School of Agriculture

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

2019-23

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

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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
6.1 Semester – I	
20000100 - Principles of Agronomy and Meteorology	**CO1:** Tell about the basics of the agronomy, seeds, sowing, tillage crop density and geometry. **CO2:** Explain crop nutrition, manures and fertilizers, nutrient use efficiency and water resources. **CO3:** Identify different agricultural tools, fertilizers, seeds, weeds, meteorology tools and Make use of agricultural tools in the field. **CO4:** Analyse the importance of weed, classification of weeds, crop weed competition and concepts of weed management. **CO5:** Evaluate the management practices of controlling Weeds
20000300 - Introduction to Soil Science	**CO1:** Define the soil, its types, pedological and edaphological concept, earth spheres, different minerals and rocks existing on earth. **CO2:** Explain soil forming processes and physical properties of the soil. **CO3:** Utilize the concept of soil survey and classification, soil taxonomy and soil orders. **CO4:** Take part in soil sampling techniques, know the functions of sampling tools and take part in determining the soil density, moisture content, texture, porosity, EC, cation exchange capacity and organic matter content of soil. **CO5:** Compare different micro-organism according to their beneficial and harmful effects
20000500 - Elementary Genetics	**CO1:** Make use of methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. **CO2:** Utilize the role of genetic technologies in industries related to biotechnology, pharmaceuticals, energy, and other fields. **CO3:** Analyse the mendelian principles and their significance in heredity and inheritance of Qualitative & Quantitative traits. **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. **CO5:** Estimate the probability of trait transfer from one generation to next generation.
20000700 - Statistical Methods	**CO1:** Define the basic statistical tools used for managerial decision-making. **CO2:** Understand and interpret simple linear regression analysis and use it in decision making. **CO3:** Apply Numerical Analysis & have wider knowledge of statistics with more emphasis on applications. **CO4:** Analyse the data & take the decisions, combine judgment and statistical analysis are more likely to be successful.

	CO5: Decide the use of suitable statistical tools and techniques to suitable data for analysis and decision making.
20000800 - Introduction to Horticulture	**CO1:** Select the basic horticulture, biology, taxonomy, and morphology of fruits and vegetables. **CO2:** Summarize the different methods of propagation and it's use in horticulture. **CO3:** Build the various principles and methods of training, pruning, kitchen gardening, basic principles of orchard establishment and unfruitfulness. **CO4:** Analyse the information related to horticulture as being scientifically based or opinion and contribute to the knowledge based information. **CO5:** Explain the method of seed germination, causes of seed dormancy and breaking method of dormancy breaking.
20001000 - Principles of Agricultural Economics	**CO1:** Explain the different concepts of Agricultural economics, nature of economics, human behaviour, goods and services, need, want, demand, etc. **CO2:** Illustrate the basic principles of economics and concepts of micro and macroeconomics. **CO3:** Summarize the elements that determine economic role of agriculture in national economy **CO4:** Classify the national income, concepts of national income accounting and approaches to measurement etc. **CO5:** Discuss the overall principles of agricultural economics
99002200 - Business Communication	**CO1:** Explain historical background and the development of communication; Importance and role of communication in everyday life. **CO2:** Understand Mechanics behind the communication process, difficulties experienced in communication. Different types of communication, impedance due to extraneous factors called "barriers" **CO3:** Apply different types of communication, impedance due to extraneous factors called "barriers". **CO4:** Analyse the Important non-verbal parameters in communication. So to make communication effective and attractive. **CO5:** Apply the appropriate body language for making presentation more effective
20001100 - Ability and Skill Enhancement	**CO1:** Understand the relevance and method of writing impactful and structured resume. **CO2:** Explain the need for right etiquettes to be followed in the professional world. **CO3:** Develop confidence in public speaking and expressing their opinions and ideas clearly and effectively. **CO4:** Build employability skills like critical thinking, team work, conflict management and leadership skills. **CO5:** Communicate effectively in English
99002800 -	**CO1:** Relate to the concept of cognitive development and Big Five

Workshops and Seminars	personality characteristics. **CO2:** Explain the basic fundamentals of Emotional Intelligence. **CO3:** Develop ability to practise new problem-solving skills in a group and use these skills in personal life. **CO4:** Build coping strategies and adapt balanced self- determined behaviour. **CO5:** Create leadership skills to be effective as a manager.
99002700 - Human Values & Social Service/NCC/NSS	**CO1:** Find about the working and mechanism of human nature. **CO2:** Classify and explain group behaviour at organizational level and individual level. **CO3:** Organize and plan organizational change and stress management practices. **CO4:** Discover various human values and their importance in real world. **CO5:** Evaluate the hierarchy of human values.

6.2 Mapping: Semester – I

20000100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	2	2	1	3	1	2	1
CO2	3	2	2	3	3	2	3	2	2	2	3	3
CO3	3	2	3	2	3	3	1	3	3	3	2	2
CO4	3	3	2	3	1	2	3	3	2	2	3	3
CO5	3	3	2	3	3	2	3	2	3	3	2	3

20000300	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	2	2	3	3	2	1	3
CO2	3	3	3	2	2	2	2	3	3	1	2	3
CO3	3	3	2	3	3	2	2	1	3	2	3	3
CO4	3	3	3	2	3	2	1	2	3	2	3	3
CO5	3	2	3	2	2	3	3	2	3	3	3	3

20000500	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			

20000700	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	3	2	3	2	2	3	3	1	3
CO2	1	3	3	1	2	2	1	3	1	1	3	3
CO3	3	1	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	3	3

20000800	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

20001000	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

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

99002800	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	3	1	3		3	3	3	3	3
CO2	2	2	3	3	3	2		2	2	3	2	3
CO3	2	3			1	2		3	2	3	2	3
CO4	3	1	2	2	3	2		3	2	3	2	3
CO5	3	3	3	3	3	3		3	3	3	3	3

99002700	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	3	3	2	1	3	1	3	1	3
CO2	3	3	2	3	2	2	2	3	2	3	2	3
CO3	3	2			3	3	2	3	2	3	2	3
CO4	2	1	2	2	2	3	2	3	2	3	2	3
CO5	3	3	3	3	3	3	3	3	3	3	3	3

6.3 Lesson Plan: Semester – I

20000100 – Principles of Agronomy and Meteorology

Unit	Particulars	Class No.	Pedagogy of Class
Unit 1	Definition of agriculture and BRANCHES OF AGRICULTURE; Agronomy and Scope of Agronomy; seed, seed rate and sowing methods	C1	Lecture
Unit 1	germination, types of seeds, factors affecting seed germination, tillage, tilth, objective and types of tillage	C2	Lecture
Unit 1	CROP STAND ESTABLISHMENT, Factors affecting plant population, PLANT GEOMETRY,	C3	Lecture
Unit 1	Crop nutrition, Criteria for essentiality of nutrient, Nutrient use efficiency, Manures and fertilizers, Advantage of green manuring, Characteristics of green manure crops, Classification of Fertilizers, Application of Fertilizers	C4	Lecture
Unit 1	Application of Fertilizer in Liquid Form, Brown manuring, Biofertilizers, Types of Biofertilizers, Field applications liquid biofertilizers & Bio NPK consortium, INM, TIME OF IRRIGATION, IRRIGATION METHODS	C5	Lecture
Unit 1	SUB-SURFACE IRRIGATION, PRESSURIZED OR MODERN IRRIGATION SYSTEMS, Drainage, Water Resources, Classification of Water,	C6	Lecture
Unit 1	Water Use Efficiency of Crops, Factors affecting crop water use efficiency, CROP WATER REQUIREMENT, Factors affecting crop water requirement, Irrigation requirement, Irrigation interval, Irrigation period, IRRIGATION SCHEDULING and types of its approach	C7	Lecture
	Clarification Class	C8	Clarification Class
	Classroom assignment	C9	Classroom assignment
Unit-2	CROP-WEED ASSOCIATION, CROP WEED COMPETITION,	C10	Lecture
Unit-2	ALLELOPATHY, Factors influencing allelopathy, Effect of weed competition on crop growth and yield, Losses Caused by Weeds	C11	Lecture
Unit-2	Principles of weed control are, MECHANICAL WEED CONTROL, CULTURAL WEED CONTROL,	C12	Lecture
Unit-2	CLASSIFICATION OF HERBICIDES, FORMULATIONS, METHODS OF APPLICATION, Benefits of Herbicides, BIOLOGICAL CONTROL, Bio-Herbicides/ Mycoherbicides	C13	Lecture
Unit-2	growth, development, ideotype, harvesting, method of harvesting, adaptation and principle of plant distribution	C14	Lecture
Unit-3	Meaning & scope of agricultural meteorology	C15	Lecture
Unit- 3	Earth Atm. Its composition extent & structure	C16	Lecture
Unit-4	Energy balance on earth	C17	Lecture
Unit-4	Precipitation and types of precipitation	C18	Lecture

20000200 – Principles of Agronomy and Meteorology Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	identification of seed, crops, manure and oil cake	C1	Practical
2	common pesticides in agriculture and types of formulation	C2	Practical
3	study of agro climatic zone of india and identification of weeds	C3	Practical
4	Methods of herbicides & fertilizer application	C4	Practical
5	Study the yield contributing characters and yield estimation	C5	Practical

20000300 –Introduction to 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

20000400 – Introduction to Soil Science Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Study of soil profile in field	P-1, P-2	Practical
2	Study of soil sampling tools	P-3, P-4	Practical
3	Collection of representative soil sample, its processing and storage	P-5, P-6	Practical
4	Collection of representative soil sample, its processing and storage	P-7, P-8	Practical
5	Study of soil forming rocks and minerals	P-9, P-10	Practical
6	Determination of soil density, moisture content and porosity	P-11, P-12	Practical
7	Determination of soil texture by feel and Bouyoucos Methods	P-13, P-14	Practical
8	Studies of capillary rise phenomenon of water in soil column and water movement in soil	P-15, P-16	Practical
9	Studies of capillary rise phenomenon of water in soil column and water movement in soil	P-17, P-18	Practical
10	Determination of soil pH and electrical conductivity	P-19, P-20	Practical
11	Determination of cation exchange capacity of soil. Study of soil map	P-21, P-22	Practical
12	Determination of cation exchange capacity of soil. Study of soil map	P-23, P-24	Practical
13	Determination of soil colour	P-25, P-26	Practical
14	Demonstration of heat transfer in soil	P-27, P-28	Practical
15	Estimation of organic matter content of soil	P-29, P-30	Practical

20000500 – Elementary 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

20000600 – Elementary 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

20000700 – 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

20000800 – Introduction to 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

20000900 – Introduction to 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

20001000 – Principles 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

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
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
7.1 Semester – II	
20001200 - Plant Biochemistry	**CO1:** Understand the types and roles of various Biomolecules for structure and functioning of bio systems **CO2:** Explain the classification, structure and importance of enzymes for plant physiology and application of enzymes in Industries. **CO3:** Analyse basic concept of metabolism in plants with respect to various biochemical reactions **CO4:** Distinguish various types of secondary metabolites produced by plants **CO5:** A new factors affecting the activity, classification, immobilization and other industrial applications
20001400 - Microbiology	**CO1:** Define prokaryotic and eukaryotic microbes, bio-fuel production and biodegradation of agro-waste. **CO2:** Explain the role of soil microorganisms in soil fertility and plant growth promotion. **CO3:** Explain about silage production, bio-fertilizers, bio pesticides. **CO4:** Develop experimental skills in soil microbiology which includes isolation of beneficial microorganisms from soil and their mass production. **CO5:** Elaborate the use of microbes and their culture techniques.
20001600 - Introduction to Entomology and Nematology	**CO1:** Define insect ecology: introduction, environment and its components. **CO2:** Explain about biotype, sub-species, species, genus, family and order of insect and nematode. **CO3:** Select different types of insecticides, toxicity of insecticides and formulations of insecticides **CO4:** Examine the economic importance of insects and eco-friendly control measures for pest management to sustainable agriculture. **CO5:** About Principles of nematode management
20001800 - Irrigation & Water Management	**CO1:** Select soil and water engineering concepts like measurement of land, surveying and levelling. **CO2:** Classify irrigation and it's different methods. **CO3:** Determine the irrigation water quality and its management including conjunctive use of water and water management of different crops. **CO4:** Discuss about agricultural drainage. **CO5:** Explain scheduling of irrigation based on different approaches.
20001900 - Rural Sociology and Educational Psychology	**CO1:** How develop communication skill with farmer and easily implement the agricultural policies. **CO2:** Explain the concepts of rural sociology and educational psychology. **CO3:** Develop the personality for professional world, self-assessment, learn rectification and improvement. **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. **CO5:** Perceive the importance of rural sociology and educational psychology in the field of agriculture.
20002000 - Natural Resources and Farm Management	**CO1:** Define concept of farm management, objectives and relationship with other sciences. **CO2:** Explain Farm business analysis: meaning and concept of farm income and profitability. **CO3:** Illustrate an understanding of various types of important issues in economics and management of land, water, forest resource and the environment **CO4:** Analyse natural resources administration, policy formulations, international environmental issues and climate change. **CO5:** Interpret the factors mitigating the natural resource scarcity
20002100 - Fundamentals of Plant Breeding	**CO1:** Explain about centers of origin, components of genetic variation; heritability and genetic advance. **CO2:** Interpret modes of reproduction and apomixes, self-incompatibility and male sterility. **CO3:** Evaluate the Genetic basis, methods of breeding in cross pollinated crops and modes of selection. **CO4:** Adapt the breeding method for self, cross and asexually propagated crops. **CO5:** Develop a consultant company to guide & supply the better varieties to the farmers.
99001900 - Environmental Studies	**CO1:** Tell different ecosystems, natural resources and environmental pollution. **CO2:** Summarize biodiversity and its conservation. **CO3:** Apply the values, feelings and participation of society in protection activities of the environment. **CO4:** Discover the use of skills in identification of natural resources and their management practices. **CO5:** Explain the role of an individual in prevention of different types of pollutions.
20002300 - Ability and Skill Enhancement	**CO1:** Select the correct phonetic symbols for improving language **CO2:** Operate reading and writing skills in English **CO3:** Prepare listening and speaking skills in English **CO4:** Focus in understanding the ethics, virtues and values **CO5:** Aware about etiquettes and personal branding

7.2 Mapping: Semester – II

20001200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		2	3	2		2	2			2
CO2	3			2	3			2		2		2
CO3	3	2	2	2			2	2		2	2	2
CO4	3	2	2		3	2						2
CO5	2	3	3	2		3	3		3	3	3	

20001400	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	3	2	2	2	2	3	2
CO2	3	3	2	2	1	2	2	2	2	3	2	1
CO3	2	1	3	2	1	2	3	1	3	1	2	3
CO4	3	3	2	2	3	1	1	2	1	2	3	2
CO5	2	3	3	3	2	2	2	3	1	2	1	2

20001600	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

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

20001900	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

20002000	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2		2	2		2	2	3	2
CO2	2	3	2	3	2			2	3			2
CO3	3	2	3	3	2	2	2	3		2	2	
CO4	2	2	2	2				2				3
CO5	1		2	1	2		3		3	2	2	2

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

99001900	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	3	2		3	3	3	2	3	3
CO2	2	2	2	3		2	3	3	3	3	3	3
CO3	3	3	3	2	2	3	3	3	3	2	1	3
CO4	2	2	1	2	3	2	3	3	3	2	2	3
CO5	2	3	3	3	3	3	3	2	2	2	3	2

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

20001200 – Plant Biochemistry

Unit	Particulars	Class No.	Pedagogy of Class
I	Biochemistry –Introduction and importance. Plant cell-Structure & organellar functions.	C-1	Lecture
I	Bio-molecules – Structure, Properties & reactions: amino acids,	C-2	Lecture
I	peptides	C-3	Lecture
I	proteins,	C-4	Lecture
I	Home Assignment I		Home Assignment
I	lipids	C-5	Lecture
I	carbohydrates	C-6	Lecture
I	nucleotides	C-7	Lecture
I	Classroom Assignment I	C-8	Classroom Assignment
I	nucleic acids	C-9	Lecture
I	Clarification Class I	C-10	Clarification Class
II	Enzymes – Factors affecting the activity	C-11	Lecture
II	classification	C-12	Lecture
II	immobilization and other industrial applications	C-13	Lecture
II	Clarification Class II	C-14	Clarification Class
III	Metabolism – Basic concepts	C-15	Lecture
III	glycolysis	C-16	Lecture
III	Quiz I	C-17	Quiz
III	citric acid cycle	C-18	Lecture
III	Pentose phosphate pathway	C-19	Lecture
III	b-Oxidation of fatty acid	C-20	Lecture
III	Home Assignment II		Home Assignment
III	Electron transport and oxidative phosphorylation	C-21	Lecture
III	General reactions of amino acid degradation	C-22	Lecture
III	Class Assignment II	C-23	Class Assignment
III	Presentation	C-24	Presentation
III	Metabolic Regulation	C-25	Lecture
III	Secondary metabolites-terpenoids	C-26	Lecture
III	alkaloids	C-27	Lecture
III	Phenolics	C-28	Lecture
	Quiz II	C-29	Quiz
	Clarification Class III	C-38	Clarification Class

20001300 – Plant Biochemistry Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Protein denaturation- heat, pH, precipitation of proteins with heavy metals	C1	Practical
2	Estimation of crude protein,	C2	Practical
3	Estimation of protein by Lowry method;	C3	Practical
4	Enzyme assay	C4	Practical
5	Extraction of nucleic acids;	C5	Practical
6	Extraction of oil from oilseeds	C6	Practical
7	Clarification class	C7	Practical
8	Estimation of crude fat	C8	Practical
9	Estimation of iodine number and saponification value of an oil	C9	Practical
10	Quantitative determination of sugars	C10	Practical
11	Paper chromatography for the separation of sugars	C11	Practical
12	Clarification class	C12	Practical
13	Determination of phenols	C13	Practical
14	Determination of Chlorophyll	C14	Practical
15	Determination of Phosphorus and ascorbic acid	C15	Practical

20001400 – 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

20001500 – 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

20001600– Introduction to Entomology and Nematology

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to phylum arthropoda	C-1	Lecture
Unit-I	Importance of class Insects	C-2	Lecture
Unit-I	unit-1 entomology in different fields	C-3	Lecture
Unit-I	unit-1 external morphology and function of cuticle and moulting body segmentation	C-4	Lecture
Unit-I	unit-1 external morphology and function of cuticle and moulting body segmentation	C-5	Lecture
Unit-I	clarification class	C-6	Clarification Class
Unit-2	unit-2 digestive system of insect & its anatomy	C-7	Lecture
Unit-2	unit-2 insect circulatory system	C-8	Lecture
Unit-2	unit-2 insect sensory system	C-9	Lecture
Unit-2	unit-2 insect respiratory system	C-10	Lecture
Unit-2	UNIT-2 INSECT GLANDULAR SYSTEM	C-11	Lecture
Unit-2	INSECT REPRODUCTIVE SYSTEM	C-12	Lecture
Unit-2	POST EMBYONIC DEVELOPMENT IN INSECT	C-13	Lecture
Unit-2	METAMORPHOSIS	C-14	Lecture
Unit-2	TYPES OF PUPA AND LARVA UP TO CLASSIFICATION	C-15	Lecture
Unit-2	ECONOMIC IMPORTANCE CLASS AND ORDER UP TO INSECTA	C-16	Lecture
Unit-2	CLASSIFICATION, ORDER, FAMILY UP TO INSECTA	C-17	Lecture
Unit-2	SUB PLANT MITES	C-18	Lecture
Unit-I	QUIZ	C-19	Quiz
Unit-I	CLASS ROOM ASSIGMENT	C-20	Class Assignment
Unit-I	CLARIFICATION CLASS	C-21	Clarification Class
Unit-I		C-22	Presentation
Unit-I	TAKE HOME ASSIGNMENT	C-23	Home Assignments
UNIT-II	ECLOSION HORMONE	C23	Lecture
Unit-II	Anatomy of digestive system	C-23	Lecture
Unit-II	Circulatory system	C-24	Lecture
Unit-II	Sensory system	C-25	Lecture
Unit-II	respiratory system	C-26	Lecture
Unit-II	glandular system	C-27	Lecture
Unit-II	excretory system	C-28	Lecture
Unit-II	nervous and reproductive systems, Types of egg larvae and pupa	C-29	Lecture
Unit-II	Types of reproduction & Postembryonic development-eclosion. Matamorphosis	C-30	Lecture
Unit-II	Clarification Class	C-31	Clarification Class
Unit-II	Webinar	C-32	Webinar
Unit-II	Home Assignments		Home Assignments
Unit-III	History and economic importance of plant parasitic nematodes	C-33	Lecture
Unit-III	Characters of Phylum Nematoda and systematic position of plant parasitic nematodes	C-34	Lecture
Unit-III	General morphology, ecology and biology; Plant nematode relationship	C-35	Lecture
Unit-III	Kinds of parasitism and symptomology	C-36	Lecture

Unit-III	Nematode interaction with other micro-organisms	C-37	Lecture
Unit-III	Nematode diseases of crop plants of economic importance in State with special reference to Meloidogyne sp. Heterodera avenae,	C-38	Lecture
Unit-III	Class Assignment	C-39	Class Assignment
Unit-III	Presentation	C-40	Presentation
Unit-III	Webinar	C-41	Webinar
Unit-III	Quiz	C-42	Quiz
Unit-III	Home Assignments		Home Assignments
Unit-III	Anguina tritici	C-43	Lecture
Unit-III	Rotylenchulus reniformis Tylenchulus semipenetrans	C-44	Lecture
Unit-III	Principles of nematode management	C-45	Lecture
	revision	C-46	Activity
	REVISION	C47	Activity

20001700 – Introduction to Entomology and Nematology Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Insect collection and preservation	C-1	Practical
2	Identification of important insects	C-2	Practical
3	General body organization of insects	C-3	Practical
4	Study on morphology of grasshopper or cockroach	C-4	Practical
5	Preparation of permanent mounts of mouth parts	C-5	Practical
6	Insect antennae	C-6	Practical
7	Insect legs and wings	C-7	Practical
8	Dissection of grasshopper and caterpillar for study of internal morphology	C-8	Practical
9	Observations on metamorphosis of larvae and pupae	C-9	Practical
10	Dissection of cockroaches	C-10	Practical
11	Identification of important plant parasitic nematodes	C-11	Practical
12	Collection and preservation of nematode diseased plant samples	C-12	Practical
13	Nematicides and their uses	C-13	Practical
14	Survey and Collection of soil and plant samples	C-14	Practical
15	Study of compound microscope along with other laboratory necessaries	C-15	Practical
	QUIZ	C16	Quiz
	CLARIFICATION CLASS	C17	Clarification Class
	CLASS ROOM ASSIGNMENT	C18	Class Assignment
	TAKE HOME ASSIGNMENT	C19	Home Assignments
	REVSION	C20	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

	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

20001900 – 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

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

20002000 – Natural Resources and Farm Management

Unit	Particulars	Class No.	Pedagogy of Class
UNIT I	Big Picture!! Real scenario	C1	Lecture
UNIT I	Fundamental Concept, Importance of this course	C2	Lecture
UNIT I	Classifications of natural resources	C3	Lecture
UNIT I	Ecology and Ecosystem	C4	Lecture
UNIT I	Natural Resource Economics	C5	Lecture
UNIT I	Future Environmental Challenges, The Role of Economics	C6	Lecture
UNIT I	The Role of Economics, Ecological Economics versus Environmental Economics	C7	Lecture
UNIT I	The Economic Approach, The Human–Environment Relationship	C8	Lecture
UNIT I	Environmental Problems, Pollution	C9	Lecture
UNIT I	Clarification Class 1	C10	Clarification Class 1
	Class Room Assignment 1	C11	Class Assignment 1
	Take Home Assignments 1		Home Assignments 1
UNIT II	Natural resources management and conservation. Issues in natural resources and management	C12	Lecture
UNIT II	Concepts of sustainability, Dynamic Efficiency and Sustainable Development	C13	Lecture
UNIT II	Economists and Ecologists on sustainability	C14	Lecture
UNIT II	Environmental valuation techniques	C15	Lecture
UNIT II	The Economics of Market Allocation, Market Equilibrium and Efficiency	C16	Lecture
UNIT II	Resource Allocation balanced economy	C17	Lecture
UNIT II	The Economics of Natural Resource Systems: Allocating Nonrenewable Resources	C18	Lecture
UNIT II	Allocating Recyclable & Renewable Resources	C19	Lecture
UNIT II	Allocating Common-Pool Resources	C20	Lecture
UNIT II	The Potential for Water Scarcity, The Efficient Allocation of Scarce Water	C21	Lecture
UNIT II	The Economics of Land Allocation	C22	Lecture
UNIT II	Factors Affecting Future Resource Scarcity	C23	Lecture
UNIT II	The Political Economy of Environmental Regulation, Clean Air Act, Natural resource policy, Environmental Taxes	C24	Lecture
UNIT II	Climate Change, Climate Change Policy	C25	Lecture
	Clarification Class 2	C26	Clarification Class 2
	Class Room Assignment 2	C27	Class Assignment 2
	Presentation 1	C28	Presentation 1
	Webinar	C29	Webinar
	Quiz	C30	Quiz
	Take Home Assignments 2		Home Assignments 2

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

99001900 – Environmental Studies

Unit	Particulars	Class No.	Pedagogy of Class
Unit 1	Introduction of Subject	C1	Lecture
Unit 1	Multidisciplinary nature of environmental studies; Scope and importance; Need for public awareness	C2	Lecture
Unit 1	Ecosystems: What is an ecosystem? Structure and function of ecosystem	C3	Lecture
Unit 1	Energy flow in an ecosystem: food chains, food webs	C4	Lecture
Unit 1	ecological succession	C5	Lecture
Unit 1	Forest ecosystem	C6	Lecture
Unit 1	Grassland ecosystem	C7	Lecture
Unit 1	Desert ecosystem	C8	Lecture
Unit 1	Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	C9	Lecture
	Home Assignment 1		Home Assignment
	Clarification Class 1	C10	Clarification Class
Unit 2	Renewable and Non-renewable Resources	C11	Lecture
Unit 2	Land resources and land use change; Land degradation, soil erosion and desertification	C12	Lecture
Unit 2	Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.	C13	Lecture
Unit 2	Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.	C14	Lecture
Unit 2	Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state)	C15	Lecture
Unit 2	Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state)	C16	Lecture
Unit 2	Energy resources	C17	Lecture
Unit 2	Renewable and non-renewable energy sources	C18	Lecture
Unit 2	Use of alternate energy sources, growing energy needs, case studies	C19	Lecture
	Home Assignment 2		Home Assignment
	Quiz 1	C20	Quiz
Unit 3	Levels of biological diversity : genetic, species and ecosystem diversity	C21	Lecture
Unit 3	Biogeographic zones of India	C22	Lecture
Unit 3	Biodiversity patterns and global biodiversity hot spots India as a mega-biodiversity nation	C23	Lecture
Unit 3	Endangered and endemic species of India	C24	Lecture
Unit 3	Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions	C25	Lecture
	Class Room Assignment 1	C26	Class Assignment
Unit 3	Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions	C27	Lecture
Unit 3	Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	C28	Lecture
Unit 3	Ecosystem and biodiversity services: Ecological,	C29	Lecture

	economic, social, ethical, aesthetic and Informational value		
Unit 3	Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value	C30	Lecture
	Power Point Presentation	C31	Presentation
	Clarification Class 2	C32	Clarification Class
Unit 4	Environmental pollution : types, causes, effects and controls	C33	Lecture
Unit 4	Air pollution hazards and human health risks	C34	Lecture
Unit 4	Water, light pollution hazards and human health risks	C35	Lecture
Unit 4	Soil and noise pollution hazards and risks	C36	Lecture
Unit 4	Environmental Policies & Practices: Sustainability and sustainable development.	C37	Lecture
Unit 4	Clarification Class 3	C38	Clarification Class
Unit 4	Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act	C39	Lecture
Unit 4	Water (Prevention and control of Pollution) Act	C40	Lecture
Unit 4	Wildlife Protection Act	C41	Lecture
Unit 4	Forest Conservation Act	C42	Lecture
Unit 4	Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context	C43	Lecture
	Class Room Assignment 2	C44	Class Assignment
	Quiz 2	C45	Quiz
	Clarification Class 4	C46	Clarification Class
Unit 5	Human population growth: Impacts on environment, human health and welfare	C47	Lecture
Unit 5	Resettlement and rehabilitation of project affected persons; case studies	C48	Lecture
Unit 5	Disaster management: floods	C49	Lecture
Unit 5	Disaster management: earthquake	C50	Lecture
Unit 5	Disaster management: cyclones	C51	Lecture
Unit 5	Disaster management: landslides	C52	Lecture
Unit 5	Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan	C53	Lecture
	Clarification Class 5	C54	Clarification Class
Unit 6	Environmental communication	C55	Lecture
Unit 6	Public Awareness	C56	Lecture
Unit 6	Case study at local area	C57	Lecture
Unit 6	Environmental communication case studies (e.g., CNG vehicles in Delhi)	C58	Lecture
Unit 6	Environmental conservation	C59	Lecture
	Clarification Class 6	C60	Clarification Class

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. **CO2:** Illustrate the origin, geographical distribution and economic importance of kharif crops **CO3:** Identify the soil and climatic requirements of Kharif crops **CO4:** Examine the cultural practices, varieties and yield of Kharif crops **CO5:** Identification of different weeds of Kharif season
20012400 - Soil & water Conservation Engineering	**CO1:** Recall the soil and water conservation techniques and spell the terms like soil erosion, their causes and agents. **CO2:** Explain water erosion, its classification, their control and soil loss measurement techniques. **CO3:** Plan the mechanical measure for controlling soil and water erosion. **CO4:** Examine the degradation of soil's chemical and physical properties. **CO5:** Value the water harvesting techniques for water conservation.
20012600 - Agricultural Finance and Cooperation	**CO1:** Explain the different credit needs and its role in Indian agriculture. **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. **CO3:** Summarize the ability to understand the terminology and facts about agriculture Finance and Cooperation. **CO4:** Classify with the different cooperatives working in India. **CO5:** Discuss the roles and responsibility of ICA, NCUI, NCDC, and NAFED.
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. **CO2:** Explain about computer models for understanding plant processes. **CO3:** Make use of MS Office for document creation & Editing, Data presentation, interpretation, graph creation, statistical analysis and mathematical expressions. **CO4:** Develop the understanding of application software, Smartphone apps, programming languages, geospatial technology for generating valuable agri-information, decision support systems, etc. **CO5:** Importance of geospatial technology for generating valuable agri-information, decision support systems
20013000 - Farm Machinery and Power	**CO1:** What are primary and secondary tillage implement and Tell about the implement used for hill agriculture. **CO2:** Explain about air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor **CO3:** Identify different components of I.C. engine, I.C. engine terminology and solved problems.

	CO4: Analyse the operation of farm machinery equipment also examines the harvesting, threshing and land preparation (heavy) machinery needed for agricultural farm. **CO5:** Develop the Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.
20013200 - Production Technology for Vegetables and Spices	**CO1:** Find practical knowledge on specific production techniques of vegetables and spices. **CO2:** Explain importance of vegetables and spices in human nutrition. **CO3:** Outline scope of vegetables and spices in national economy. **CO4:** Solve the Problems of nursery and field. **CO5:** Evaluate the nutrition requirement for humans through Vegetables
20013400 - Fundamentals of Crop Physiology RKS	**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. **CO2:** Explain Importance of growth Harmon in Agriculture. **CO3:** Develop the understanding about the mechanisms of various metabolic processes in plants - Photosynthesis, respiration, fat metabolism, plant growth, nutrient absorption, etc. **CO4:** Formulate the quantity of plant growth regulators. **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.
20013600 - Fundamentals of Plant Pathology	**CO1:** Name and identify different Diseases, nature of pathogens and different strategies for management of plant diseases. **CO2:** Outline concepts, nomenclature, classification and characters of pathogens **CO3:** Apply different principles and methods for plant disease management. **CO4:** Take a part in identification of diseases and marketing of relevant pesticides. **CO5:** Conclude methods to diagnose and manage a wide range of plant diseases.
20013800 - Livestock and Poultry Management MK	**CO1:** Identify indigenous and exotic breeds of cattle, buffalo, sheep, goat and poultry. **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. **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. **CO4:** Discuss digestive system of livestock and poultry, classification of feed stuffs, nutrients and their functions with animal diseases. **CO5:** Information about Indian agricultural concerns and future prospects

20014000 - Agriculture Heritage & Human Values & Ethics	**CO1:** Explain the relevance of heritage in agriculture. **CO2:** Interpret the scope of agriculture in future. **CO3:** Develop the skills on philosophical and technical difference between historical and scientific agriculture. **CO4:** Examine a balanced view about heritage of agriculture and knowledge with recent advances. **CO5:** Information about Indian agricultural concerns and future prospects
20014100 - Ability and Skill Enhancement - III	**CO1:** Classify the different types of reviews i.e. book review, movie review etc. **CO2:** Express his/ her feeling at pressor situation or emotional situation **CO3:** Explain his/her thoughts in group discussion and also build leadership quality **CO4:** Enhance creativity in making documentary etc. **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

20012400	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

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

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

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

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

20013400	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

20013600	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

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

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

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

20012400 – 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

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

20013400– 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

20013600 – 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 Room 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 Room 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

20013700 – 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

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

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

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
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. **CO2:** Examine the production techniques of rabi crops and their origin, economic importance, geographical distribution and botanical description. **CO3:** Assess the sowing methods of rabi crops in the field and their management. **CO4:** Discuss all rabi crops (wheat, barley, pea, chickpea, mustard, sugarcane etc.) with their cultivation practices. **CO5:** Perceive the outcomes obtained by different breeding methods ensured for sustainable rabi crop production
20014400 - Production Technology for Ornamental Crops, MAP and Landscaping	**CO1:** Identify different types of ornamental and medicinal crops. **CO2:** Examine various principles of landscaping, uses of landscape trees, shrubs and climbers, production technology of important ornamental crops, etc. **CO3:** Determine about Demonstrate various Package of practices for loose flowers and their transportation, storage house and required condition for cut and loose flower. **CO4:** Construct about the various problems with the production technology of medicinal and aromatic plants. **CO5:** Importance of Processing and value addition in ornamental crops and MAPs produce.
20014600 - Renewable Energy and Green Technology	**CO1:** Define the environmental aspects of non-conventional energy resources. **CO2:** Explain the benefit from utilization the biomass, solar and wind energy. **CO3:** Develop the skill in utilization of renewable energy recourses/gadgets. **CO4:** Discover Ability to apply in renewable energy in the agricultural sector. **CO5:** Imagine the renewable energy as ultimate source of power.
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. **CO2:** Explain how to improve soil fertility and productivity by application of fertilizers, macro & micronutrients based on soil test. **CO3:** Identify Multipurpose tree species for remediation of problematic soil. **CO4:** Analyse the use of remote sensing and GIS application to categorize the problematic soil for their reclamation. **CO5:** Determine the quality and standards of irrigation water.
20014900 - Production Technology for Fruit and	**CO1:** Find out the importance of different fruit crops and plantation crops. **CO2:** Explain package of practices of the major crops like Mango, Banana, Guava, Citrus group, Date palm, papaya, Pineapple, Ber, Aonla, Bael,

Plantation Crops	Apple, Pear, Peach Plum, Coffee, Coconut, Tea, Cocoa and Rubber. **CO3:** Utilize various concepts of high-density planting, new techniques of high density planting, plant propagation, seed propagation, etc. **CO4:** Examine canopy architecture for higher productive fruit plants. **CO5:** To determine different propagation techniques in fruit and plantation crops.
20015100 - Principles of Seed Technology RKS	**CO1:** Explain scope and importance of seed technology in agriculture and the role of officials & legislation, seed act, seed order in quality seed production. **CO2:** Develop an understanding of various seed production techniques for different field crops. **CO3:** Analyze the factors related to genetic and physical purity of seed and its health status of seeds of a variety during seed processing. **CO4:** Compare the various phases of seed certification, field inspection and seed purity testing. **CO5:** Interpret the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also.
20015300 - Plant Biotechnology	**CO1:** Understand the scope and importance of Plant Biotechnology for Crop improvement **CO2:** Apply various techniques of Plant Tissue culture for Plant Propagation **CO3:** Apply skills of plant tissue culture for Crop Improvement **CO4:** Analyse and select various Biotechnological techniques suitable for Crop improvement **CO5:** Explain of genetic engineering method of gene transfer transgenic plants and their applications. Blotting techniques- DNA finger printing – DNA based markers- RFLP, AFLP, RAPD, SSR and DNA Probes.
20015500 - Agricultural Marketing Trade & Prices	**CO1:** Explain about the agriculture marketing, market structure, marketing mix, marketing segmentation, demand, supply and producer surplus. **CO2:** classify the product life cycle and its different aspects, product, price, place, promotion, advertising, personal selling, sales promotion and publicity. **CO3:** Simplify marketing process and functions: Marketing process- concentration, dispersion and equalization. **CO4:** Discover understanding about role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions. **CO5:** Measure the marketing efficiency obtained from different marketing channel using different methods.
20015700 - Fundamentals of Agriculture Extension Education	**CO1:** Explain an understanding on the process, steps, principles, monitoring and evaluation involved in agricultural extension programme development for transfer of technology. **CO2:** Illustrate the skills about genesis of agricultural extension, extension efforts in pre and post-independence era along with specific agricultural

	programmes. **CO3:** Build new trends in agricultural extension like private extension, market led extension, expert systems, farmer led extension and cyber extension. **CO4:** Discover communication strategies using agricultural journalism for innovation, diffusion and adoption of agricultural technology. **CO5:** Decide when, where and to whom to use the appropriate extension teaching methods.
20015900 Ability and Skill Enhancement IV	**CO1:** Design the resume and know about different format **CO2:** Know and classify the different types of interviews i.e. Mock Interview, HR Expert Mock Interview, Telephonic Interviews. **CO3:** Examine the Company Specific Research and Presentation. **CO4:** Build conversation skill **CO5:** Find out Industry suitable for internship or job.

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

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

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

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

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

20015300	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2		2	2			3		2
CO2	3	2	3		3	3	2		2	3	2	2
CO3	3		2	3	3	2	2			3	2	2
CO4	3	3		3	3	3	2		3	2	3	2
CO5	3	2	3	2	2	3	3	2		3		3

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

20015700	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

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

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

20015300 – Plant Biotechnology

Unit	Particulars	Class No.	Pedagogy of Class
Unit 1	Introduction of Plant Biotechnology & History	C1	Lecture
Unit 1	Plant Genetic Engineering; Scope and importance in Crop Improvement	C2	Lecture
Unit 1	Totipotency and Morphogenesis, Nutritional requirements of in-vitro cultures	C3	Lecture
Unit 1	Techniques of In-vitro cultures and Micro propagation	C4	Lecture
Unit 1	Anther Culture and Pollen Culture	C5	Lecture
Unit 1	Ovule culture and Embryo culture	C6	Lecture
	Clarification Class-I	C7	Clarification Class
	Class Room Assignment-I	C8	Class Assignment
Unit 1	Test tube fertilization, Endosperm culture, applications	C9	Lecture
Unit 1	Somaclonal variation: Types, Reasons	C10	Lecture
Unit 1	Somatic embryogenesis and synthetic seed production technology	C11	Lecture
	Take Home Assignments-I		Home Assignments
	Presentation-I	C12	Presentation
Unit 1	Protoplast isolation, culture, manipulation and fusion	C13	Lecture
Unit 1	products of somatic hybrids and cybrids	C14	Lecture
	Clarification Class-II	C 15	Clarification Class
	Activity-I	C 16	Activity
	Presentation II	C 17	Presentation
Unit- 2	Applications in crop improvement	C 18	Lecture
Unit- 2	Genetic engineering; Restriction enzymes, Vectors for gene transfer	C 19	Lecture
Unit- 2	gene cloning-direct and indirect method of gene transfer	C 20	Lecture
Unit- 2	gene cloning-direct and indirect method of gene transfer	C 21	Lecture
Unit- 2	transgenic plants and their applications	C 22	Lecture
Unit- 2	Blotting techniques- DNA finger printing, DNA based markers- RFLP, AFLP,	C 23	Lecture
	Clarification Class-III	C 24	Clarification Class
	Take Home Assignments II		Home Assignments
Unit- 2	Blotting techniques- DNA finger printing, DNA based markers- RFLP, AFLP,	C 25	Lecture
Unit- 2	RAPD, SSR and DNA Probes	C 26	Lecture
	Class Room Assignment II	C 27	Class Assignment
	Webinar	C 28	Webinar
	Clarification Class-IV	C 29	Clarification Class
	Activity-II	C 30	Activity

20015400 – Plant Biotechnology Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Requirements of Plant tissue culture laboratory and Techniques in Plant tissue culture- Media	P1	Practical
2	Requirements of Plant tissue culture laboratory and Techniques in Plant tissue culture- Media	P2	Practical
3	Components and preparation; sterilization techniques and inoculation of various explants, callus	P3	Practical
4	Components and preparation; sterilization techniques and inoculation of various explants, callus	P4	Practical
5	induction and plant regeneration	P 5	Practical
6	induction and plant regeneration	P6	Practical
7	Demonstration of Micropropagation, Anther culture, embryo culture	P7	Practical
8	Demonstration of Micropropagation, Anther culture, embryo culture	P 8	Practical
9	Hardening/ Acclimatization of regenerated plants, somatic embryogenesis and synthetic seed production	P 9	Practical
10	Hardening/ Acclimatization of regenerated plants, somatic embryogenesis and synthetic seed production	P10	Practical
11	Demonstration of isolation and culture of protoplast	P11	Practical
12	Demonstration of isolation and culture of protoplast	P12	Practical
13	demonstration of isolation of DNA, gene transfer technique and gel electrophoresis techniques	P13	Practical
14	demonstration of isolation of DNA, gene transfer technique and gel electrophoresis techniques	P14	Practical
15	Activity	P15	Activity

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

	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

20015700 – Fundamentals of Agriculture 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

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

20015800 – 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

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

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

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

	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

20016200 – 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
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. **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. **CO3:** Analyse prevention and control measures during the disease spread, disease cycle and integrated pest managements in cereal, millet, major oil crops and legumes. **CO4:** Evaluate economic injury level and economic threshold level for timely application of control measures for pest management. **CO5:** About development and validation of IPM module.
20017000 - Manures, Fertilizers and Soil Fertility Management	**CO1:** Recall the manures, its applications, composition and different methods for its preparation. **CO2:** Explain the concept of soil fertility, productivity and how it can be enhanced. **CO3:** Identify the mechanisms of nutrient transport to plants and factors affecting nutrient availability to plants. **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. **CO5:** Recommend the methods of fertilizer application in different conditions for maximum Nutrient Use Efficiency (NUE)
20017200 - Pests of Crops and Stored Grain and their Management	**CO1:** Explain the identification, taxonomy, host range, biology and bionomics, nature of the damage and preventive and curative control measures of crop and stored grain pests. **CO2:** Apply the ecological approach to insect pest management. **CO3:** Explain the technique to operate various pesticide appliances as a knap-sack sprayer, foot sprayer, aerosol, fumigators, etc, for pesticide application. **CO4:** Build crop-wise IPM modules for sustainable agriculture and Storage structure and methods of grain storage to minimize the risk of food security. **CO5:** Importance of Storage structure and methods of grain storage and fundamental principles of grain store management.
20017400 - Diseases of Field and Horticultural Crops and their Management -I	**CO1:** Find the common pathogens of different diseases in the crops. **CO2:** Explain about etiology and symptoms of these diseases which helps in diagnosis of the diseases of field and horticultural crops **CO3:** Identify the different culture, techniques and biology of pathogens in the laboratory. **CO4:** Apply Eco-friendly and economically suitable management practices.

	CO5: Elaborate of disease cycle and management of major diseases of field and horticulture 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. **CO2:** Identify Genetic basis and methods of breeding in cross pollinated crops and modes of selection. **CO3:** Build the understanding of germplasm conservation, utilization, and genetics of qualitative and quantitative characters, and their inheritance. **CO4:** Elaborate breeding procedures, methods and breeding objectives in different crop which is important for the development of improved varieties. **CO5:** Interpret Gene preservation method for further use to improve kharif crops.
20017800 - Food Safety & standards	**CO1:** Tell about the food safety, hazards, risks, types of hazards - biological, chemical, physical hazards. **CO2:** Explain food laws and standards of Indian food regulatory regime. **CO3:** Identify the importance of Food Safety Management, Packaging, Product, Nutritional labelling and Scope of food safety. **CO4:** Test for safe practices: surface sanitation, personal hygiene and newer approaches to food safety. **CO5:** Prioritize safe practices: surface sanitation, personal hygiene and newer approaches to food safety.
20018000 - Bio pesticides & Bio fertilizers	**CO1:** Tell about the bio pesticides: importance, scope and potential of bio pesticides. **CO2:** Demonstrate bio fertilizers its status and scope and characteristic features of various bacterial bio fertilizers. **CO3:** Experiment with the storage, shelf life, quality control, marketing and factors influencing the efficacy of Bio-pesticides & Bio-fertilizers. **CO4:** Analyse mechanism of Production technology of Bio-pesticides & Bio-fertilizers. **CO5:** Determine mechanism of Production technology of Bio-pesticides & Bio-fertilizers.
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. **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. **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.

	CO4: Explain production techniques of major Kharif season crops according to resources available in the field. **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. **CO2:** Explain about traditional knowledge-meaning and rights of TK holders. **CO3:** Apply the principles of intellectual property law (including copyright, patents, designs, and trademarks) to solve real problems and analyse the social impact of intellectual property law and policy. **CO4:** Impart UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India. **CO5:** Explain the various rules and regulations regarding Patent and copyright.
20018400 - Ability and Skill Enhancement -V	**CO1:** Express and build leadership quality **CO2:** Recall the traits of Successful Entrepreneurs, and Entrepreneurial qualities **CO3:** Classify the differences between organizational decision making process, entrepreneurial decision making process **CO4:** Create work related skills and prepare effective interview questions to conduct effective interviews. **CO5:** Enhance employability skills
20018500 - Summer Internship and Report	**CO1:** Understand the real-time working of organizations. **CO2:** Demonstrate professional knowledge, skills and attitude along with the experience needed to constitute a successful career. **CO3:** Analyse career opportunities in their areas of interest. **CO4:** Build aptitude for gaining supervised professional experiences. **CO5:** Create a clear understanding of industry trends and advancements

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

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

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

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

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			

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

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

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

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

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

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

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

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

20018800 Farming System & Sustainable Agriculture (Elective)

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-I	Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability	C-15	Lecture
Unit-I	Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability	C-16	Lecture
	Quiz-I	C-17	Quiz
Unit-I	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

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

20019100 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

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. **CO2:** Interpret various water harvesting techniques and their efficient utilization. **CO3:** Apply contingent crop planning for aberrant weather conditions. **CO4:** Examine the seasonal rainfall and different types of watershed and its components. **CO5:** Select soil and water conservation techniques to avoid their losses.
20019500 - Protected Cultivation and Secondary Agriculture	**CO1:** Explain better knowledge for fundamental principles of crop cultivation under controlled conditions. **CO2:** Apply different types of green houses and plant response to green house environment. **CO3:** Identify the various research investigations under greenhouse. **CO4:** Take Part in with the farmers to give knowledge about the protected cultivation. **CO5:** Take knowledge of storage and drying of final produce
20019700 - Diseases of Field and Horticultural Crops and their Management-II	**CO1:** Find common pathogens of different diseases in the crops. **CO2:** Interpret the knowledge about etiology and diagnosis the symptoms of diseases in field and horticultural crops. **CO3:** Identify different culture, techniques, biology of pathogens in the laboratory. **CO4:** Apply Eco-friendly and economically suitable management practices. **CO5:** About important issues in economics and management of common property resources of land, water, pasture and forest resources.
20019900 - Post-harvest Management and Value Addition of Fruits and Vegetables	**CO1:** Define importance and use of processing and value addition of fruits and vegetables. **CO2:** Identify various problems (storage, shelf life of food product, spoilage etc.) faced by the farmers. **CO3:** Classify and development of various products related to food processing or prevent the food from microorganism or enzymatic spoilage. **CO4:** Simplify and development of various products related to food processing. **CO5:** Distinguish between jam, jelly, squash and pickles and their preparation
20020100 - Management of Beneficial Insects	**CO1:** Explain about importance of beneficial Insects, beekeeping and pollinators. **CO2:** Select diseases of beneficial insect and their management. **CO3:** Discover understanding about commercial methods of rearing honey bees, silkworm, lac insects, pollinators and their enemies. **CO4:** Evaluate specific major parasitoids and predators commonly being

	used in biological control. **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.
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. **CO2:** Explain plant genetic resources, its utilization and conservation. **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. **CO4:** Discuss the major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties. **CO5:** Interpret Gene preservation method for further use to improve Rabi varieties.
20020500 - Practical Crop Production –II (Rabi crops)	**CO1:** How to prepare field, seed treatment, nursery raising, sowing, nutrient management, water management and weed management. **CO2:** Explain management of insect pests and diseases of crops also describe harvesting, threshing, drying, winnowing, storage and marketing of produce. **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. **CO4:** Analyse the understanding on production techniques of major rabi season crops according to resources available in the field. **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. **CO2:** Summarise the Fundamental cultural practices including insect, pest, weed and disease management under organic crop production. **CO3:** Choose about government schemes and the role of NGOs in producing organic products. **CO4:** Take Part in knowledge on certification methods of organic produce. **CO5:** Learn about processing and export of organic produce.
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. **CO2:** Classify Farm business analysis: meaning and concept of farm income and profitability. **CO3:** illustrate the different law and principles of farm management, relationship between factor and product, etc. **CO4:** Determine the important issues in farm management.

	CO5: About important issues in economics and management of common property resources of land, water, pasture and forest resources.
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. **CO2:** Explain food and nutrition, malnutrition (over and under nutrition), nutritional disorders. **CO3:** Make use of various equipment for preserving (use of heat, low temperature, radiation, drying etc.) related to food processing. **CO4:** Analyse nutritional disorders, energy metabolism and novel technologies related to food science. **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 **CO2:** Develop a winning attitude **CO3:** Learn the ways to understand news and be a journalist. **CO4:** Learn the ability to prepare reports on major national and international news. **CO5:** Conduct chat shows, panel discussions, parliamentary debates etc.

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

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

20019700	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

20019900	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

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

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			

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

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

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

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

20019700 – 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

20019800 – Diseases of Field and Horticultural Crops and their Management-II Lab

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
	Apple diseases	C11	Class Room Assignment
	Peach diseases	C12	Clarification Class
I	Strawberry diseases	C13	Lecture
I	Potato diseases	C14	Lecture
	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
	coriander diseases	C21	Class 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

20019900 – Post-harvest Management and Value Addition of Fruits and Vegetables

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Importance of Postharvest Technology in horticultural crops. Maturity indices, harvesting, handling, grading of fruits, vegetables, cut flowers, plantation crops, spices, medicinal and aromatic plants.	C1	Lecture
Unit-I	Maturity indices, harvesting, handling, grading of fruits, vegetables, cut flowers, plantation crops, spices, medicinal and aromatic plants.	C2	Lecture
Unit-I	Maturity indices, harvesting, handling, grading of fruits, vegetables, cut flowers, plantation crops, spices, medicinal and aromatic plants.	C3	Lecture
Unit-I	Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and bio-chemical changes, hardening and delaying ripening process.	C4	Lecture
Unit-I	Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and bio-chemical changes, hardening and delaying ripening process.	C5	Lecture
Unit-I	Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and bio-chemical changes, hardening and delaying ripening process.	C6	Lecture
Unit-I	Postharvest treatments of horticultural crops.	C7	Lecture
Unit-II	Postharvest treatments of horticultural crops.	C8	Lecture
Unit-II	Quality parameters and specifications. Structure of fruits, vegetables and cut flowers related to physiological changes after harvest.	C9	Lecture
Unit-II	Methods of storage for local market and export. Pre-harvest treatment and pre-cooling, prestorage treatments.	C10	Lecture
Unit-II	Methods of storage for local market and export. Pre-harvest treatment and pre-cooling, prestorage treatments.	C11	Lecture
Unit-II	Different systems of storage, packaging methods and types of packages, recent advances in packaging.	C12	Lecture
Unit-II	Types of containers and cushioning materials, vacuum packaging, cold storage, poly shrink packaging, grape guard packing treatments. Modes of transport.	C13	Lecture
Unit-II	Clarification Class	C14	Clarification Class
Unit-II	Class Room Assignment	C15	Class Assignment
Unit-II	Home Assignments		Home Assignments
Unit-I	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

Course	Course outcomes: - After completion of these courses students should be able to
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. **CO2:** Explain the profitable based farming system can we adopted with the help of course content **CO3:** Explain about the functioning of the extension organizations viz., state agricultural departments, KVK's, and research stations. **CO4:** Justify on campus training from various faculties before step into the village attachment and Agro-industrial attachment. **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 **CO2:** Develop practical knowledge about various processing units and hands-on trainings under supervision of industry staff **CO3:** Discuss business network including outlets of the industry and skill development in all crucial tasks of the industry. **CO4:** Combine with the agri related industries and make them Aware about the functioning of the agri. Industries. **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
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. **CO2:** Discover the methods of application of Rhizobium, Azotobacter, Azospirillum and phosphate solubilizing biofertilizers. **CO3:** Explain the use of biocontrol agents like Trichoderma, Pseudomonas and bio fertilisers like phosphor bacteria for sustainable agriculture and commercial marketing. **CO4:** Create a favourable environment and conditions for mass production of bioagents and biofertilizers. **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. **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. **CO3:** Interpret the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also. **CO4:** Analyze the genetic and physical purity of seed, as well as the health state of seeds of a variety, during seed processing. **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. **CO2:** Outline the climatic requirements of mushroom cultivation, illustrate the knowledge on diseases and pests of mushroom and their management **CO3:** Utilize the Knowledge to Produce Pleurotus / button mushroom for commercial marketing and harvesting and post harvesting processes of mushroom **CO4:** Take a part in Learning value added products preparation from mushroom **CO5:** Decide having the prospects of commercial mushroom production
20022300 - Commercial Beekeeping	**CO1:** Tell honey using their practical knowledge on commercial bee keeping. **CO2:** List the different species of honey bee. **CO3:** Explain the commercial methods of rearing. **CO4:** Illustrate the nature of different species of honey bee. **CO5:** Validity of ideas of Poultry by-products and their uses in agriculture farming.
20022400 -	**CO1:** Find the importance of horticulture in human diet

Commercial Horticulture	**CO2:** Develop the nurseries of different vegetables crops for the purpose commercial sale. **CO3:** Identify the role of vegetable in nutrition. **CO4:** Develop the entrepreneurship skill through modern practices **CO5:** Plan the nursery raising and its maintenance.
20022500 - Agriculture Waste Management	**CO1:** Define the type of agricultural wastes **CO2:** Compare various type of agricultural waste and their management. **CO3:** Categorise various type of waste and their management **CO4:** Perceive different techniques to manage agricultural waste and its sustainable use. **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. **CO2:** Summarise the Fundamental cultural practices including insect, pest, weed and disease management under organic crop production. **CO3:** Choose about government schemes and the role of NGOs in producing organic products. **CO4:** Take Part in knowledge on organic crop production and certification methods of organic produce. **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. **CO2:** Explain the concept of value addition in milk & dairy products. **CO3:** Classify the importance of value addition in dairy products. **CO4:** Develop different dairy products **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. **CO2:** Make use of sterilization techniques for media, containers and small instruments, sterilization techniques for explants. **CO3:** Evaluate the culturing of explants: Seeds, shoot tip and single node, Callus induction. **CO4:** Develop the somatic embryos regeneration of whole plants from different explants, Hardening procedures. **CO5:** Importance of application of plant tissue culture in crop improvement.
20022900 – Poultry Production Technology	**CO1:** Identify indigenous and exotic breeds of poultry. **CO2:** Discover practical knowledge about Poultry management and the products produce from them, Introduce the diseases of poultry and its prevention (including vaccination schedule) and control of important diseases of poultry.

	CO3: Determine the ability to select different types of houses suited in specific climatic conditions for best management of poultry, Incubation, Brooding and Hatching **CO4:** Discuss digestive system of poultry, classification of feed stuffs, nutrients and their functions with poultry diseases. **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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