10 | Practical |
| 11 | Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. | C-11 | Practical |
| 12 | Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. | C-12 | Practical |
| 13 | Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming | C-13 | Practical |
| 14 | Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming | C-14 | Practical |
| 15 | Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming | C-15 | Practical |

**20018900 – Weed Management (Elective)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Introduction to weeds, characteristics of weeds, their harmful and beneficial effects on ecosystem | C1 | Lecture |
| Unit I | Classification of weeds | C2-C3 | Lecture |
| Unit I | Reproduction and dissemination of weeds | C4 | Lecture |
| | Clarification class-1 | C5 | Clarification class |
| | Class room assignment-1 | C6 | Class assignment |
| Unit I | Herbicide classification | C7 | Lecture |
| | Presentation 1 | C8-C9 | Presentation |
| Unit I | Concept of adjuvant, surfactant, herbicide formulation and their use | C10 | Lecture |
| | Quiz 1 | C11 | Activity |
| Unit I | Introduction to mode of action of herbicides and selectivity | C12 | Lecture |
| | Class room assignment-2 | C13 | Class assignment |
| | Allelopathy and its application for weed management | C14 | Lecture |
| | Presentation 2 | C15-C16 | Presentation |
| Unit II | Bio herbicides and their application in agriculture | C 17 | Lecture |
| Unit II | Concept of herbicide mixture and utility in agriculture | C18-C19 | Lecture |
| | Clarification class -2 | C20 | Clarification class |
| | Quiz 2 | C21 | Activity |
| Unit II | Herbicide compatibility with agro chemicals and their application | C22 | Lecture |
| | Presentation 3 | C23-C24 | Presentation |
| Unit II | Integration of herbicides with non chemical methods of weed management | C25 | Lecture |
| | Class room assignment 3 | C26 | Class assignment |
| Unit II | Herbicide resistance and its management | C27-C28 | Lecture |
| | Class room assignment 4 | C 29 | Class assignment |
| | Clarification class 3 | C30 | Clarification class |

**20019000 – Weed Management Lab (Elective)**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Techniques of weed preservation | C1 | Lecture |
| 2 | Weed identification and their losses study | C2-C3 | Lecture |
| 3 | Biology of important weeds | C4 | Lecture |
| 4 | Clarification Class | C5 | Clarification Class |
| 5 | Study of herbicide formulations and mixture of herbicides | C6-C7 | Lecture |
| 6 | Practical | C8 | Demo/Calculation |
| 7 | Herbicides and agrochemical study | C9 | Lecture |
| 8 | Shift of weed flora study in long term experiments | C10 | Lecture |
| 9 | Class room assignment | C11 | Class assignment |
| 10 | Practical | C12 | Demo/Calculation |
| 11 | Study of methods of herbicide application, spraying equipments | C13 | Lecture |
| 12 | Calculation of herbicide doses and weed control efficiency and weed index | C14 | Lecture |
| 13 | Class room assignment | C15 | Class assignment |

**20019100 Micro propagation Technologies (Elective)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Introduction, History of Micropropagation | 1 | Lecture |
| Unit I | Introduction, History of Micropropagation | 2 | Lecture |
| Unit I | Advantages and limitations of Micropropagation | 3 | Lecture |
| Unit I | Advantages and limitations of Micropropagation | 4 | Lecture |
| Unit I | Types of cultures (seed, embryo, organ, callus, cell | 5 | Lecture |
| Unit I | Types of cultures (seed, embryo, organ, callus, cell | 6 | Lecture |
| Unit I | Stages of micropropagation, | 7 | Lecture |
| Unit I | Stages of micropropagation, | 8 | Lecture |
| Unit I | Axillary bud proliferation (Shoot tip and meristem culture, bud cu1ture), | 9 | Lecture |
| Unit I | Axillary bud proliferation (Shoot tip and meristem culture, bud cu1ture), | 10 | Lecture |
| Unit I | Axillary bud proliferation (Shoot tip and meristem culture, bud cu1ture), | 11 | Lecture |
| Unit II | 0rganogenesis (callus and direct organ formation), | 12 | Lecture |
| Unit II | 0rganogenesis (callus and direct organ formation), | 13 | Lecture |
| Unit II | Somatic embryogenesis, | 14 | Lecture |
| Unit II | Somatic embryogenesis, | 15 | Lecture |
| Unit II | Cell suspension cultures, | 16 | Lecture |
| Unit II | Cell suspension cultures, | 17 | Lecture |
| Unit II | Production of secondary metabolites, | 18 | Lecture |
| Unit II | Production of secondary metabolites, | 19 | Lecture |
| Unit II | Somaclonal variation, | 20 | Lecture |
| Unit II | Somaclonal variation, | 21 | Lecture |
| Unit II | Cryopreservation | 22 | Lecture |
| Unit II | Cryopreservation | 23 | Lecture |
| Unit II | Cryopreservation | 24 | Lecture |
| | Class Assignment | 25 | Class Assignment |
| | Class Assignment | 26 | Class Assignment |
| | Class Assignment | 27 | Class Assignment |
| | PPT | 28 | PPT |
| | PPT | 29 | PPT |
| | Quiz | 30 | Quiz |

**20019200 Micro propagation Technologies Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Identification and use of equipment's in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants | 1 | Practical |
| 2 | Identification and use of equipment's in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants | 2 | Practical |
| 3 | Identification and use of equipment's in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants | 3 | Practical |
| 4 | Identification and use of equipment's in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants | 4 | Practical |
| 5 | Preparation of stocks and working solution | 5 | Practical |
| 6 | Preparation of stocks and working solution | 6 | Practical |
| 7 | Preparation of stocks and working solution | 7 | Practical |
| 8 | Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction | 8 | Practical |
| 9 | Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction | 9 | Practical |
| 10 | Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction | 10 | Practical |
| 11 | Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction | 11 | Practical |
| 12 | Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction | 12 | Practical |
| 13 | Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures | 13 | Practical |
| 14 | Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures | 14 | Practical |
| 15 | Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures | 15 | Practical |

**20018000 – Bio pesticides & Bio fertilizers**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Definitions, Concepts And Classification Of Biopesticides | C1 | Lecture |
| I | Pathogen, Botanical Pesticides, And Biorationals. | C2 | Lecture |
| I | Botanicals And Their Uses. | C3 | Lecture |
| I | Mass Production Technology Of Bio-Pesticides. | C4 | Lecture |
| I | Virulence, Pathogenicity And Symptoms Of Entomopathogenic Pathogens And Nematodes. | C5 | Lecture |
| I | Methods Of Application Of Biopesticides. | C6 | Lecture |
| I | Home Assignment I | | Home Assignments |
| I | Methods Of Quality Control And Techniques Of Biopesticides. | C7 | Lecture |
| I | Impediments And Limitation In Production And Use Of Biopesticide. | C8 | Lecture |
| I | Classroom Assignment I | C9 | Class Room Assignment |
| I | Biofertilizers - Introduction, Status And Scope. | C10 | Lecture |
| II | Structure And Characteristic Features Of Bacterial Biofertilizers- Azospirillum, Azotobacter, Bacillus, | C11 | Lecture |
| II | Pseudomonas, Rhizobium And Frankia; | C12 | Lecture |
| II | Cyanobacterial Biofertilizers- Anabaena, Nostoc, Hapalosiphon | C13 | Lecture |
| II | Quiz | C14 | Quiz |
| II | Fungal Biofertilizers- | C15 | Lecture |
| II | AM Mycorrhiza And Ectomycorrhiza. | C16 | Lecture |
| II | Presentation I | C17 | Presentation |
| II | Nitrogen Fixation -Free Living And Symbiotic Nitrogen Fixation. | C18 | Lecture |
| II | Mechanism Of Phosphate Solubilization And Phosphate Mobilization, | C19 | Lecture |
| II | K Solubilization. | C20 | Lecture |
| II | Classroom Assignment II | C21 | Class Assignment |
| II | Production Technology: Strain Selection, Sterilization, | C22 | Lecture |
| II | Growth And Fermentation, | C23 | Lecture |
| II | Mass Production Of Carrier Based And Liquid Biofertilizers. | C24 | Lecture |
| II | Home Assignment II | | Home Assignments |
| II | FCO Specifications And Quality Control Of Biofertilizers. | C25 | Lecture |
| II | Application Technology For Seeds, Seedlings, Tubers, Sets Etc. | C26 | Lecture |
| II | Presentation II | C27 | Presentation |
| II | Biofertilizers -Storage, Shelf Life, Quality Control And Marketing. | C28 | Lecture |
| II | Factors Influencing The Efficacy Of Biofertilizers. | C29 | Lecture |
| II | Clarification Class | C30 | Clarification Class |

**20018100 – Bio pesticides & Bio fertilizers Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Isolation And Purification Of Important Biopesticides: Trichoderma | P1 | Practical |
| 2 | Bacillus thuringiensis Production | P2 | Practical |
| 3 | Identification Of Important Botanicals | P3 | Practical |
| 4 | Visit To Biopesticide Laboratory In Nearby Area | P4 | Practical |
| 5 | Field Visit To Explore Naturally Infected Cadavers. Identification Of Entomopathogenic Entities In Field Condition | P5 | Practical |
| 6 | Quality Control Of Biopesticides | P6 | Practical |
| 7 | Isolation And Purification Of Azospirillum, Azotobacter, Rhizobium, P-Solubilizers | P7 | Practical |
| 8 | Cyanobacteria | P8 | Practical |
| 9 | Mass Multiplication And Inoculums Production Of Biofertilizers | P9 | Practical |
| 10 | Isolation Of AM | P10 | Practical |
| 11 | Revision | P11 | Practical |
| 12 | Revision | P12 | Practical |
| 13 | Revision | P13 | Practical |
| 14 | Revision | P14 | Practical |
| 15 | Revision | P15 | Practical |

| Course | Course outcomes: - After completion of these courses students should be able to |
|---|---|
| **11.1 Semester - VI** | |
| 20019300 - Rainfed Agriculture & Watershed Management | **CO1:** Tell the soil and climatic conditions prevalent in rainfed areas.<br>**CO2:** Interpret various water harvesting techniques and their efficient utilization.<br>**CO3:** Apply contingent crop planning for aberrant weather conditions.<br>**CO4:** Examine the seasonal rainfall and different types of watershed and its components.<br>**CO5:** Select soil and water conservation techniques to avoid their losses. |
| 20019400 Rainfed Agriculture & Watershed Management lab | **CO1:** Introduction to climate classification, rainfall pattern in India.<br>**CO2:** Studies of cropping pattern of rainfed areas of the country.<br>**CO3:** Interpretation of meteorological data and scheduling of irrigation.<br>**CO4:** Study on cultural practices for mitigating stress and moisture conservation practices.<br>**CO5:** Explain water harvesting structures, watershed and rainfed research station. |
| 20019500 - Protected Cultivation and Secondary Agriculture | **CO1:** Explain better knowledge for fundamental principles of crop cultivation under controlled conditions.<br>**CO2:** Apply different types of green houses and plant response to green house environment.<br>**CO3:** Identify the various research investigations under greenhouse.<br>**CO4:** Take Part in with the farmers to give knowledge about the protected cultivation.<br>**CO5:** Take knowledge of storage and drying of final produce |
| 20019600 Protected Cultivation and Secondary Agriculture lab | **CO1:** Study of different type of green houses based on shape and design.<br>**CO2:** Plan a Visit to various Post Harvest Laboratories.<br>**CO3:** Determination of Moisture content of various grains by oven drying & infrared moisture methods and their engineering properties.<br>**CO4:** Determination of Moisture content of various grains by moisture meter.<br>**CO5:** Study of green house equipments. |
| 20026900 - Diseases of Field and Horticultural Crops and their Management-II | **CO1:** Find common pathogens of different diseases in the crops.<br>**CO2:** Interpret the knowledge about etiology and diagnosis the symptoms of diseases in field and horticultural crops.<br>**CO3:** Identify different culture, techniques, biology of pathogens in the laboratory.<br>**CO4:** Apply Eco-friendly and economically suitable management practices.<br>**CO5:** About important issues in economics and management of common property resources of land, water, pasture and forest resources. |

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| 20027000 Diseases of Field and Horticultural Crops and their Management-II Lab | **CO1:** List making of diseases for field crops about wheat, barley, sugarcane, mustard and gram.<br>**CO2:** Elaborate meaning of theses diseases such as Malformation, dieback, black, heart and Red rot.<br>**CO3:** Compare between Downy mildew and powdery mildew diseases symptoms with examples.<br>**CO4:** Identify the types of diseases that damage fruit and spices crops.<br>**CO5:** Classify disease to base on their micro-organisms. |
| 20025900 - Post-harvest Management and Value Addition of Fruits and Vegetables | **CO1:** Define importance and use of processing and value addition of fruits and vegetables.<br>**CO2:** Identify various problems (storage, shelf life of food product, spoilage etc.) faced by the farmers.<br>**CO3:** Classify and development of various products related to food processing or prevent the food from microorganism or enzymatic spoilage.<br>**CO4:** Simplify and development of various products related to food processing.<br>**CO5:** Distinguish between jam, jelly, squash and pickles and their preparation |
| 20020000 Post-harvest Management and Value Addition of Fruits and Vegetables lab | **CO1:** Apply different types of packaging, containers for shelf life extension.<br>**CO2:** Formulate the Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products.<br>**CO3:** Evaluate extraction and preservation of pulps and juices.<br>**CO4:** Effect of temperature on shelf life and quality of produce.<br>**CO5:** Develop concepts regarding horticultural processing and post harvest management. |
| 20020100 - Management of Beneficial Insects | **CO1:** Explain about importance of beneficial Insects, beekeeping and pollinators.<br>**CO2:** Select diseases of beneficial insect and their management.<br>**CO3:** Discover understanding about commercial methods of rearing honey bees, silkworm, lac insects, pollinators and their enemies.<br>**CO4:** Evaluate specific major parasitoids and predators commonly being used in biological control.<br>**CO5:** Discuss about Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance. |
| 20020200 Management of Beneficial Insects lab | **CO1:** Define Bee pasturage, bee foraging and communication.<br>**CO2:** Classify the Honey bee species, castes of bees<br>**CO3:** Identification and techniques for mass multiplication of natural enemies. |

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| | **CO4:** Categorize to silkworm, voltinism and biology of silkworm.<br>**CO5:** Choose Species of lac insect, host plant identification. |
| 20020300 - Crop Improvement-II (Rabi crops) | **CO1:** Tell about the evolutionary history of important field crops along with their centre of origin, its wild species and wild relatives that can be utilized in crop improvement.<br>**CO2:** Explain plant genetic resources, its utilization and conservation.<br>**CO3:** Develop the understanding for germplasm conservation, utilization, and centre of origin of various rabi field crops, genetics of qualitative and quantitative characters, and their inheritance.<br>**CO4:** Discuss the major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties.<br>**CO5:** Interpret Gene preservation method for further use to improve Rabi varieties. |
| 20020400 Crop Improvement-II (Rabi crops) Lab | **CO1:** Interpret the floral biology, emasculation and hybridization techniques in different crop species<br>**CO2:** Plan how to use different population improvement approach<br>**CO3:** Plan different experimental design for crop research<br>**CO4:** Utilize Study of field techniques for seed production and hybrid seeds production in Rabi crops;<br>**CO5:** Estimate the heterosis, inbreeding depression and heritability |
| 20020500 - Practical Crop Production –II (Rabi crops) | **CO1:** How to prepare field, seed treatment, nursery raising, sowing, nutrient management, water management and weed management.<br>**CO2:** Explain management of insect pests and diseases of crops also describe harvesting, threshing, drying, winnowing, storage and marketing of produce.<br>**CO3:** Develop knowledge about preparation of balance sheet including cost of cultivation, net returns per student as well as per team of a group of students.<br>**CO4:** Analyse the understanding on production techniques of major rabi season crops according to resources available in the field.<br>**CO5:** Evaluate the field techniques for seed production and hybrid seeds production in rabi crops |
| 20020600 - Principles of Organic Farming | **CO1:** Name of the principles of organic farming in context of improving human health and amelioration of the environment.<br>**CO2:** Summarise the Fundamental cultural practices including insect, pest, weed and disease management under organic crop production.<br>**CO3:** Choose about government schemes and the role of NGOs in producing organic products.<br>**CO4:** Take Part in knowledge on certification methods of organic produce.<br>**CO5:** Learn about processing and export of organic produce. |
| 20020700 Principles of | **CO1:** Introduction to organic farms and their different components.<br>**CO2:** Build the knowledge about preparation of compost, vermi-compost |

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| Organic Farming lab | and bio-fertilizer.<br>**CO3:** Information about indigenous technology knowledge for nutrient, pest disease and weed management.<br>**CO4:** Analyze cost of organic production system.<br>**CO5:** Study about grading, quality aspect, packaging and handling. |
| 20020800 - Farm Management, Production & Resource Economics | **CO1:** Define the concept of farm management, different terms, principles and laws of farm management, different types of farm, etc.<br>**CO2:** Classify Farm business analysis: meaning and concept of farm income and profitability.<br>**CO3:** illustrate the different law and principles of farm management, relationship between factor and product, etc.<br>**CO4:** Determine the important issues in farm management.<br>**CO5:** About important issues in economics and management of common property resources of land, water, pasture and forest resources. |
| 20020900 Farm Management, Production & Resource Economics Lab | **CO1:** Design of farm layout.<br>**CO2:** Analyse the cost of fencing of a farm.<br>**CO3:** Choose of most profitable enterprise combination.<br>**CO4:** Create of depreciation cost of farm assets.<br>**CO5:** Build of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India. |
| 20021000 - Principles of Food Science and Nutrition | **CO1:** What is food science, food composition and chemistry water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactive and important reactions.<br>**CO2:** Explain food and nutrition, malnutrition (over and under nutrition), nutritional disorders.<br>**CO3:** Make use of various equipment for preserving (use of heat, low temperature, radiation, drying etc.) related to food processing.<br>**CO4:** Analyse nutritional disorders, energy metabolism and novel technologies related to food science.<br>**CO5:** Perceive knowledge of the role of nutrition in sustaining health and preventing diseases |
| 20021100 - Ability and Skill Enhancement VI | **CO1:** Learn about verbal reasoning & English aptitude<br>**CO2:** Develop a winning attitude<br>**CO3:** Learn the ways to understand news and be a journalist.<br>**CO4:** Learn the ability to prepare reports on major national and international news.<br>**CO5:** Conduct chat shows, panel discussions, parliamentary debates etc. |
| 20021200 Hi-tech. Horticulture | **CO1:** Develop the understanding of modern horticultural practices.<br>**CO2:** Discuss the hydroponic system of cultivation.<br>**CO3:** Develop the nurseries of different vegetables crops for the purpose commercial sale<br>**CO4:** Elaborate the knowledge of remote sensing and geographical |

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| | information system.<br>**CO5:** Elaborate the concept of precision farming in horticulture crops. |
| 20021300<br>Hi-tech.<br>Horticulture Lab | **CO1:** Explain about Types of polyhouses and shade net houses.<br>**CO2:** Elaborate the micro-propagation.<br>**CO3:** Take part in Nursery portray filling.<br>**CO4:** Model of hydroponics, development.<br>**CO5:** Perceive micro-irrigation and EC, PH based fertilizer scheduling.<br>**CO6:** . |
| 20021400<br>Protected Cultivation | **CO1:** What is Greenhouse technology: Introduction, Types of Green Houses.<br>**CO2:** Explain Planning and design of greenhouses,<br>**CO3:** Make use of drying theory, various drying method, commercial grain dryer<br>**CO4:** Analyse cost estimation and economic analysis.<br>**CO5:** Importance of Green house equipments, materials of construction for traditional and low cost green houses. |
| 20021500<br>Protected Cultivation Lab | **CO1:** Name of different type of green houses based on shape.<br>**CO2:** Explain the rate of air exchange in an active summer winter cooling system.<br>**CO3:** Plan Field visit to seed processing plant.<br>**CO4:** List of green house equipments.<br>**CO5:** Determine of Moisture content of various grains by oven drying & infrared. |
| 20021600<br>System Simulation and Agro-advisory | **CO1:** Recall the components of soil water and nutrients balance.<br>**CO2:** How to prepare agro-advisory bulletin based on weather forecast.<br>**CO3:** Learn about system approach for representing soil-plant-atmospheric continuum, system boundaries, crop models, concepts & techniques.<br>**CO4:** Explain different types of crop models and relational diagrams.<br>**CO5:** Explain the ITK for weather forecast and its validity. |
| 20021700<br>System Simulation and Agro-advisory Lab | **CO1:** How to prepare crop weather calendars and agro-advisories based on weather weather forecast using various approaches and synoptic charts.<br>**CO2:** How to use statistical approaches in data analysis.<br>**CO3:** Explain how to work with statistical and simulation models for crop growth.<br>**CO4:** Demonstrate the sensitivity analysis of varying weather and crop management practices.<br>**CO5:** Make use of feedback from farmers about the agro-advisory. |
| 20021800<br>Agricultural Journalism | **CO1:** Define Agricultural Journalism, its nature and scope of agricultural journalism. |

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| | **CO2:** How agricultural journalism is similar to and different from other types of journalism.<br>**CO3:** Explain newspapers and magazines as communication media.<br>**CO4:** Analyse agricultural stories, subject matter of the agricultural story and structure of the agricultural story.<br>**CO5:** Select the material, treatment of the story, writing the news lead and the body, readability measures. |
| 20021900 Agricultural Journalism Lab | **CO1:** How to write the agriculture story.<br>**CO2:** Summarize the agriculture events.<br>**CO3:** Apply the pictures and artwork for the agricultural story.<br>**CO4:** Analyse the different research paper and articles.<br>**CO5:** Evaluate the different interview. |

## 11.2 Mapping: Semester – VI

| 20019300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |

| 20019400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 |
| CO2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 |
| CO4 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 |
| CO5 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 |

| 20019500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 |  | 3 | 2 | 3 |  | 3 | 3 |  |  |  | 2 |
| CO2 | 3 | 2 | 2 | 2 |  | 3 |  | 1 |  | 3 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 |  |  |  | 3 |  |
| CO4 | 3 | 3 |  | 2 | 2 |  |  | 2 | 2 |  | 2 | 3 |
| CO5 | 2 |  | 3 |  | 3 | 3 | 3 | 3 | 3 | 3 |  | 3 |

| 20019600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 1 | 2 | 2 |  | 2 | 3 | 2 | 2 |
| CO2 | 3 | 2 | 2 | 2 | 2 |  |  | 3 |  | 2 | 2 | 2 |
| CO3 | 2 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 |  | 2 | 2 |
| CO4 | 2 | 3 | 1 | 2 | 3 | 2 | 3 | 1 | 2 | 2 | 3 | 1 |
| CO5 | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |

| 20026900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 |  | 3 | 3 | 3 |  | 2 |  |  |  | 2 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 3 |  |  | 2 | 3 |  | 2 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 2 |  | 2 | 3 |  | 3 |  |
| CO4 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 1 |  | 2 | 2 | 3 |
| CO5 | 2 | 3 |  | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |

| 20027000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 |  | 1 | 2 | 3 | 2 | 3 | 2 | 1 | 2 |
| CO2 | 3 |  | 1 |  | 2 |  | 3 | 2 | 2 | 2 | 2 | 2 |
| CO3 | 3 | 2 |  | 2 |  | 3 | 3 | 3 | 3 |  | 3 | 2 |
| CO4 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 |
| CO5 |  | 2 | 3 | 2 | 3 | 3 | 3 | 2 |  | 2 | 3 | 3 |

| 20025900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 |
| CO2 | 3 | 2 | 2 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 1 |
| CO3 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | 2 | 3 | 1 | 1 | 2 |
| CO4 | 3 | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 3 |
| CO5 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 2 |

| 20020000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| CO2 | 3 | 3 | 3 | 1 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 3 |
| CO3 | 2 |  | 2 | 1 |  | 3 | 2 | 3 | 3 | 2 | 1 | 3 |
| CO4 | 2 | 3 | 3 | 2 | 3 | 1 | 1 | 3 | 2 | 3 | 2 | 1 |
| CO5 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 3 |  |

| 20020100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 |  | 2 | 2 | 2 |  | 3 | 2 |  | 2 |
| CO2 | 3 | 3 |  | 2 |  |  |  |  |  | 2 |  |  |
| CO3 | 3 | 3 | 2 | 2 |  | 2 |  | 3 |  |  | 2 |  |
| CO4 | 3 | 2 |  |  |  |  | 2 |  | 3 |  |  | 2 |
| CO5 | 3 | 2 | 3 |  | 3 | 2 | 3 |  |  | 3 | 2 | 3 |

| 20020200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 1 |  | 2 | 3 |  |  |  | 2 | 1 | 2 | 2 |
| CO2 |  | 3 |  |  |  | 3 | 2 | 2 |  |  |  |  |
| CO3 | 1 |  | 2 | 3 | 3 |  |  | 2 |  |  |  |  |
| CO4 | 3 |  |  |  |  | 3 | 2 | 3 |  | 2 | 3 | 2 |
| CO5 |  | 2 | 3 | 3 |  | 2 |  |  | 2 |  |  |  |

| 20020300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 3 | 3 | 3 |  | 2 | 3 | 2 | 2 |
| CO2 | 2 | 3 |  |  | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 |
| CO3 | 2 | 3 | 2 | 3 | 3 |  |  | 2 | 2 |  | 2 | 3 |
| CO4 | 3 | 3 | 2 |  |  | 3 | 2 | 3 | 3 | 2 | 3 | 2 |
| CO5 | 2 | 2 | 3 | 3 |  | 2 | 3 |  | 2 |  |  |  |

| 20020400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 |  | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 |
| CO2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 |  |  |
| CO3 | 3 |  |  | 2 | 2 |  | 2 | 3 | 2 | 3 | 2 | 3 |
| CO4 |  | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 |  |
| CO5 |  | 2 | 3 |  | 2 |  |  |  | 2 | 2 | 3 | 3 |

| 20020500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 |  | 3 | 3 |  | 2 | 2 | 2 | 3 | 3 | 3 |
| CO2 | 3 | 2 | 3 | 3 | 3 | 2 | 3 |  |  | 2 | 3 | 3 |
| CO3 | 3 |  |  | 2 | 2 |  |  |  | 3 | 2 | 3 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |  | 2 | 3 |
| CO5 | 2 | 2 | 2 |  | 2 |  | 2 | 3 | 3 |  | 2 | 3 |

| 20020600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 |  |  |  | 3 | 3 | 2 | 2 | 2 |  | 2 |
| CO2 | 3 | 2 | 2 | 3 |  | 3 | 3 |  | 2 | 2 |  | 2 |
| CO3 | 2 |  |  |  | 2 | 2 | 2 |  | 3 | 2 | 2 | 2 |
| CO4 | 3 |  |  | 2 | 2 | 3 | 3 | 2 | 2 |  | 2 |  |
| CO5 | 2 | 3 | 3 | 3 | 3 |  |  | 2 |  | 3 | 3 | 3 |

| 20020700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 |
| CO2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 |
| CO3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| CO5 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 |

| 20020800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 3 | 2 |  | 2 | 2 |  | 3 | 2 |
| CO2 | 2 | 3 |  | 3 |  |  |  |  |  | 2 | 2 |  |
| CO3 | 3 |  | 3 |  |  |  | 3 |  |  | 3 | 1 | 2 |
| CO4 | 2 | 2 |  | 2 |  |  |  | 2 | 3 |  |  | 1 |
| CO5 | 2 | 2 | 3 |  | 3 |  | 3 | 3 | 3 |  | 2 | 3 |

| 20020900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 1 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO2 | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 |
| CO3 | 2 | 3 |  | 3 | 3 |  | 3 | 1 | 2 |  | 2 | 2 |
| CO4 | 2 | 3 | 3 | 3 | 3 |  | 3 | 3 |  | 3 | 3 | 3 |
| CO5 | 2 | 3 | 3 |  | 2 |  | 2 | 2 | 3 |  |  | 2 |

| 20021000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 1 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 |

| 20021100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 |  | 3 | 2 | 3 |  | 3 |  | 3 | 2 | 2 |
| CO2 | 2 | 2 | 3 |  |  |  |  | 2 | 3 | 3 |  | 2 |
| CO3 |  | 2 |  |  | 3 | 2 |  | 3 |  | 3 | 3 | 2 |
| CO4 | 2 | 2 | 3 | 3 | 2 | 2 |  |  | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 |  | 3 | 3 |  | 3 | 3 | 2 |  | 2 | 2 |

| 20021200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 2 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 1 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| CO4 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 |
| CO5 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 1 |

| 20021300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 1 |  |
| CO2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 |  | 2 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 |
| CO4 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 |
| CO5 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 2 | 1 | 1 |

| 20021400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 3 |
| CO4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |

| 20021500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 2 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 3 |
| CO4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 |
| CO5 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |

| 20021600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO4 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |

| 20021700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO4 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |

| 20021800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 |
| CO2 | 2 | 3 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 |
| CO3 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 3 | 2 | 1 |
| CO4 | 2 | 3 | 3 | 1 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 2 |
| CO5 | 3 | 3 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 1 |

| 20021900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 3 | 3 |
| CO2 | 3 | 1 | 2 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 3 | 3 |
| CO3 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 2 |
| CO4 | 3 | 3 | 1 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 |
| CO5 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 3 | 3 | 1 | 2 | 3 |

## 11.3 Lesson Plan: Semester – VI

**20019300 – Rainfed Agriculture & Watershed Management**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India | C-1 | Lecture |
| I | Problems and prospects of rainfed agriculture in India | C-2 | Lecture |
| I | Soil and climatic conditions prevalent in rainfed areas | C-3 | Lecture |
| I | Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants | C-4 | Lecture |
| I | Crop adaptation and mitigation to drought | C-5 | Lecture |
| | Classroom assignment | C-6 | Class Assignment |
| I | Clarification class | C-7 | Clarification Class |
| II | Water harvesting: importance, its techniques | C-8 | Lecture |
| | Home assignment-I | | Home Assignments |
| II | Efficient utilization of water through soil and crop management practices | C-9 | Lecture |
| II | Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions | C-10 | Lecture |
| II | Concept, objective, principles and components of watershed management, | C-11 | Lecture |
| | Quiz | C-12 | Lecture |
| II | factors affecting watershed management | C-13 | Lecture |
| | Home assignment-II | | Home Assignments |
| II | Clarification class | C-14 | Clarification Class |
| | Presentation | C-15 | Presentation |

**20019400 – Rainfed Agriculture & Watershed Management Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons | P-1 | Practical |
| 2 | Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons | P-2 | Practical |
| 3 | Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India | P-3 | Practical |
| 4 | Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India | P-4 | Practical |
| 5 | Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops | P-5 | Practical |
| 6 | Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops | P-6 | Practical |
| 7 | Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation | P-7 | Practical |
| 8 | Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation | P-8 | Practical |
| 9 | Studies on cultural practices for mitigating moisture stress | P-9 | Practical |
| 10 | Studies on cultural practices for mitigating moisture stress | P-10 | Practical |
| 11 | Characterization and delineation of model watershed | P-11 | Practical |
| 12 | Characterization and delineation of model watershed | P-12 | Practical |
| 13 | Field demonstration on soil & moisture conservation measures | P-13 | Practical |
| 14 | Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed | P-14 | Practical |
| 15 | Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed | P-15 | Practical |

**20019500 – Protected Cultivation and Secondary Agriculture**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Green house technology: Introduction, Types of Green Houses | C1 | Lecture |
| I | Plant response to Green house environment | C2-C3 | Lecture |
| I | Planning and design of greenhouses | C4-C5 | Lecture |
| I | Design criteria of green house for cooling and heating purposes | C6-C7 | Lecture |
| | Home Assignment I | | Home Assignment |
| I | Green house equipment's, materials of construction for traditional and low cost green houses | C8-C9 | Lecture |
| | Classroom Assignment I | C10 | Class Assignment |
| I | Irrigation systems used in greenhouses, typical applications | C11-C12 | Lecture |
| I | Passive solar green house, hot air green house heating systems, green house drying | C13 | Lecture |
| I | Cost estimation and economic analysis | C14 | Lecture |
| | Presentation I | C15 | Presentation |
| | Clarification Class I | C16 | Clarification Class |
| I | Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation | C17-C19 | Lecture |
| | Classroom Assignment II | C20 | Class Assignment |
| | Home Assignment II | | Home Assignment |
| I | Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer) | C21-C24 | Lecture |
| I | Material handling equipment; conveyer and elevators, their principle, working and selection | C25-C26 | Lecture |
| | Presentation II | C27 | Presentation |
| | Clarification Class II | C28 | Clarification Class |
| | Quiz | C29 | Quiz |
| | Activity | C30 | Activity |

**20019600– Protected Cultivation and Secondary Agriculture Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Study of different type of green houses based on shape | P1 | Practical |
| 2 | Determine the rate of air exchange in an active summer winter cooling system | P2-P3 | Practical |
| 3 | Determination of drying rate of agricultural products inside green house | P4-P5 | Practical |
| 4 | Study of greenhouse equipment's | P6-P7 | Practical |
| 5 | Study of greenhouse equipment's | P8 | Practical |
| 6 | Determination of Moisture content of various grains by oven drying & infrared moisture methods | P9-P10 | Practical |
| 7 | Determination of Moisture content of various grains by oven drying & infrared moisture methods | P11-P12 | Practical |
| 8 | Determination of Moisture content of various grains by moisture meter | P13-P14 | Practical |
| 9 | Field visit to seed processing plant | P15 | Field Visit |

**20026900 – Diseases of Field and Horticultural Crops and their Management-II**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Introduction of Diseases- LAB | C1 | Lecture |
| I | ISOLATION OF PLANT PATHOGENS | C2 | Lecture |
| I | STRUCTURE OF PLANT PATHOGENS | C3 | Lecture |
| I | STUDY ON FUSARIUM LIFE CYCLE | C4 | Lecture |
| I | STUDY ON BACTERIAL LIFE CYCLE | C5 | Lecture |
| I | STUDY ON FUNGAL LIFE CYCLE | C6 | Lecture |
| I | TAXONOMY | C7 | Lecture |
| I | SYSTEMATIC POSITION | C8 | Presentation |
| I | citrus diseases | C9 | Lecture |
| I | Grape diseases | C10 | Lecture |
| I | Apple diseases | C11 | Class Assignment |
| I | Peach diseases | C12 | Clarification Class |
| I | Strawberry diseases | C13 | Lecture |
| I | Potato diseases | C14 | Lecture |
| I | cucurbits diseases | C15 | Class Assignment |
| I | onion diseases | C16 | Lecture |
|  | assignment 2 |  | Home Assignments |
| I | garlic diseases | C17 | Lecture |
| I | chilly diseases | C18 | Lecture |
|  | assignment 3 | C19 | Presentation |
| I | turmeric diseases | C20 | Quiz |
| I | coriander diseases | C21 | Class Room Assignment |
| I | marigold diseases | C22 | Lecture |
| I | rose diseases | C23 | Lecture |
|  | Home Assignments |  | Home Assignments |
| I | Carrot: Alternaria blight | C24 | Lecture |
| I | Pea: powdery mildew | C25 | Lecture |
| I | Cabbage: Alternaria leaf spot and black rot | C26 | Lecture |
|  | Presentation | C27 | Presentation |
|  | Quiz 2 | C28 | Quiz |
|  | Class Room Assignment No.4 | C29 | Class Assignment |
|  | Clarification Class No.2 | C-30 | Clarification Class |

**20027000 – Diseases of Field and Horticultural Crops and their Management-II Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Wheat: Rusts, loose smut, karnal bunt and ear cockle. | P1 | Practical |
| 2 | Barley: Stripe, covered smut and molya disease. | P2 | Practical |
| 3 | Sugarcane: Red rot. | P3 | Practical |
| 4 | Lentil: Wilt. | P4 | Practical |
| 5 | Mustard: Alternaria blight, white rust and Sclerotinia stem rot. | P5 | Practical |
| 6 | Gram: Root rot, wilt and Ascochyta blight. | P6 | Practical |
| 7 | Isabgol: Downy mildew. | P7 | Practical |
| 8 | Cumin: Wilt, powdery mildew and Alternaria blight. | P8 | Practical |
| 9 | Fenugreek: Powdery mildew. | P9 | Practical |
| 10 | Mango: Malformation Citrus: Canker, dieback | P10 | Practical |
| 11 | Ber: Powdery mildew. | P11 | Practical |
| 12 | Potato: Late blight, black heart | P12 | Practical |
| 13 | Onion: Purple blotch. | P13 | Practical |
| 14 | Chillies: Anthracnose and leaf curl. | P14 | Practical |
| 15 | Clarification class | P15 | Clarification Class |

**20025900 – Post-harvest Management and Value Addition of Fruits and Vegetables**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-I | Importance of post-harvest processing of fruits and vegetables | C1 | Lecture |
| Unit-I | extent and possible causes of post harvest losses; | C2 | Lecture |
| Unit-I | Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; | C3 | Lecture |
| Unit-I | Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; | C4 | Lecture |
| Unit-I | Respiration and factors affecting respiration rate | C5 | Lecture |
| Unit-I | Respiration and factors affecting respiration rate | C6 | Lecture |
| Unit-I | Harvesting and field handling. | C7 | Lecture |
| Unit-II | Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; | C8 | Lecture |
| Unit-II | Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. | C9 | Lecture |
| Unit-II | Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. | C10 | Lecture |
| Unit-II | Tomato products- Concepts and Standards; | C11 | Lecture |
| Unit-II | Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. | C12 | Lecture |
| Unit-II | Canning -– Concepts and Standards, packaging of products. | C13 | Lecture |
| Unit-II | Clarification Class | C14 | Clarification Class |
| Unit-II | Class Room Assignment | C15 | Class Assignment |
| | Home Assignments | | Home Assignments |
| | Home Assignments | | Home Assignments |

**200020000 – Post-harvest Management and Value Addition of Fruits and Vegetables Lab**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Applications of different types of packaging, containers for shelf life extension | P1, P2 | Practical |
| Unit-1 | Effect of temperature on shelf life and quality of produce | P3, P4 | Practical |
| Unit-1 | Demonstration of chilling and freezing injury in vegetables and fruits | P5, P6 | Practical |
| Unit-1 | Extraction and preservation of pulps and juices | P7, P8 | Practical |
| Unit-1 | Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. | P9, P10 | Practical |
| Unit-1 | Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry | P11, P12 | Practical |
| Unit-1 | Industrial Visit | P13, P14 | Industrial Visit |
| | clarification class | P15 | Clarification Class |
| | clarification class | P16, P17 | Clarification Class |

**20020100 – Management of Beneficial Insects**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Introduction and economic importance of insects | C-1 | Lecture |
| Unit I | History of Beekeeping and biology | C-2 | Lecture |
| Unit I | Bee pasturage and Foraging behaviour of honey bees | C-3 | Lecture |
| Unit I | Types of bee hives and the enemies that occur in hive | C-4 | Lecture |
| Unit I | Various silkworm types along with their biology and voltinism | C-5 | Lecture |
| Unit I | Cultivation practices of mulberry | C-6 | Lecture |
| Unit I | Methods of harvesting and preservation of mulberry leaves, rearing appliances and methods of disinfection. | C-7 | Lecture |
| Unit I | Silkworm rearing, mounting and harvesting cocoons | C-8 | Lecture |
| Unit I | pests and diseases of silkworm and their management | C-9 | Lecture |
| Unit I | Species, morphology, biology and lac production | C-10 | Lecture |
| Unit I | Lac products and uses | C-11 | Lecture |
| Unit I | Mass production techniques of major parasitoids and predators | C-12 | Lecture |
| Unit I | important species of pollinators, weed killers ans scavengers | C-13 | Lecture |
| | Class room assignment | C-14 | Assignment |

**20020200 – Management of Beneficial Insects lab**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Honey bee species, castes of bees | P1 | Practical |
| Unit-1 | Beekeeping appliances and seasonal management | P2 | Practical |
| Unit-1 | bee enemies and disease | P3 | Practical |
| Unit-1 | Bee pasturage, bee foraging and communication | P4 | Practical |
| Unit-1 | types of silkworm, voltinism and biology of silkworm | P5 | Practical |
| Unit-1 | Mulberry cultivation, mulberry varieties | P6-P7 | Practical |
| Unit-1 | Methods of harvesting and preservation of leaves | P8-P9 | Practical |
| Unit-1 | Species of lac and host plant identification | P10-P11 | Practical |
| Unit-1 | Identification of other important pollinators, weed killers and scavengers | P12-P-13 | Practical |
| Unit-1 | Identification of natural enemies | P14-P15 | Practical |
| Unit-1 | techniques for mass multiplication of natural enemies | P16-P-17 | Practical |
| Unit-1 | visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. | P18-P-19 | Industrial Visit |
| | clarification class | P20 | Clarification Class |
| | clarification class | P21-P22 | Clarification Class |

**20020300 – Crop Improvement-II (Rabi crops)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Centers of origin, distribution of species, wild relatives in different vegetable crops | C-1 | Lecture |
| 2 | Centers of origin, distribution of species, wild relatives in different horticultural crops | C-2, 3 | Lecture |
| 3 | Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops | C-4, 5, 6, 7 | Lecture |
| 4 | Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters; | C-7, 8, 9, 10 | Lecture |
| 5 | Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); | C-11,12,13,14, 15 | Lecture |
| 6 | Hybrid seed production technology of rabi crops. Ideotype concept and climate resilient crop varieties for future. | C-16,17,18,19, 20 | Lecture |

**20020400 – Crop Improvement-II (Rabi crops) Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Layout of field experiments; Study of quality characters, study of donor parents for different characters | P1 | Practical |
| 2 | Estimation of heterosis, inbreeding depression and heritability | P2 | Practical |
| 3 | Study of field techniques for seed production and hybrid seeds production in Rabi crops | P3 | Practical |
| 4 | Handling of germ plasm and segregating populations by different methods like pedigree, bulk and single seed decent methods | P4 | Practical |
| 5 | Floral biology, emasculation and hybridization techniques in different crop species namely Potato, Berseem. Sugarcane, Tomato, Chili, Onion | P5 | Practical |

**20020500 – Practical Crop Production –II (Rabi crops)**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Crop planning, raising field crops in multiple cropping systems: | C1 | lecture |
| 1 | Field preparation, seed, treatment, nursery raising, sowing, nutrient, | C2 | lecture |
| 1 | water and weed management and management of insect-pests diseases of crops | C3 | lecture |
| 1 | harvesting, threshing, drying winnowing, storage and marketing of produce. | C4 | lecture |
| 1 | The emphasis will be given to seed production, mechanization, resource conservation | C5 | lecture |
| 1 | Integrated Nutrient, insect disease etc | C6 | lecture |
| 1 | Economic studies/ B: C | C7 | lecture |
| 1 | Clarification class | C8 | Clarification class |
| 1 | Class room assignment | C9 | Class room assignment |
| 1 | Activity | C10 | Activity |

**20020600 – Principles of Organic Farming**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-1 | Organic farming, principles and its scope in india | C1 | Lecture |
| Unit-1 | Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture | C2 | Lecture |
| Unit-1 | Organic ecosystem and their concepts | C3 | Lecture |
| Unit-1 | Organic nutrient resources and its fortification | C4 | Lecture |
| Unit-1 | Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming | C5 | Lecture |
| Unit-1 | Clarification Class | C6 | Clarification Class |
| Unit-II | Fundamentals of insect, pest, disease and weed management under organic mode of production | C7 | Lecture |
| | Class Room Assignment | C8 | Class Assignment |
| Unit-II | Operational structure of NPOP | C9 | Lecture |
| Unit-II | Certification process and standards of organic farming | C10 | Lecture |
| | Quiz | C11 | Quiz |
| Unit-II | Processing, leveling, economic considerations and viability | C12 | Lecture |
| Unit-II | marketing and export potential of organic products | C13 | Lecture |
| Unit-II | Clarification Class | C14 | Clarification Class |
| | Presentation | C15 | Presentation |

**20020700 – Principles of Organic Farming Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Visit of organic farms to study the various components and their utilization | P 1 | Practical |
| 2 | Visit of organic farms to study the various components and their utilization | P 2 | Practical |
| 3 | Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis | P 3 | Practical |
| 4 | Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis | P 4 | Practical |
| 5 | Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis | P 5 | Practical |
| 6 | Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis | P 6 | Practical |
| 7 | Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis | P 7 | Practical |
| 8 | Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis | P 8 | Practical |
| 9 | Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management | P 9 | Practical |
| 10 | Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management | P 10 | Practical |
| 11 | Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management | P 11 | Practical |
| 12 | Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management | P 12 | Practical |
| 13 | Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling | P13 | Practical |
| 14 | Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling | P 14 | Practical |
| 15 | Activity | P 15 | Activity |

**20020800 – Farm Management, Production & Resource Economics**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Meaning and concept of farm management, objectives and relationship with other sciences | C1 | Lecture |
| 2 | Meaning and definition of farms, its types and characteristics, factor determining types and size of farms | C2 | Lecture |
| 3 | Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm | C3 | Lecture |
| 4 | factor-product, factor-factor and product -product relationship, | C4 | Lecture |
| 5 | law of equi-marginal/or principles of opportunity cost and law of comparative advantage | C5 | Lecture |
| 6 | Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income | C6 | Lecture |
| 7 | family labour income and farm business income | C7 | Lecture |
| 8 | Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises | C8 | Lecture |
| 9 | Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts | C9 | Lecture |
| 10 | Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises | C10 | Lecture |
| 11 | Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies | C11 | Lecture |
| 12 | Crop/livestock/machinery insurance– weather based crop insurance, features, determinants of compensation. Concepts of resource economics, | C12 | Lecture |
| 13 | differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture | C13 | Lecture |
| 14 | Inefficiency and welfare loss, solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources | C14 | Lecture |

**20020900 – Farm Management, Production & Resource Economics Lab**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Preparation of farm layout | C-1 | Practical |
| 2 | Computation of depreciation cost of farm assets | C-2 | Practical |
| 3 | Computation of depreciation cost of farm assets | C-3 | Practical |
| 4 | Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India | C-4 | Practical |

**20021000– Principles of Food Science and Nutrition**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| I | Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc. | C1-C4 | Lecture |
| I | Food composition and chemistry (water, carbohydrates) | C6-C8 | Lecture |
| | Classroom Assignment I | C9 | Classroom Assignment I |
| I | Proteins, fats, vitamins and minerals | C10-C11 | Lecture |
| I | Flavours, colours, miscellaneous bio-actives and important reactions | C12-C13 | Lecture |
| | Clarification Class I | C14 | Clarification Class |
| | Home Assignment I | | Home Assignment |
| | Presentation I | C15 | Presentation |
| II | Food microbiology (bacteria, yeast, moulds) | C16 | Lecture |
| II | Food microbiology (Spoilage of fresh & processed foods, Production of fermented foods); | C17-C18 | Lecture |
| II | Principles and methods of food processing and preservation (Use of heat, low temperature, chemicals, radiation, drying etc.) | C19-C20 | Lecture |
| | Classroom Assignment II | C21 | Class Assignment |
| | Home Assignment II | | Home Assignment |
| II | Food and Nutrition; Malnutrition (over and under nutrition), nutritional disorders | C22-C23 | Lecture |
| | Presentation II | C24 | Presentation |
| II | Energy metabolism (carbohydrate, fat, proteins) | C25-C26 | Lecture |
| II | Balanced/modified diets, Menu planning, New trends in food science and nutrition | C27 | Lecture |
| | Clarification Class II | C28 | Clarification Class |
| | Activity I | C29 | Activity |
| | Quiz I | C30 | Quiz |

**20021100 – Ability and Skill Enhancement VI**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit-I | Logical Sequence of Words, Verbal Analogy | C-1 | Lecture |
| Unit-I | Quiz | C-2 | Quiz |
| Unit-I | ASSIGNMENT | C-3 | |
| Unit-I | classification, Blood Relation Test, Syllogism, Reading Comprehension. | C-4 | Lecture |
| Unit-I | ASSIGNMENT | C-5 | |
| Unit-II | CLARIFICATION CLASS | C-6 | Clarification Class |
| Unit-II | Quiz | C-7 | |
| Unit-II | Attitude is the most important thing for success | C-8 | Lecture |
| Unit-II | ASSIGNMENT | C-9 | |
| Unit-II | how to develop a winning attitude: what is it, when we need it | C-10 | Lecture |
| Unit-II | how to develop a winning attitude: what is it, when we need it | C-10 | Lecture |
| Unit-II | how to develop a winning attitude: what is it, when we need it | C-10 | Lecture |
| Unit-II | Quiz | C-13 | Quiz |
| Unit-II | ASSIGNMENT | C-14 | ASSIGNMENT |
| Unit-II | what is mindset, how to have a winning and positive mindset | C-15 | Lecture |
| Unit-II | how to win in difficult situations, Positive thinking, passion, dedication, confidence, well preparation, focus, hard work, planning, never give up, etc | C-16 | Lecture |
| Unit-II | some traits that help in developing winning attitude. | C-17 | Lecture |
| Unit-II | Quiz | C-18 | Quiz |
| Unit-II | clarification class | C-19 | Clarification Class |
| Unit-II | ASSIGNMENT | C-20 | ASSIGNMENT |
| Unit-III | Reading Current News, Comparing & Analysing the news | C-21 | Lecture |
| Unit-III | Write an editorial, News Vocabulary, Presentation on any major news (political/ social/ sports/ economics). | C-22 | Lecture |
| Unit-III | CLARIFICATION CLASS | C-23 | Clarification Class |
| Unit-III | quiz | C-24 | Quiz |
| Unit-IV | Chat Show, Panel Discussion, Parliamentary debate, News Inspired Theatrical Performance. | C-25 | Lecture |
| Unit-IV | Chat Show, Panel Discussion, Parliamentary debate, News Inspired Theatrical Performance. | C-26 | Lecture |
| Unit-IV | CLEARIFICATION CLASS | C-27 | Clarification Class |
| Unit-IV | Quiz | C-28 | Quiz |
| Unit-IV | ASSIGNMENT | C-29 | ASSIGNMENT |
| Unit-V | Preparing a report on major National/International News – Insights/ review of major newspapers and news channels. | C-30 | Lecture |

**20021200 Hi-tech. Horticulture (Elective)**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Introduction & importance of Hi-tech. Horticulture | C-1 | Lecture |
| Unit I | Nursery management and mechanization | C-2 | Lecture |
| Unit I | micro propagation of horticultural crops; | C-3 | Lecture |
| Unit I | Modern field preparation and planting methods | C-4 | Lecture |
| Unit I | Protected cultivation: advantages | C-5 | Lecture |
| Unit I | Clarification Class | C-6 | Clarification Class |
| Unit I | controlled conditions, method and techniques | C-7 | Lecture |
| Unit I | Micro irrigation systems and its components | C-8 | Lecture |
| Unit I | EC, pH based fertilizer scheduling | C-9 | Lecture |
| Unit I | canopy management | C-10 | Lecture |
| Unit I | high density orcharding | C-10 | Lecture |
| Unit II | Components of precision farming | C-10 | Lecture |
| Unit II | Remote sensing, Geographical Information System (GIS), | C-13 | Lecture |
| 14 | ASSIGNMENT | C-14 | ASSIGNMENT |
| Unit II | Remote sensing, Geographical Information System (GIS), | C-15 | Lecture |
| Unit II | Differential Geo-positioning System (DGPS), | C-16 | Lecture |
| Unit II | Variable Rate applicator (VRA), | C-17 | Lecture |
| 18 | Activity | C-18 | Activity |
| 19 | Clarification Class | C-19 | Clarification Class |
| 20 | ASSIGNMENT | C-20 | ASSIGNMENT |
| Unit II | Variable Rate applicator (VRA), | C-21 | Lecture |
| Unit II | application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); | C-22 | Lecture |
| 23 | Clarification Class | C-23 | Clarification Class |
| 24 | Activity | C-24 | Activity |
| Unit II | application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); | C-25 | Lecture |
| Unit II | mechanized harvesting of produce. | C-26 | Lecture |
| Unit II | mechanized harvesting of produce. | C-27 | Lecture |
| 28 | Activity | C-28 | Activity |
| 29 | ASSIGNMENT | C-29 | ASSIGNMENT |
| 30 | Clarification Class | C-30 | Clarification Class |

**20021300 Hi-tech. Horticulture Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Types of polyhouses and shade net houses | C 1 | Lecture |
| 2 | Types of polyhouses and shade net houses | C 2 | Practical |
| 3 | Intercultural operations, tools and equipments identification and application | C 3 | Practical |
| 4 | Intercultural operations, tools and equipments identification and application | C 4 | Practical |
| 5 | Micro propagation | C 5 | Practical |
| 6 | Micro propagation | C 6 | Practical |
| 7 | Nursery-protrays | C 7 | Practical |
| 8 | Nursery-protrays | C 8 | Practical |
| 9 | micro-irrigation, EC, pH based fertilizer scheduling, | C 9 | Practical |
| 10 | micro-irrigation, EC, pH based fertilizer scheduling, | C 10 | Practical |
| 11 | canopy management | C 11 | Practical |
| 12 | canopy management | C 12 | Practical |
| 13 | canopy management | C 13 | Practical |
| 14 | visit to hi-tech orchard/nursery | C 14 | Practical |
| 15 | visit to hi-tech orchard/nursery | C 15 | Practical |

**20021400 Protected Cultivation (Elective)**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Protected cultivation- importance and scope | C-1 | Lecture |
| Unit I | Status of protected cultivation in India and World | C-2 | Lecture |
| Unit I | types of protected structure based on site and climate | C-3 | Lecture |
| Unit I | Cladding material involved in greenhouse/ poly house. | C-4 | Lecture |
| Unit I | Cladding material involved in greenhouse/ poly house. | C-5 | Lecture |
| Unit I | Clarification Class | C-6 | Clarification Class |
| Unit I | Greenhouse design, environment control, artificial lights, Automation. | C-7 | Lecture |
| Unit I | Greenhouse design, environment control, artificial lights, Automation. | C-8 | Lecture |
| Unit I | Soil preparation and management, Substrate management | C-9 | Lecture |
| Unit I | Soil preparation and management, Substrate management | C-10 | Lecture |
| Unit I | Types of benches and containers. | C-10 | Lecture |
| Unit II | Irrigation and fertigation management | C-10 | Lecture |
| Unit II | Propagation and production of quality planting material of horticultural crops. | C-13 | Lecture |
| Unit II | Assignment | C-14 | Assignment |
| Unit II | Greenhouse cultivation of important horticultural crops | C-15 | Lecture |
| Unit II | rose, carnation, chrysanthemum | C-16 | Lecture |
| Unit II | gerbera, orchid, anthurium, lilium | C-17 | Lecture |
| Unit II | Activity | C-18 | Activity |
| Unit II | Clarification Class | C-19 | Clarification Class |
| Unit II | Assignment | C-20 | Assignment |
| Unit II | tulip, tomato, bell pepper, cucumber | C-21 | Lecture |
| Unit II | strawberry, pot plants, etc | C-22 | Lecture |
| Unit II | Clarification Class | C-23 | Clarification Class |
| Unit II | Activity | C-24 | Activity |
| Unit II | Cultivation of economically important medicinal and aromatic plants. | C-25 | Lecture |
| Unit II | Off-season production of flowers and vegetables. | C-26 | Lecture |
| Unit II | Insect pest and disease management | C-27 | Lecture |
| Unit II | Activity | C-28 | Activity |
| Unit II | Assignment | C-29 | Assignment |
| Unit II | Clarification Class | C-30 | Clarification Class |

**20021500 Protected Cultivation Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Raising of seedlings and saplings under protected conditions | C 1 | Lecture |
| 2 | Raising of seedlings and saplings under protected conditions | C 2 | Practical |
| 3 | use of portrays in quality planting material production | C 3 | Practical |
| 4 | use of portrays in quality planting material production | C 4 | Practical |
| 5 | Bed preparation and planting of crop for production, | C 5 | Practical |
| 6 | Bed preparation and planting of crop for production, | C 6 | Practical |
| 7 | Inter cultural operations, | C 7 | Practical |
| 8 | Inter cultural operations, | C 8 | Practical |
| 9 | Soil EC and pH measurement | C 9 | Practical |
| 10 | Soil EC and pH measurement | C 10 | Practical |
| 11 | Regulation of irrigation and fertilizers through drip, | C 11 | Practical |
| 12 | Regulation of irrigation and fertilizers through drip, | C 12 | Practical |
| 13 | Regulation of irrigation and fertilizers through drip, | C 13 | Practical |
| 14 | fogging ad misting | C 14 | Practical |
| 15 | fogging ad misting | C 15 | Practical |

**20021600 System Simulation and Agro-advisory (Elective)**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | System Approach for representing soil-plant-atmospheric continuum | C-1 | Lecture |
| Unit I | System Approach for representing soil-plant-atmospheric continuum | C-2 | Lecture |
| Unit I | system boundaries, | C-3 | Lecture |
| Unit I | Crop models, concepts & techniques | C-4 | Lecture |
| Unit I | Crop models, concepts & techniques | C-5 | Lecture |
| Unit I | Clarification Class | C-6 | Clarification Class |
| Unit I | types of crop models | C-7 | Lecture |
| Unit I | data requirements | C-8 | Lecture |
| Unit I | relational diagrams | C-9 | Lecture |
| Unit I | Evaluation of crop responses to weather elements | C-10 | Lecture |
| Unit I | Elementary crop growth models | C-10 | Lecture |
| Unit I | calibration, validation, verification and sensitivity analysis. | C-10 | Lecture |
| Unit II | Potential and achievable crop production-concept and modelling techniques for their estimation. | C-13 | Lecture |
| Unit II | | C-14 | Assignment |
| Unit II | Crop production in moisture and nutrients limited conditions | C-15 | Lecture |
| Unit II | components of soil water and nutrients balance | C-16 | Lecture |
| Unit II | Weather forecasting, types, methods | C-17 | Lecture |
| Unit II | Activity | C-18 | Activity |
| Unit II | Clarification Class | C-19 | Clarification Class |
| Unit II | Assignment | C-20 | Assignment |
| Unit II | tools & techniques, forecast verification | C-21 | Lecture |
| Unit II | Value added weather forecast | C-22 | Lecture |
| Unit II | Clarification Class | C-23 | Clarification Class |
| Unit II | Activity | C-24 | Activity |
| Unit II | ITK for weather forecast and its validity; | C-25 | Lecture |
| Unit II | Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. | C-26 | Lecture |
| Unit II | Use of crop simulation model for preparation of Agro-advisory and its effective dissemination. | C-27 | Lecture |
| Unit II | Activity | C-28 | Activity |
| Unit II | Assignment | C-29 | Assignment |
| Unit II | Clarification Class | C-30 | Clarification Class |

**20021700 System Simulation and Agro-advisory Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Preparation of crop weather calendars | C 1 | Lecture |
| 2 | Preparation of crop weather calendars | C 2 | Practical |
| 3 | Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. | C 3 | Practical |
| 4 | Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. | C 4 | Practical |
| 5 | Working with statistical and simulation models for crop growth. | C 5 | Practical |
| 6 | Working with statistical and simulation models for crop growth. | C 6 | Practical |
| 7 | Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options. | C 7 | Practical |
| 8 | Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options. | C 8 | Practical |
| 9 | Sensitivity analysis of varying weather and crop management practices | C 9 | Practical |
| 10 | Sensitivity analysis of varying weather and crop management practices | C 10 | Practical |
| 11 | Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast | C 11 | Practical |
| 12 | Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast | C 12 | Practical |
| 13 | Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast | C 13 | Practical |
| 14 | Feedback from farmers about the agro advisory. | C 14 | Practical |
| 15 | Feedback from farmers about the agro advisory. | C 15 | Practical |

**20021800 – Agricultural Journalism**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Concept of Agricultural Journalism | C-1 | Lecture |
| Unit I | The nature and scope of agricultural journalism, types of journalism | C-2 | Lecture |
| Unit I | how agricultural journalism is similar to and different from other types of journalism, characteristics and training of the agricultural journalist | C-3 | Lecture |
| Unit I | Newspapers and magazines as communication media: | C-4 | Lecture |
| Unit I | Characteristics; kinds and functions of newspapers and magazines, | C-5 | Lecture |
| Unit I | characteristics of newspaper and magazine readers | C-6 | Lecture |
| Unit I | Form and content of newspapers and magazines | C-7 | Lecture |
| Unit I | Style and language of newspapers and magazines | C-8 | Lecture |
| Unit I | parts of newspapers and magazines | C-9 | Lecture |
| Unit I | Clarification | C-10 | Clarification |
| Unit I | Assignment | C-11 | Assignment |
| Unit I | Activity | C-12 | Activity |
| Unit II | The agricultural story: | C-13 | Lecture |
| Unit II | Types of agricultural stories, subject matter of the agricultural story | C-14 | Lecture |
| Unit II | structure of the agricultural story | C-15 | Lecture |
| Unit II | Gathering agricultural information: | C-16 | Lecture |
| Unit II | Sources of agricultural information | C-17 | Lecture |
| Unit II | interviews, coverage of events, abstracting from research and scientific materials | C-18 | Lecture |
| Unit II | other agricultural news sources. | C-19 | Lecture |
| Unit II | Writing the story | C-20 | Lecture |
| Unit II | Organizing the material, treatment of the story | C-21 | Lecture |
| Unit II | writing the news lead and the body, readability measures | C-22 | Lecture |
| Unit II | Illustrating agricultural stories: | C-23 | Lecture |
| Unit II | Use of photographs, | C-24 | Lecture |
| Unit II | use of artwork (graphs, charts, maps, etc.), writing the captions. | C-25 | Lecture |
| Unit II | Editorial mechanics: | C-26 | Lecture |
| Unit II | Copy reading, headline and title writing | C-27 | Lecture |
| Unit II | Proofreading, lay outing. | C-28 | Lecture |
| Unit II | Presentation | C-29 | Presentation |
| Unit II | Clarification | C-30 | Clarification |

**20021900 – Agricultural Journalism Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction to topic | C 1 | Lecture |
| 2 | Practice in interviewing. | C 2 | Practical |
| 3 | Practice in interviewing. | C 3 | Practical |
| 4 | Covering agricultural events | C 4 | Practical |
| 5 | Covering agricultural events | C 5 | Practical |
| 6 | Abstracting stories from research and scientific materials and from wire services | C 6 | Practical |
| 7 | Abstracting stories from research and scientific materials and from wire services | C 7 | Practical |
| 8 | Writing different types of agricultural stories. Selecting pictures and artwork for the agricultural story. | C 8 | Practical |
| 9 | Writing different types of agricultural stories. Selecting pictures and artwork for the agricultural story. | C 9 | Practical |
| 10 | Writing different types of agricultural stories. Selecting pictures and artwork for the agricultural story. | C 10 | Practical |
| 11 | Practice in editing, copy reading, headline and title writing, proofreading, lay outing. Testing copy with a readability formula. | C 11 | Practical |
| 12 | Practice in editing, copy reading, headline and title writing, proofreading, lay outing. Testing copy with a readability formula. | C 12 | Practical |
| 13 | Practice in editing, copy reading, headline and title writing, proofreading, lay outing. Testing copy with a readability formula. | C 13 | Practical |
| 14 | Practice in editing, copy reading, headline and title writing, proofreading, lay outing. Testing copy with a readability formula. | C 14 | Practical |
| 15 | Visit to a publishing office. | C 15 | Practical |

| 12.1 Semester - VII | |
|---|---|
| RAWE- 411 Rural Agricultural Work Experience | **CO1:** Relate the rural and urban setting in relation to Agriculture and allied sectors and familiarize with socio-economic conditions of the agriculture stakeholders/ farmers and their problems.<br>**CO2:** Explain the profitable based farming system can we adopted with the help of course content<br>**CO3:** Explain about the functioning of the extension organizations viz., state agricultural departments, KVK's, and research stations.<br>**CO4:** Justify on campus training from various faculties before step into the village attachment and Agro-industrial attachment.<br>**CO5:** Develop communication skills during data collection and extension works and ability to solve the problems in agriculture and forestry. |
| AIA- 412 Agro Industrial Attachment | **CO1:** Develop knowledge about structure, functioning, ethics, objective and mandates of the industry<br>**CO2:** Develop practical knowledge about various processing units and hands-on trainings under supervision of industry staff<br>**CO3:** Discuss business network including outlets of the industry and skill development in all crucial tasks of the industry.<br>**CO4:** Combine with the agri related industries and make them Aware about the functioning of the agri. Industries.<br>**CO5:** Create an understanding of market and entrepreneurship skill. |

## 12.2 Mapping: Semester – VII

| RAWE-411 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 |
| CO2 | 3 | 2 | 3 | | | | 3 | | 3 | 2 | 2 | 3 |
| CO3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | | 3 | 3 |
| CO4 | 2 | 2 | 2 | 2 | | 2 | | | 3 | 2 | 3 | |
| CO5 | 3 | 3 | | 3 | 3 | 3 | 2 | 3 | 2 | | | 3 |

| AIA- 412 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 3 | | 2 | | 2 | 2 | | 2 | 2 |
| CO2 | 3 | 2 | 3 | 2 | 2 | | 2 | | | 2 | | |
| CO3 | 2 | 3 | 2 | 3 | | 2 | 2 | | 2 | 2 | 2 | |
| CO4 | 3 | 2 | | | 3 | 2 | | 2 | | | 2 | 2 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |

| Course | Course outcomes: - After completion of these courses students should be able to |
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| **13.1 Semester - VIII** | |
| 20022000 - Production Technology for Bioagents & Biofertilizer | **CO1:** Apply the best bioagent and biofertilizer in the field for disease management and good growth of crops.<br>**CO2:** Discover the methods of application of Rhizobium, Azotobacter, Azospirillum and phosphate solubilizing biofertilizers.<br>**CO3:** Explain the use of biocontrol agents like Trichoderma, Pseudomonas and bio fertilisers like phosphor bacteria for sustainable agriculture and commercial marketing.<br>**CO4:** Create a favourable environment and conditions for mass production of bioagents and biofertilizers.<br>**CO5:** Alternative solutions and uses of Bioagents & Biofertilizer. |
| 20022100 - Seed Production, Processing and Technology | **CO1:** Tell about different seed production procedures for various field crops.<br>**CO2:** Explain the extent and relevance of seed technology in agriculture, as well as the function of officials and regulations, such as the Seed Act and the Seed Order, in quality seed production.<br>**CO3:** Interpret the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also.<br>**CO4:** Analyze the genetic and physical purity of seed, as well as the health state of seeds of a variety, during seed processing.<br>**CO5:** Elaborate breeding techniques, methods, and breeding objectives in various crops to aid in the production of better varieties. |
| 20022200 - Mushroom Cultivation Technology | **CO1:** Define mushrooms, types (edible & poisonous) of mushroom, cultivation of different edible mushrooms Which is the best method to.<br>**CO2:** Outline the climatic requirements of mushroom cultivation, illustrate the knowledge on diseases and pests of mushroom and their management<br>**CO3:** Utilize the Knowledge to Produce Pleurotus / button mushroom for commercial marketing and harvesting and post harvesting processes of mushroom<br>**CO4:** Take a part in Learning value added products preparation from mushroom<br>**CO5:** Decide having the prospects of commercial mushroom production |
| 20022300 - Commercial Beekeeping | **CO1:** Tell honey using their practical knowledge on commercial bee keeping.<br>**CO2:** List the different species of honey bee.<br>**CO3:** Explain the commercial methods of rearing.<br>**CO4:** Illustrate the nature of different species of honey bee.<br>**CO5:** Validity of ideas of Poultry by-products and their uses in agriculture |

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| | farming. |
| 20022400 - Commercial Horticulture | **CO1:** Find the importance of horticulture in human diet<br>**CO2:** Develop the nurseries of different vegetables crops for the purpose commercial sale.<br>**CO3:** Identify the role of vegetable in nutrition.<br>**CO4:** Develop the entrepreneurship skill through modern practices<br>**CO5:** Plan the nursery raising and its maintenance. |
| 20022500 - Agriculture Waste Management | **CO1:** Define the type of agricultural wastes<br>**CO2:** Compare various type of agricultural waste and their management.<br>**CO3:** Categorise various type of waste and their management<br>**CO4:** Perceive different techniques to manage agricultural waste and its sustainable use.<br>**CO5:** Examine the methods of agricultural waste decomposition. |
| 20022600 – Organic Crop Production Technology | **CO1:** Name the principles of organic farming in context of improving human health and amelioration of the environment.<br>**CO2:** Summarise the Fundamental cultural practices including insect, pest, weed and disease management under organic crop production.<br>**CO3:** Choose about government schemes and the role of NGOs in producing organic products.<br>**CO4:** Take Part in knowledge on organic crop production and certification methods of organic produce.<br>**CO5:** Discuss of Certification process and standards of organic farming; Processing, levelling, economic considerations and viability, marketing and export potential of organic products. |
| 20022700 - Value addition in Milk | **CO1:** Classify how to increase the quality of milk and their products.<br>**CO2:** Explain the concept of value addition in milk & dairy products.<br>**CO3:** Classify the importance of value addition in dairy products.<br>**CO4:** Develop different dairy products<br>**CO5:** Validity of ideas of Poultry by-products and their uses in agriculture farming. |
| 20022800 - Micro Propagation | **CO1:** Identify the use of equipment in tissue culture Laboratory.<br>**CO2:** Make use of sterilization techniques for media, containers and small instruments, sterilization techniques for explants.<br>**CO3:** Evaluate the culturing of explants: Seeds, shoot tip and single node, Callus induction.<br>**CO4:** Develop the somatic embryos regeneration of whole plants from different explants, Hardening procedures.<br>**CO5:** Importance of application of plant tissue culture in crop improvement. |
| 20022900 – Poultry Production | **CO1:** Identify indigenous and exotic breeds of poultry.<br>**CO2:** Discover practical knowledge about Poultry management and the |

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| Technology | products produce from them, Introduce the diseases of poultry and its prevention (including vaccination schedule) and control of important diseases of poultry.<br>**CO3:** Determine the ability to select different types of houses suited in specific climatic conditions for best management of poultry, Incubation, Brooding and Hatching<br>**CO4:** Discuss digestive system of poultry, classification of feed stuffs, nutrients and their functions with poultry diseases.<br>**CO5:** Validity of ideas of Poultry by-products and their uses in agriculture farming. |

## 13.2 Mapping: Semester – VIII

| 20022000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 2 | | | 2 | | 3 | 3 | 3 |
| CO2 | | 3 | | 3 | 1 | 2 | 2 | | | | 3 | |
| CO3 | 3 | 3 | 3 | 3 | 3 | 2 | | 3 | 2 | 2 | | 3 |
| CO4 | 3 | | 3 | | 2 | 3 | 2 | 2 | 3 | | | |
| CO5 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |

| 20022100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 |
| CO2 | 2 | 3 | 2 | | | 3 | 2 | | 3 | | 2 | 3 |
| CO3 | 3 | 3 | | 3 | 3 | 2 | 3 | 2 | 2 | | 2 | |
| CO4 | 2 | 2 | 3 | | | | 2 | | 3 | 2 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | | | 3 | 2 | 3 | | 3 |

| 20022200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO4 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

| 20022300 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | 3 | 2 | | 2 | 2 | | 3 | 2 |
| CO2 | 2 | 3 | | 2 | | | | | | 2 | 2 | 3 |
| CO3 | 3 | | 3 | | 3 | 3 | 3 | | | | | 2 |
| CO4 | 2 | 2 | | 2 | | 2 | | 3 | 3 | 3 | | |
| CO5 | | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | | 3 |

| 20022400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO2 | 2 | 3 | 2 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 |
| CO3 | 2 | 2 | 1 | 2 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 1 |
| CO4 | 1 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 3 | 1 | 1 | 2 |
| CO5 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 |

| 20022500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| CO2 | 2 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| CO3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 |
| CO4 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 1 |
| CO5 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |

| 20022600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | | | | 3 | 3 | 3 | 2 | 2 | | 2 |
| CO2 | 3 | 2 | 2 | 3 | | 3 | 3 | | 2 | 2 | | 2 |
| CO3 | 2 | | | | 2 | 2 | 2 | | 3 | 2 | 2 | 2 |
| CO4 | 3 | | | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | |
| CO5 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | | 3 | 3 | | 3 |

| 20022700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | | 2 | | 2 | | 3 | 2 | | 3 |
| CO2 | 3 | 3 | | 2 | | 2 | | 2 | 3 | | 2 | |
| CO3 | 2 | | 3 | | | 2 | | | | 3 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 2 | 3 | | 3 | | 1 | | | 2 |
| CO5 | 2 | 3 | | 3 | 3 | 3 | 3 | 2 | 3 | 3 | | 3 |

| 20022800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | 2 | | 2 | 2 | | 2 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | | 2 | | 3 | 3 |
| CO3 | 3 | 3 | 3 | | 2 | 2 | | | | | | 3 |
| CO4 | 3 | | 3 | 2 | | | | 2 | 3 | 2 | 3 | 3 |
| CO5 | 2 | 3 | | 3 | 3 | 3 | 3 | | 3 | 3 | | 3 |

| 20022900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | | | | 2 | | 2 | 2 | 2 | 3 | |
| CO2 | 2 | 3 | 3 | 3 | 2 | | | 2 | 2 | | 3 | 2 |
| CO3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | | 2 | 2 | 2 | 3 |
| CO4 | 2 | | 2 | 3 | | 3 | | 2 | | 2 | 2 | 3 |
| CO5 | 2 | 3 | | 3 | 3 | 3 | 3 | | 3 | 3 | | |

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