Detailed Course Scheme

Bachelor of Science (Hons.)

Agriculture

Semester-VI

(2022- 26)

DOC202407170008

RNB GLOBAL UNIVERSITY
Educating stars for tomorrow

RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road,
Bikaner, Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System along with Choice Based Credit System as per latest guidelines of University Grants Commission (UGC). Accordingly, each academic year is divided into two semesters, Odd(July-December) and Even (January-June).Also, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The Curriculum for B. Sc Agriculture program **for (January-June) Even Semester 2025** along with examination pattern is as follows:

Course Scheme

Semester- VI

S. No.	Course Code	Course Name	L	T	P	Credits
1.	20019300	Rainfed Agriculture & Watershed Management	1	0	0	1
2.	20019400	Rainfed Agriculture & Watershed Management lab	0	0	2	1
3.	20019500	Protected Cultivation and Secondary Agriculture	1	0	0	1
4.	20019600	Protected Cultivation and Secondary Agriculture lab	0	0	2	1
5.	20026900	Diseases of Field and Horticultural Crops and their Management-II	2	0	0	2
6.	20027000	Diseases of Field and Horticultural Crops and their Management-II Lab	0	0	2	1
7.	20025900	Post-harvest Management and Value Addition of Fruits and Vegetables	1	0	0	1
8.	20020000	Post-harvest Management and Value Addition of Fruits and Vegetables lab	0	0	2	1
9.	20020100	Management of Beneficial Insects	1	0	0	1
10.	20020200	Management of Beneficial Insects lab	0	0	2	1
11.	20020300	Crop Improvement-II(Rabi crops)	1	0	0	1
12.	20020400	Crop Improvement-II(Rabi crops) Lab	0	0	2	1
13.	20020500	Practical Crop Production –II(Rabi crops)	0	0	4	2
14.	20020600	Principles of Organic Farming	1	0	0	1
15.	20020700	Principles of Organic Farming lab	0	0	2	1
16.	20020800	Farm Management, Production &Resource Economics	1	0	0	1
17.	20020900	Farm Management, Production & Resource Economics Lab	0	0	2	1
18.	20021000	Principles of Food Science and Nutrition	2	0	0	2
19.	-	Elective III	2	0	0	2
20.	-	Elective III Lab	0	0	2	1

21.	20021100	Ability and Skill Enhancement VI	2	0	0	2
22.	99003300	Workshops & Seminars/ Human Values & Social Service/NCC/NSS	-	-	-	1
	Total		15	0	22	27

Electives

Elective	Course Code	Course Name
Elective III	20021200	Hi-tech. Horticulture
	20021300	Hi-tech. Horticulture Lab
	20021400	Protected Cultivation
	20021500	Protected Cultivation Lab
	20021600	System Simulation and Agro-advisory
	20021700	System Simulation and Agro-advisory Lab
	20021800	Agricultural Journalism
	20021900	Agricultural Journalism Lab

EVALUATION SCHEME - THEORY

The evaluation of the theory paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

Internal Assessment

The distribution of Internal Assessment Marks is as follows:

Type	Details	Marks
Mid Term	Two Mid-term Sessional of 15 marks each (15+15)	30
Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc.	Average of marks obtained	15
Attendance	75%+ : 5 marks	5
TOTAL	50	

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME - PRACTICAL

The evaluation of the practical paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	45
Attendance	75%+ : 5 marks	5
TOTAL	50	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluatedinternally by the institute. The credit for this will be given at the end of Semester.

2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of Semester.

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.

6. Course Outcomes

Course	Course outcomes: - After completion of these courses students should be able to
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.
20019400- Rainfed Agriculture & Watershed Management lab	**CO1:** Introduction to climate classification, rainfall pattern in India. **CO2:** Studies of cropping pattern of rainfed areas of the country. **CO3:** Interpretation of meteorological data and scheduling of irrigation. **CO4:** Study on cultural practices for mitigating stress and moisture conservation practices. **CO5:** Explain water harvesting structures, watershed and rainfed research station.
20019500 - Protected Cultivation and Secondary Agriculture	**CO1:** Explain better knowledge for fundamental principles of crop cultivation under controlled conditions. **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
20019600 - Protected Cultivation and Secondary Agriculture lab	**CO1:** Study of different type of green-houses based on shape and design. **CO2:** Plan a Visit to various Post Harvest Laboratories. **CO3:** Determination of Moisture content of various grains by oven drying & infrared moisture methods and their engineering properties. **CO4:** Determination of Moisture content of various grains by moisture meter. **CO5:** Study of green-houseequipment.
20026900 - 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.
20027000 - Diseases of Field and Horticultural Crops and their Management-II Lab	**CO1:** List making of diseases for field crops about wheat, barley, sugarcane, mustard and gram. **CO2:** Elaborate meaning of these diseases such as Malformation, dieback, black, heart and Red rot. **CO3:** Compare between Downy mildew and powdery mildew diseases symptoms with examples. **CO4:** Identify the types of diseases that damage fruit and spices crops. **CO5:** Classify disease to base on their micro-organisms.
20025900 – Post-harvest Management and Value Addition of Fruits and Vegetables	**CO1:** Define importance and use of processing and value addition of fruits and vegetables. **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
20020000- Post-harvest Management and Value Addition of Fruits and Vegetables lab	**CO1:** Apply different types of packaging, containers for shelf life extension. **CO2:** Formulate the Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. **CO3:** Evaluate extraction and preservation of pulps and juices. **CO4:** Effect of temperature on shelf life and quality of produce. **CO5:** Develop concepts regarding horticultural processing and post harvest management.
20020100 - Management of Beneficial Insects	**CO1:** Explain about importance of beneficial Insects, beekeeping and pollinators. **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.
20020200- Management of Beneficial Insects lab	**CO1:** Define Bee pasturage, bee foraging and communication. **CO2:** Classify the Honey bee species, castes of bees **CO3:** Identification and techniques for mass multiplication of natural

	enemies. **CO4:** Categorize to silkworm, voltinism and biology of silkworm. **CO5:** Choose Species of lac insect, host plant identification.
20020300 – Crop Improvement-II (Rabi crops)	**CO1:** Tell about the evolutionary history of important field crops along with their Centre of origin, its wild species and wild relatives that can be utilized in crop improvement. **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.
20020400 - Crop Improvement-II (Rabi crops) Lab	**CO1:** Interpret the floral biology, emasculation and hybridization techniques in different crop species **CO2:** Plan how to use different population improvement approach **CO3:** Plan different experimental design for crop research **CO4:** Utilize Study of field techniques for seed production and hybrid seeds production in Rabi crops; **CO5:** Estimate the heterosis, inbreeding depression and heritability
20020500 - Practical Crop Production –II (Rabi crops)	**CO1:** How to prepare field, seed treatment, nursery raising, sowing, nutrient management, water management and weed management. **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:** Analyze 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:** Summarize 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.

20020700 - Principles of Organic Farming lab	**CO1:** Introduction to organic farms and their different components. **CO2:** Build the knowledge about preparation of compost, vermi-compost and bio-fertilizer. **CO3:** Information about indigenous technology knowledge for nutrient, pest disease and weed management. **CO4:** Analyze cost of organic production system. **CO5:** Study about grading, quality aspect, packaging and handling.
20020800 – Farm Management, Production & Resource Economics	**CO1:** Define the concept of farm management, different terms, principles and laws of farm management, different types of farm, etc. **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.
20020900 - Farm Management, Production & Resource Economics Lab	**CO1:** Design of farm layout. **CO2:** Analyze the cost of fencing of a farm. **CO3:** Choose of most profitable enterprise combination. **CO4:** Create of depreciation cost of farm assets. **CO5:** Build of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India.
20021000 - Principles of Food Science and Nutrition	**CO1:** What is food science, food composition and chemistry water, carbohydrates, proteins, fats, vitamins, minerals, flavors, colors, 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:** Analyze 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.
20021200 - Hi-tech. Horticulture	**CO1:** Develop the understanding of modern horticultural practices. **CO2:** Discuss the hydroponic system of cultivation.

	CO3: Develop the nurseries of different vegetables crops for the purpose commercial sale **CO4:** Elaborate the knowledge of remote sensing and geographical information system. **CO5:** Elaborate the concept of precision farming in horticulture crops.
20021300 - Hi-tech. Horticulture Lab	**CO1:** Explain about Types of polyhouses and shade net houses. **CO2:** Elaborate the micro-propagation. **CO3:** Take part in Nursery portray filling. **CO4:** Model of hydroponics, development. **CO5:** Perceive micro-irrigation and EC, PH based fertilizer scheduling. **CO6:** .
20021400 - Protected Cultivation	**CO1:** What is Greenhouse technology: Introduction, Types of Green Houses. **CO2:** Explain Planning and design of greenhouses, **CO3:** Make use of drying theory, various drying method, commercial grain dryer **CO4:** Analyze cost estimation and economic analysis. **CO5:** Importance of Green-house equipment, materials of construction for traditional and low cost green houses.
20021500 - Protected Cultivation Lab	**CO1:** Name of different type of green-houses based on shape. **CO2:** Explain the rate of air exchange in an active summer winter cooling system. **CO3:** Plan Field visit to seed processing plant. **CO4:** List of green-houseequipment. **CO5:** Determine of Moisture content of various grains by oven drying & infrared.
20021600 - System Simulation and Agro-advisory	**CO1:** Recall the components of soil water and nutrients balance. **CO2:** How to prepare agro-advisory bulletin based on weather forecast. **CO3:** Learn about system approach for representing soil-plant-atmospheric continuum, system boundaries, crop models, concepts & techniques. **CO4:** Explain different types of crop models and relational diagrams. **CO5:** Explain the ITK for weather forecast and its validity.
20021800 - Agricultural Journalism	**CO1:** Define Agricultural Journalism, its nature and scope of agricultural journalism. **CO2:** How agricultural journalism is similar to and different from other types of journalism. **CO3:** Explain newspapers and magazines as communication media. **CO4:** Analyze agricultural stories, subject matter of the agricultural story and structure of the agricultural story. **CO5:** Select the material, treatment of the story, writing the news lead and the body, readability measures.

20021900 - Agricultural Journalism Lab	**CO1:** How to write the agriculture story. **CO2:** Summarize the agriculture events. **CO3:** Apply the pictures and artwork for the agricultural story. **CO4:** Analyze the different research paper and articles. **CO5:** Evaluate the different interview.

7. CO PO Mapping

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8. CURRICULUM

Course Name: Rainfed Agriculture & Watershed Management

Course Code: 20019300

Course Outline

Unit I

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India ; Soil and climatic conditions prevalent in Rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought.

Unit II

Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of water shed management, factors affecting watershed management.

Course Name: Rainfed Agriculture & Watershed Management Lab

Course Code: 20019400

Course Outline

1. Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons.
2. Studies on cropping pattern of different Rainfed areas in the country and demarcation of Rainfed area on map of India.
3. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops.
4. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation.
5. Studies on cultural practices for mitigating moisture stress.
6. Characterization and delineation of model watershed.
7. Field demonstration on soil & moisture conservation measures.
8. Field demonstration on construction of water harvesting structures.
9. Visit to Rainfed research station/watershed.

Course Name: Protected Cultivation and Secondary Agriculture

Course Code: 20019500

Course Outline

Unit I

Green house technology: Introduction, Types of Green Houses; Plant response to Greenhouse environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipment, materials of construction for traditional and low-cost green houses. Irrigation systems used in greenhouses, typical applications, passive

solar green house, hot air greenhouse heating systems, greenhouse drying. Cost estimation and economic analysis.

Unit II

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. 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, re-circulatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

Course Name: Protected Cultivation and Secondary Agriculture Lab

Course Code: 20019600

Course Outline

1. Study of different type of greenhouses based on shape.
2. Determine the rate of air exchange in an active summer winter cooling system.
3. Determination of drying rate of agricultural products inside green house.
4. Study of greenhouse equipment.
5. Visit to various Post Harvest Laboratories.
6. Determination of Moisture content of various grains by oven drying & infrared moisture methods.
7. Determination of engineering properties (shape and size, bulk density and porosity of bio-materials).
8. Determination of Moisture content of various grains by moisture meter.
9. Field visit to seed processing plant.

Course Name: Diseases of Field and Horticultural Crops and their Management-II

Course Code: 20026900

Course Outline

Unit I

Symptoms, etiology, disease cycle and management of major diseases of following crops: Field crops: Wheat: Rusts, loose smut, karnal bunt, flag smut and ear cockle & tundu. Barley: Stripe, covered smut and molya disease. Sugarcane: Red rot, whip smut, grassy shoot, ratoon stunting and Pokkahboeng. Lentil: Wilt. Mustard: Alternaria blight, white rust and Sclerotinia rot. Gram: Root rot, wilt and Ascochyta blight. Isabgol: Downy mildew. Coriander: Stem gall. Cumin: Wilt, powdery mildew and Alternaria blight. Fenugreek: Powdery mildew.

Unit II

Horticultural crops: Mango: Malformation and black tip. Citrus: Canker, dieback and gummosis. Grape vine: Downy mildew and anthracnose. Apple: Scab. Ber: Powdery mildew. Aonla: Rust. Potato: Late blight, black heart, golden nematode and leaf roll. Onion: Purple blotch. Chilies: Anthracnose and leaf curl. Cabbage: Alternaria leaf spot and black rot. Pea: powdery mildew. Carrot: Alternaria blight. Rose: Dieback and powdery mildew. Marigold: Blight.

Course Name: Diseases of Field and Horticultural Crops and their Management-II Lab

Course Code: 20027000

Course Outline

1.Wheat: Rusts, loose smut, karnal bunt and ear cockle.
2.Barley: Stripe, covered smut and molya disease.
3.Sugarcane: Red rot.
4. Lentil: Wilt.
5. Mustard: Alternaria blight, white rust and Sclerotinia stem rot.
6. Gram: Root rot, wilt and Ascochyta blight.
7. Isabgol: Downy mildew.
8. Cumin: Wilt, powdery mildew and Alternaria blight.
9. Fenugreek: Powdery mildew.
10. Mango: Malformation Citrus: Canker, dieback
11. Ber: Powdery mildew.
12. Potato: Late blight, black heart
13. Onion: Purple blotch.
14. Chillies: Anthracnose and leaf curl.

Note: Students should submit 20 pressed and well-mounted specimens.

Suggested Readings:

1. Cook, A. A. 1981. Diseases of tropical and sub-tropical field fiber and oil plants. Mac Millan Publishing Co. New York.
2. Gupta V K and Paul, Y S 2008. IInd ed. Diseases of field crops. Kalyani Publishing Co. ND.
3. Mehrotra R S and Aggarwal A. 2012. 12th ed. Plant Pathology, Tata McGraw-Hill Publishing Co Ltd. ND.
4. Mishra A , Bohra A and Mishra , A. 2005. Plant Pathology. Agrobios. Jodhpur (India). 119
5. Rangaswamy,G and Mahadevan, A . 2012. 4th ed. Diseases of crop plants in India. Prentice hall of India Pvt Ltd, New Delhi.
6. Gupta ,V. K. 2014. Diseases of Fruit Crops. Kalyani Publishers
7. Chaube H.S. Crop Diseases and Their Management. PHI
8. Singh R S .2007. Plant Diseases.(9th Ed.) Oxford and IBH Publishing Co.Pvt .Ltd .ND
9. Singh , R.P. 2013. Plant Pathology. Kalyani Publishers
10. Tripati, D.P. 2009. Crop Diseases, Kalyani Publishers
11. Gangawane, L.V. and Khilare, V.C. 2008. Crop diseases identification and management. Daya publishing house, New Delhi.
12. Gupta, S.K. and Thind, T.S. 2006. Disease problems in vegetable production. Scientific Publishers, Jodhpur.
13. Pathak, V.N. 1980 Diseases of fruit crops. Oxford and IBH Publishing Co. Pvt. Ltd, . New Delhi.
14. Singh, R.S. 2006. Diseases of fruit crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
15. Singh, R.S.1994 Diseases of vegetable crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.

Course Name: Post-harvest Management and Value Addition of Fruits and Vegetables

Course Code: 20025900

Course Outline

Unit I
Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling.

Unit II
Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -– Concepts and Standards, packaging of products.

Course Name: Post-harvest Management and Value Addition of Fruits and Vegetables Lab
Course Code: 20020000

Course Outline

1. Applications of different types of packaging
2. Containers for shelf life extension.
3. Effect of temperature on shelf life and quality of produce.
4. Demonstration of chilling and freezing injury in vegetables and fruits.
5. Extraction and preservation of pulps and juices.
6. Preparation of jam, jelly,RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products.
7. Quality evaluation of products -- physico-chemical and sensory.
8. Visit to processingunit/ industry.

Course Name: Management of Beneficial Insects

Course Code:20020100

Course Outline

Unit I
Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation,

mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons.

Unit II

Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection. Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control. 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.

Course Name: Management of Beneficial Insects Lab

Course Code:20020200

Course Outline

1. Honey bee species, castes of bees.
2. Beekeeping appliances and seasonal management, bee enemies and disease.
3. Bee pasturage, bee foraging and communication.
4. Types of silkworm, voltinism and biology of silkworm.
5. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves.
6. Species of lac insect, host plant identification.
7. Identification of other important pollinators weed killers and scavengers.
8. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.
9. Identification and techniques for mass multiplication of natural enemies.

Course Name: Crop Improvement-II (Rabi crops)

Course Code:20020300

Course Outline

Unit I

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters;

Unit II

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); Hybrid seed production technology of rabi crops. Ideotype concept and climate resilient crop varieties for future.

Course Name: Crop Improvement-II (Rabi crops) Lab

Course Code: 20020400

Course Outline

1. Floral biology, emasculation and hybridization techniques in different crop species namelyWheat, Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chili, Onion
2. Handling of Germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods
3. Study of field techniques for seed production and hybrid seeds production in Rabi crops
4. Estimation of heterosis, inbreeding depression and heritability
5. Layout of field experiments
6. Study of quality characters
7. study of donor parents for different characters
8. Visit to seed production plots
9. Visit to AICRP plots of different field crops

Course Name: Practical Crop Production –II (Rabi crops)

Course Code:20020500

Course Outline

1. Crop planning
2. Raising field crops in multiple cropping systems
3. Field preparation, seed, treatment, nursery raising, sowing, nutrient, water
4. Weed management
5. Management of insect-pests diseases of crops
6. Harvesting, threshing, drying winnowing
7. Storage and marketing of produce
8. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies.
9. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

Course Name: Principles of Organic Farming

Course Code:20020600

Course Outline

Unit I

Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming.

Unit II

Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

Course Name: Principles of Organic Farming Lab

Course Code:20020700

Course Outline

1. Visit of organic farms to study the various components and their utilization
2. Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis
3. Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management
4. Cost of organic production system
5. Post harvest management
6. Quality aspect, grading
7. Packaging and handling

Course Name: Farm Management, Production & Resource Economics

Course Code: 20020800

Course Outline

Unit I

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship, law of Equi-marginal/or principles of opportunity cost and law of comparative advantage. 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, family labor income and farm business income.

Unit II

Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. 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. 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.

Unit III

Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance– weather based crop insurance, features, determinants of compensation. Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions, Important issues in

economics and management of common property resources of land, water, pasture and forest resources etc.

Course Name: Farm Management, Production & Resource Economics Lab

Course Code:20020900

Course Outline

1. Preparation of farm layout.
2. Determination of cost of fencing of a farm.
3. Computation of depreciation cost of farm assets.
4. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources.
5. Determination of most profitable level of inputs use in a farm production process.
6. Determination of least cost combination of inputs.
7. Selection of most profitable enterprise combination.
8. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises.
9. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.
10. Collection and analysis of data on various resources in India.

Course Name: Principles of Food Science and Nutrition

Course Code:20021000

Course Outline

Unit I

Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.); Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavors, colors, miscellaneous bio-actives, important reactions);

Unit II

Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods); Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.); Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/modified diets, Menu planning, New trends in food science and nutrition.

Course Name: Ability and Skill Enhancement VI
Course Code:20021100

Course Outline – Final Assessment – Report/Presentation

Unit I: Verbal Reasoning & English Aptitude
Logical Sequence of Words, Verbal Analogy, Classification, Blood Relation Test, Syllogism, Reading Comprehension.

Unit II: Winning Attitude
Attitude is the most important thing for success, how to develop a winning attitude, what is it, when we need it, what is mindset, how to have a winning and positive mindset, how to win in difficult situations, Positive thinking, passion, dedication, confidence, well preparation, focus, hard work, planning, never give up, etc - some traits that help in developing winning attitude.

Unit III: Understanding the News
Reading Current News, Comparing &Analyzing the news, Write an editorial, News Vocabulary, Presentation on any major news (political/social/sports/economics).

Unit IV: Be a Journalist
Chat Show, Panel Discussion, Parliamentary debate, News Inspired Theatrical Performance.

Unit V: Report
Preparing a report on major National/International News – Insights/ review of major news papers and news channels.

Note: The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

Course Name: Hi-tech. Horticulture

Course Code: 20021200

Course Outline

Unit I

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods, Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC, pH based fertilizer scheduling, canopy management, high density orcharding,

Unit II

Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), application of

precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.

Course Name: Hi-tech. HorticultureLab

Course Code: 20021300

Course Outline

1. Types of polyhouses and shade net houses.
2. Intercultural operations, tools and equipment identification and application.
3. Micro propagation.
4. Nursery-portrays.
5. Micro-irrigation.
6. EC, pH based fertilizer scheduling.
7. Canopy management.
8. Visit to hi-tech orchard/nursery.

Suggested Readings

1. Hartman, HT and Kester, DE (1986). Plant propagation principles and practices. Prentice Hall of India Pvt. Ltd., Bombay.
2. Gill, SS. Bal, JS and Sadhu, AS (1985). Raising Fruit Nursery, Kalyani Publishers, New Delhi.
3. Chadha, K.L. Handbook of Horticulture (2002) ICAR, New Delhi.
4. Chadda K.L Advanced in Horticulture (2009) Malhotra Publishing House, New Delhi.
5. Anonymous 2003. Proc. All India Seminar on Potential and Prospects for Protective Cultivation. Organised by Institute of Engineers, Ahmednagar. Dec.12-13, 2003.
6. Chandra,S& Som,V.2000. Cultivating Vegetables in Green House. Indian Horticulture 45: 17- 18.
7. Prasad S & Kumar U. 2005. Greenhouse Management for Horticultural Crops. 2nd Ed. Agrobios.
8. Tiwari GN. 2003. Green House Technology for Controlled Environment. Narosa Publ. House.

Course Name: Protected Cultivation

Course Code: 20021400

Course Outline

Unit I

Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate. Cladding material involved in greenhouse/ poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers.

Unit II

Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops. Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, lilium, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc. Cultivation of economically important medicinal and aromatic plants. Off-season production of flowers and vegetables. Insect pest and disease management.

Course Name: Protected Cultivation Lab

Course Code: 20021500

Course Outline

1. Raising of seedlings and saplings under protected conditions.
2. Use of protrays in quality planting material production.
3. Bed preparation.
4. Planting of crop for production.
5. Inter cultural operations.
6. Soil EC and pH measurement.
7. Regulation of irrigation and fertilizers through drip, fogging and misting.

Course Name: System Simulation and Agro-advisory

Course Code: 20021600

Course Outline

Unit I

System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams. Evaluation of crop responses to weather elements; Elementary crop growth models; calibration, validation, verification and sensitivity analysis.

Unit II

Potential and achievable crop production- concept and modelling techniques for their estimation. Crop production in moisture and nutrients limited conditions; components of soil water and nutrients balance. Weather forecasting, types, methods, tools & techniques, forecast verification; Value added weather forecast, ITK for weather forecast and its validity; Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. Use of crop simulation model for preparation of Agro-advisory and its effective dissemination.

Course Name: System Simulation and AgroadvisoryLab

Course Code: 20021700

Course Outline

1. Preparation of crop weather calendars.
2. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts.
3. Working with statistical and simulation models for crop growth.
4. Potential & achievable production; yield forecasting, insect & disease forecasting models.
5. Simulation with limitations of water and nutrient management options.
6. Sensitivity analysis of varying weather and crop management practices.
7. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast.
8. Feedback from farmers about the agroadvisory.

Course Name: Agricultural Journalism

Course Code: 20021800

Course Outline

Unit I

Agricultural Journalism: The nature and scope of agricultural journalism characteristics and training of the agricultural journalist, how agricultural journalism is similar to and different from other types of journalism. Newspapers and magazines as communication media: Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. Form and content of newspapers and magazines: Style and language of newspapers and magazines, parts of newspapers and magazines.

Unit II

The agricultural story: Types of agricultural stories, subject matter of the agricultural story, structure of the agricultural story. Gathering agricultural information: Sources of agricultural information, interviews, coverage of events, abstracting from research and scientific materials, wire services, other agricultural news sources. Writing the story: Organizing the material, treatment of the story, writing the news lead and the body, readability measures. Illustrating agricultural stories: Use of photographs, use of artwork (graphs, charts, maps, etc.), writing the captions. Editorial mechanics: Copy reading, headline and title writing, proofreading, lay outing.

Course Name: Agricultural Journalism Lab

Course Code: 20021900

Course Outline

1. Practice in interviewing.
2. Covering agricultural events.
3. Abstracting stories from research and scientific materials and from wire services.
4. Writing different types of agricultural stories.
5. Selecting pictures and artwork for the agricultural story.
6. Practice in editing, copy reading, headline and title writing, proofreading, layouting.
7. Testing copy with a readability formula.
8. Visit to a publishing office.

Suggested Readings

1. Ray, G. L. and Mondal, S. 2005. Journalism including communication, Farm and Rural Journalism, Public Relations, Kalyani Publication, Ludhiana.
2. Bhaskaranet. al. 2008. Farm Journalism and media management. Agrotech Publishing Company.
3. Narayanaswamy V R. 1979. Strengthen your writing. Orient Longman, New Delhi.
4. Kamat,M.G., Writing for farm families.
5. Indu Grover. Mass media and Communication.
6. Arvind Kumar (1999). The Electronic Media. Anmol Publications, New Delhi.

7. Bhatt, S.C. (1993) Broadcast Journalism. Basic Principles. HarAnand Publications, Delhi
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9. Lesson Plans

20019300 – Rainfed Agriculture & Watershed Management

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

20019400 –Rainfed Agriculture & Watershed Management Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	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
Unit-I	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
Unit-I	Studies on cropping pattern of different Rainfed areas in the country and demarcation of Rainfed area on map of India	P-3	Practical
Unit-I	Studies on cropping pattern of different Rainfed areas in the country and demarcation of Rainfed area on map of India	P-4	Practical
Unit-I	Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops	P-5	Practical
Unit-I	Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops	P-6	Practical
Unit-I	Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation	P-7	Practical
Unit-I	Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation	P-8	Practical
Unit-I	Studies on cultural practices for mitigating moisture stress	P-9	Practical
Unit-I	Studies on cultural practices for mitigating moisture stress	P-10	Practical
Unit-I	Characterization and delineation of model watershed	P-11	Practical
Unit-I	Characterization and delineation of model watershed	P-12	Practical
Unit-I	Field demonstration on soil & moisture conservation measures	P-13	Practical
Unit-I	Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed	P-14	Practical
Unit-I	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
Unit-I	Introduction to Greenhouse Technology	C-1	Lecture
Unit-I	Types of Greenhouses	C-2	Lecture
Unit-I	Plant Response to Greenhouse Environment	C-3	Lecture
Unit-I	Planning and Design of Greenhouses	C-4	Lecture
Unit-I	Design Criteria for Cooling and Heating	C-5	Lecture
Unit-I	Clarification Class	C-6	Clarification Class
Unit-I	Greenhouse Equipment and Construction Materials	C-7	Lecture
Unit-II	Engineering Properties of Cereals, Pulses, and Oilseeds	C-8	Lecture
Unit-II	Drying and Dehydration Methods	C-9	Lecture
	Class Assignment	C-10	Class Assignment
Unit-II	Commercial Grain Dryers	C-11	Lecture
Unit-II	Moisture Measurement and Drying Theory	C-12	Lecture
	Home Assignment		Home Assignment
Unit-II	Material Handling Equipment	C-13	Lecture
Unit-II	Working and Selection of Material Handling Equipment	C-14	Lecture
Unit-II	Commercial Grain Dryers	C-15	Lecture

20019600–Protected Cultivation and Secondary Agriculture Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Study of different type of greenhouses based on shape	P-1	Practical
Unit-I	Determine the rate of air exchange in an active summer winter cooling system	P-2, 3	Practical
Unit-I	Determination of drying rate of agricultural products inside green house	P-4, 5	Practical
Unit-I	Study of greenhouse equipment's	P-6, 7	Practical
Unit-I	Study of greenhouse equipment's	P-8	Practical
Unit-I	Determination of Moisture content of various grains by oven drying & infrared moisture methods	P-9, 10	Practical
Unit-I	Determination of Moisture content of various grains by oven drying & infrared moisture methods	P-11 , 12	Practical
Unit-I	Determination of Moisture content of various grains by moisture meter	P-13, 14	Practical
Unit-I	Field visit to seed processing plant	P-15	Field Visit

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

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction of Diseases- LAB	C-1	Lecture
Unit-I	Isolation of Plant Pathogens	C-2	Lecture
Unit-I	Structure of Plant Pathogens	C-3	Lecture
Unit-I	Study on Fusarium Life Cycle	C-4	Lecture
Unit-I	Study on Bacterial Life Cycle	C-5	Lecture
Unit-I	Study on Fungal Life Cycle	C-6	Lecture
Unit-I	Taxonomy	C-7	Lecture
Unit-I	Systematic Position	C-8	Presentation
Unit-I	Citrus Diseases	C-9	Lecture
Unit-I	Grape and Apple diseases	C-10	Lecture
Unit-I	Class Assignment	C-11	Class Assignment
Unit-I	Clarification Class	C-12	Clarification Class
Unit-I	Strawberry and Peach diseases	C-13	Lecture
Unit-I	Potato diseases	C-14	Lecture
Unit-I	Class Assignment	C-15	Class Assignment
Unit-I	Onion and Cucurbit diseases	C-16	Lecture
	Home Assignment		Home Assignments
Unit-I	Garlic diseases	C-17	Lecture
Unit-I	Chilly diseases	C-18	Lecture
	Presentation	C-19	Presentation
Unit-I	Turmeric and Coriander diseases	C-20	Lecture
Unit-I	Class Assignment	C-21	Class Assignment
Unit-I	Marigold Diseases	C-22	Lecture
Unit-I	Rose Diseases	C-23	Lecture
	Home Assignments		Home Assignments
Unit-I	Carrot: Alternaria blight	C-24	Lecture

Unit-I	Pea: powdery mildew	C-25	Lecture
Unit-I	Cabbage: Alternaria leaf spot and black rot	C-26	Lecture
	Presentation	C-27	Presentation
	Class Assignment	C-28	Class Assignment
Unit-I	Carrot Diseases	C-29	Lecture
Unit-I	Potato Disease	C-30	Lecture

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

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Wheat: Rusts, loose smut, karnal bunt and ear cockle.	P-1	Practical
Unit-I	Barley: Stripe, covered smut and molya disease.	P-2	Practical
Unit-I	Sugarcane: Red rot.	P-3	Practical
Unit-I	Lentil: Wilt.	P-4	Practical
Unit-I	Mustard: Alternaria blight, white rust and Sclerotinia stem rot.	P-5	Practical
Unit-I	Gram: Root rot, wilt and Ascochyta blight.	P-6	Practical
Unit-I	Isabgol: Downy mildew.	P-7	Practical
Unit-I	Cumin: Wilt, powdery mildew and Alternaria blight.	P-8	Practical
Unit-I	Fenugreek: Powdery mildew.	P-9	Practical
Unit-I	Mango: Malformation Citrus: Canker, dieback	P-10	Practical
Unit-I	Ber: Powdery mildew.	P-11	Practical
Unit-I	Potato: Late blight, black heart	P-12	Practical
Unit-I	Onion: Purple blotch.	P-13	Practical
Unit-I	Chillies: Anthracnose and leaf curl.	P-14	Practical
Unit-I	Chillies: Anthracnose and leaf curl.	P-15	Practical

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

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Importance of post-harvest processing of fruits and vegetables	C-1	Lecture
Unit-I	extent and possible causes of post-harvest losses;	C-2	Lecture
Unit-I	Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening;	C-3	Lecture
Unit-I	Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening;	C-4	Lecture
Unit-I	Respiration and factors affecting respiration rate	C-5	Lecture
	Class Room Assignment	C-6	Class Assignment
Unit-I	Respiration and factors affecting respiration rate	C-7	Lecture
Unit-I	Harvesting and field handling.	C-8	Lecture
Unit-II	Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation;	C-9	Lecture
	Home Assignments		Home Assignments
Unit-II	Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages.	C-10	Lecture
	Home Assignments		Home Assignments
Unit-II	Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages.	C-11	Lecture
Unit-II	Tomato products- Concepts and Standards;	C-12	Lecture
Unit-II	Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying.	C-13	Lecture
Unit-II	Clarification Class	C-14	Clarification Class
Unit-II	Canning -– Concepts and Standards, packaging of products.	C-15	Lecture

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

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Applications of different types of packaging, containers for shelf-life extension	P-1 , 2	Practical
Unit-I	Effect of temperature on shelf life and quality of produce	P-3 , 4	Practical
Unit-I	Demonstration of chilling and freezing injury in vegetables and fruits	P-5 , 6	Practical
Unit-I	Extraction and preservation of pulps and juices	P-7 , 8	Practical
Unit-I	Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products.	P-9 , 10	Practical
Unit-I	Quality evaluation of products -- physio-chemical and sensory. Visit to processing unit/ industry	P-11 , 12	Practical
Unit-I	Industrial Visit	P-13, 14	Industrial Visit
Unit-I	Field Inspection	P-15	Practical

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 behavior of honey bees	C-3	Lecture
Unit-I	Types of bee hives and the enemies that occur in hive	C-4	Lecture
Unit-I	Class Assignment	C-5	Class Assignment
Unit-I	Various silkworm types along with their biology and voltinism	C-6	Lecture
Unit-I	Cultivation practices of mulberry	C-7	Lecture
Unit-I	Methods of harvesting and preservation of mulberry leaves, rearing appliances and methods of disinfection.	C-8	Lecture
	Home Assignment		Home Assignment
Unit-I	Silkworm rearing, mounting and harvesting cocoons	C-9	Lecture
Unit-I	pests and diseases of silkworm and their management	C-10	Lecture
Unit-I	Species, morphology, biology and lac production	C-11	Lecture
	Presentation	C-12	Presentation
Unit-I	Lac products and uses	C-13	Lecture
Unit-I	Mass production techniques of major parasitoids and predators	C-14	Lecture
Unit-I	Important species of pollinators, weed killers and scavengers	C-15	Lecture

20020200 –Management of Beneficial Insects lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Honey bee species, castes of bees	P-1	Practical
Unit-I	Beekeeping appliances and seasonal management	P-2	Practical
Unit-I	Bee enemies and disease	P-3	Practical
Unit-I	Bee pasturage, bee foraging and communication	P-4	Practical
Unit-I	Types of silkworms, voltinism and biology of silkworm	P-5	Practical
Unit-I	Mulberry cultivation, mulberry varieties	P-6	Practical
Unit-I	Methods of harvesting and preservation of leaves	P-7	Practical
Unit-I	Species of lac and host plant identification	P-8	Practical
Unit-I	Identification of other important pollinators, weed killers and scavengers	P-9,10	Practical
Unit-I	Identification of natural enemies	P-11,12	Practical
Unit-I	Techniques for mass multiplication of natural enemies	P-13,14	Practical
Unit-I	Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.	P-15	Industrial Visit

20020300 –Crop Improvement-II (Rabi crops)

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction Aim and objective of crop Improvement	C-1	Lecture
Unit-I	Centers of Origin and Distribution of Species	C-2	Lecture
Unit-I	Plant Genetic Resources: Utilization and Conservation	C-3	Lecture
Unit-I	Genetics of Qualitative Characters	C-4	Lecture
Unit-I	Genetics of Quantitative Characters	C-5	Lecture
Unit-II	Major breeding objectives, conventional breeding methods (selection, hybridization, mutation breeding, etc.),	C-6	Lecture
	Presentation	C-7	Presentation
Unit-II	Modern breeding techniques (biotechnology, marker-assisted selection, genomic selection), their applications and examples.	C-8	Lecture
Unit-II	Development of Hybrids and Varieties: Yield and Adaptability	C-9	Lecture
	Class Assignment	C-10	Class Assignment
Unit-II	Development of Hybrids and Varieties: Stability and Stress Tolerance	C-11	Lecture
Unit-II	Breeding for Quality Traits	C-12	Lecture
	Home Assignment		Home Assignment
Unit-II	Hybrid Seed Production Technology of Rabi Crops	C-13	Lecture
Unit-II	Ideotype Concept and Climate Resilient Crop Varieties	C-14	Lecture
	Clarification class	C-15	Clarification class

20020400 –Crop Improvement-II (Rabi crops) Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Floral Biology	P-1	Practical
Unit-I	Emasculation Techniques in Wheat, Oat, Barley	P-2	Practical
Unit-I	Practical hybridization methods in Chickpea, Lentil, Field Pea	P-3	Practical
Unit-I	Practical on hybrid seed production techniques in Safflower, Potato	P-4	Practical
Unit-I	Study of Heritability	P-5	Practical
Unit-I	Estimation of Heterosis	P-6	Practical
Unit-I	Inbreeding Depression	P-7	Practical
Unit-I	Germplasm Handling	P-8	Practical
Unit-I	Field techniques for seed production in Rabi crops	P-9	Practical
Unit-I	Methods for producing hybrid seeds in selected Rabi crops	P-10	Practical
Unit-I	Practical exercises on estimating heterosis, inbreeding depression, and heritability	P-11	Practical
Unit-I	Field Experiment Layout	P-12	Practical
Unit-I	Evaluation of quality characters and identification of donor parents for different traits in Rabi crops	P-13	Practical
Unit-I	Seed Production Plot Visit	P-14	Practical
Unit-I	All India Coordinated Research Project (AICRP) Plot Visit	P-15	Practical

20020500 –Practical Crop Production –II (Rabi crops)

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Crop planning	C-1, 2	Lecture
Unit-I	Raising field crops in multiple cropping systems	C-3, 4	Lecture
Unit-I	Field preparation, seed, treatment, nursery raising, sowing, nutrient, water	C-5,6	Lecture
	Presentation	C-7	Presentation
	Home Assignment		Home Assignment
Unit-I	Weed management	C-8, 9,10	Lecture
Unit-I	Management of insect-pests diseases of crops	C-11, 12, 13	Lecture
Unit-I	Class Assignment	C-14	Class Assignment
Unit-I	Harvesting, threshing, drying winnowing	C-15, 16, 17	Lecture
	Quiz	C-18	Quiz
Unit-I	Storage and marketing of produce	C-19, 20, 21	Lecture
Unit-I	The emphasis will be given to seed production, mechanization, resource conservation.	C-22, 23, 24	Lecture
Unit-I	Clarification class	C-23	Clarification Class
Unit-I	Preparation of balance sheet including cost of cultivation, net returns per student	C-24, 25, 26	Lecture
Unit-I	Management of insect-pests diseases of crops	C-27	Lecture
	Home Assignment		Home Assignment
Unit-I	Storage and marketing of produce	C-28	Lecture
Unit-I	The emphasis will be given to seed production, mechanization, resource conservation.	C-29, 30	Lecture

20020600 –Principles of Organic Farming

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Organic farming, principles and its scope in India	C-1	Lecture
Unit-I	Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture	C-2	Lecture
Unit-I	Organic ecosystem and their concepts	C-3	Lecture
Unit-I	Organic nutrient resources and its fortification	C-4	Lecture
Unit-I	Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming	C-5	Lecture
Unit-I	Clarification Class	C-6	Clarification Class
Unit-II	Fundamentals of insect, pest, disease and weed management under organic mode of production	C-7	Lecture
	Class Room Assignment	C-8	Class Assignment
Unit-II	Operational structure of NPOP	C-9	Lecture
Unit-II	Certification process and standards of organic farming	C-10	Lecture
	Quiz	C-11	Quiz
Unit-II	Processing, leveling, economic considerations and viability	C-12	Lecture
Unit-II	marketing and export potential of organic products	C-13	Lecture
Unit-II	Clarification Class	C-14	Clarification Class
	Presentation	C-15	Presentation

20020700 –Principles of Organic Farming Lab

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

20020800 –Farm Management, Production & Resource Economics

S. No.	Particulars	Class No.	Pedagogy of Class
Unit-I	Meaning and concept of farm management, objectives and relationship with other sciences, Meaning and definition of farms, its types and characteristics, factor determining types and size of farms	C-1	Lecture
Unit I	Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm	C-2	Lecture
Unit I	factor-product, factor-factor and product -product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage	C-3	Lecture
Unit-I	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, Family labor income and farm business income	C-4	Lecture
	Clarification Class	C-5	Clarification Class
Unit-II	Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises	C-6	Lecture
Unit-II	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	C-7	Lecture
	Class Assignment	C-8	Class Assignment
Unit-II	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	C9	Lecture
Unit-III	Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies	C-10	Lecture
	Presentation	C-11	Presentation
Unit-III	Crop/livestock/machinery insurance– weather-based crop insurance, features, determinants of compensation. Concepts of resource economics,	C-12	Lecture
Unit-III	Differences between NRE and agricultural economics, unique properties of natural resources. Positive and	C-13	Lecture

	negative externalities in agriculture		
Unit-III	Inefficiency and welfare loss, solutions,	C-14	Lecture
	Home Assignment		Home Assignment
Unit-III	Important issues in economics and management of common property resources of land, water, pasture and forest resources	C-15	Lecture

20020900 –Farm Management, Production & Resource Economics Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Preparation of farm layout.	P-1	Practical
Unit-I	Determination of cost of fencing of a farm.	P-2	Practical
Unit-I	Computation of depreciation cost of farm assets.	P-3	Practical
Unit-I	Application of equi-marginal returns/opportunity cost principle in allocation of farm resources.	P-4,5	Practical
Unit-I	Determination of most profitable level of inputs use in a farm production process.	P-6,7	Practical
Unit-I	Determination of least cost combination of inputs.	P-8, 9	Practical
Unit-I	Selection of most profitable enterprise combination.	P-10,11	Practical
Unit-I	Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises.	P-12,13	Practical
Unit-I	Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.	P-14	Practical
Unit-I	Collection and analysis of data on various resources in India.	P-15	Practical

20021000– Principles of Food Science and Nutrition

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.	C-1, 4	Lecture
Unit-I	Food composition and chemistry (water, carbohydrates)	C-6-, 8	Lecture
	Classroom Assignment	C-9	Class Assignment
Unit-I	Proteins, fats, vitamins and minerals	C-10, 11	Lecture
Unit-I	Flavors, colors, miscellaneous bio-actives and important reactions	C-12, 13	Lecture
	Clarification Class	C-14	Clarification Class
	Home Assignment		Home Assignment
	Presentation	C-15	Presentation
Unit-II	Food microbiology (bacteria, yeast, molds)	C-16	Lecture
Unit-II	Food microbiology (Spoilage of fresh & processed foods, Production of fermented foods);	C-17, 18	Lecture
	Quiz	C-19	Quiz
Unit-II	Principles and methods of food processing and preservation (Use of heat, low temperature, chemicals, radiation, drying etc.)	C-20, 21	Lecture
	Classroom Assignment	C-22	Class Assignment
	Home Assignment		Home Assignment
Unit-II	Food and Nutrition; Malnutrition (over and under nutrition), nutritional disorders	C-23, 24	Lecture
	Presentation II	C-25	Presentation
Unit-II	Energy metabolism (carbohydrate, fat, proteins)	C-26, 27	Lecture
Unit-II	Balanced/modified diets, Menu planning, New trends in food science and nutrition	C-28	Lecture
	Clarification Class II	C-29	Clarification Class
	Activity I	C-30	Activity

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	Logical Sequence of Words, Verbal Analogy	C-2	Lecture
Unit-I	Class Assignment	C-3	Class Assignment
Unit-I	Classification, Blood Relation Test, Syllogism, Reading Comprehension.	C-4	Lecture
Unit-I	Class Assignment	C-5	Class Assignment
Unit-II	Attitude is the most important thing for success	C-6	Lecture
Unit-II	Class Assignment	C-7	Class Assignment
Unit-II	How to develop a winning attitude: what is it, when we need it	C-8	Lecture
Unit-II	How to develop a winning attitude: what is it, when we need it	C-9 ,10	Lecture
Unit-II	how to develop a winning attitude: what is it, when we need it	C-11	Lecture
Unit-II	Quiz	C-12	Quiz
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	Home Assignment		Home 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-IV	Chat Show, Panel Discussion, Parliamentary debate, News Inspired Theatrical Performance.	C-25 , 25	Lecture

Unit-IV	Chat Show, Panel Discussion, Parliamentary debate, News Inspired Theatrical Performance.	C-26	Lecture
Unit-IV	Clarification Class	C-27	Clarification Class
Unit-V	Preparing a report on major National/International News – Insights/ review of major newspapers and news channels.	C-28 ,29, 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
	Home Assignment		Home Assignment
Unit-I	high density orcharding	C-11	Lecture
Unit-II	Components of precision farming	C-12	Lecture
Unit-II	Remote sensing, Geographical Information System (GIS),	C-13	Lecture
	Class Assignment	C-14	Class 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 ,19	Lecture
	Class Assignment	C-20	Class 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
	Clarification Class	C-23	Clarification Class

Unit-II	Application of precision farming in horticultural crops (fruits, vegetables and ornamental crops);	C-24 , 25	Lecture
Unit-II	Mechanized harvesting of produce.	C-26	Lecture
Unit-II	Mechanized harvesting of produce.	C-27 , 29	Lecture
	Activity	C-30	Activity

20021300 Hi-tech. Horticulture Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Types of poly houses and shade net houses	C-1	Lecture
Unit-I	Types of poly houses and shade net houses	C-2	Practical
Unit-I	Intercultural operations, tools and equipment identification and application	C-3	Practical
Unit-I	Intercultural operations, tools and equipment identification and application	C-4	Practical
Unit-I	Micro propagation	C-5	Practical
Unit-I	Micro propagation	C-6	Practical
Unit-I	Nursery-portrays	C-7	Practical
Unit-I	Nursery-portrays	C-8	Practical
Unit-I	Micro-irrigation, EC, pH-based fertilizer scheduling,	C-9	Practical
Unit-I	Micro-irrigation, EC, pH-based fertilizer scheduling,	C-10	Practical
Unit-I	Canopy management	C-11	Practical
Unit-I	Canopy management	C-12	Practical
Unit-I	Canopy management	C-13	Practical
Unit-I	Visit to hi-tech orchard/nursery	C-14	Practical
Unit-I	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	Class Assignment	C-14	Class Assignment
Unit-II	Greenhouse cultivation of important horticultural crops	C-15	Lecture
Unit-II	rose, carnation, chrysanthemum	C-16	Lecture
Unit-II	Class Assignment	C-17	Class Assignment
Unit-II	gerbera, orchid, anthurium, lilium	C-18	Lecture
Unit-II	Activity	C-19	Activity
Unit-II	tulip, tomato, bell pepper, cucumber	C-20	Lecture
Unit-II	Clarification Class	C-21	Clarification Class
Unit-II	Strawberry, pot plants, etc	C-22	Lecture

Unit-II	Class Assignment	C-23	Class Assignment
Unit-II	Cultivation of economically important medicinal and aromatic plants.	C-24	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	Insect pest and disease management	C-29	Lecture
Unit-II	Off-season production of flowers and vegetables.	C-30	Lecture

20021500 Protected Cultivation Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Raising of seedlings and saplings under protected conditions	C-1	Lecture
Unit-I	Raising of seedlings and saplings under protected conditions	C-2	Practical
Unit-I	Use of portrays in quality planting material production	C-3	Practical
Unit-I	Use of portrays in quality planting material production	C-4	Practical
Unit-I	Bed preparation and planting of crop for production,	C-5	Practical
Unit-I	Bed preparation and planting of crop for production,	C-6	Practical
Unit-I	Inter cultural operations,	C-7	Practical
Unit-I	Inter cultural operations,	C-8	Practical
Unit-I	Soil EC and pH measurement	C-9	Practical
Unit-I	Soil EC and pH measurement	C-10	Practical
Unit-I	Regulation of irrigation and fertilizers through drip,	C-11	Practical
Unit-I	Regulation of irrigation and fertilizers through drip,	C-12	Practical
Unit-I	Regulation of irrigation and fertilizers through drip,	C-13	Practical
Unit-I	Fogging ad misting	C-14	Practical
Unit-I	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-11	Lecture
Unit-I	Calibration, validation, verification and sensitivity analysis.	C-12	Lecture
Unit-II	Potential and achievable crop production- concept and modeling techniques for their estimation.	C-13	Lecture
Unit-II	Class Assignment	C-14	Class 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	Assignment	C-17	Assignment
Unit-II	Weather forecasting, types, methods	C-18	Lecture
Unit-II	Activity	C-19	Activity
Unit-II	Tools & techniques, forecast verification	C-20	Lecture
Unit-II	Clarification Class	C-21	Clarification Class
Unit-II	Components of soil water and nutrients balance	C-22	Lecture
Unit-II	Value added weather forecast	C-23	Lecture
Unit-II	Clarification Class	C-24	Clarification Class
Unit-II	Activity	C-25	Activity

Unit-II	ITK for weather forecast and its validity;	C-26	Lecture
Unit-II	Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast.	C-27	Lecture
	Home Assignment		Home Assignment
Unit-II	Use of crop simulation model for preparation of Agro-advisory and its effective dissemination.	C-28	Lecture
Unit-II	Activity	C-29	Activity
Unit-II	Clarification Class	C-30	Clarification Class

20021700 System Simulation and Agro-advisory Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Preparation of crop weather calendars	C-1	Lecture
Unit-I	Preparation of crop weather calendars	C-2	Practical
Unit-I	Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts.	C-3	Practical
Unit-I	Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts.	C-4	Practical
Unit-I	Working with statistical and simulation models for crop growth.	C-5	Practical
Unit-I	Working with statistical and simulation models for crop growth.	C-6	Practical
Unit-I	Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options.	C-7	Practical
Unit-I	Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options.	C-8	Practical
Unit-I	Sensitivity analysis of varying weather and crop management practices	C-9	Practical
Unit-I	Sensitivity analysis of varying weather and crop management practices	C-10	Practical
Unit-I	Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast	C-11	Practical
Unit-I	Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast	C-12	Practical
Unit-I	Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast	C-13	Practical
Unit-I	Feedback from farmers about the agro advisory.	C-14	Practical
Unit-I	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	Class Assignment	C-11	Class 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	Presentation	C-24	Presentation
Unit-II	Use of photographs,	C-25	Lecture
Unit-II	Use of artwork (graphs, charts, maps, etc.), writing the captions.	C-26	Lecture
Unit-II	Editorial mechanics:	C-27	Lecture
Unit-II	Copy reading, headline and title writing	C-28	Lecture
Unit-II	Proof reading lay outing.	C-29	Lecture
Unit-II	Clarification	C-30	Clarification

20021900 –Agricultural Journalism Lab

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

Note: This is a tentative lesson plan. The same may change from faculty to faculty as per the teaching pedagogy adopted by the faculty.

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