Detailed Course Scheme

Bachelor of Science (Hons.)

Agriculture

Semester-IV

(2023-27)

DOC202407170010

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 –IV

S.No.	CourseCode	CourseName	L	T	P	Credits
1.	20014200	Crop Production Technology–II(*Rabi Crops*)	1	0	0	1
2.	20014300	Crop Production Technology–II(*Rabi Crops*)Lab	0	0	2	1
3.	20014400	Production Technology for ornamental Crops, MAP and Landscaping	1	0	0	1
4.	20014500	Production Technology for ornamental Crops, MAP and Landscaping Lab	0	0	2	1
5.	20014600	Renewable Energy and Green Technology	1	0	0	1
6.	20014700	Renewable Energy and Green Technology Lab	0	0	2	1
7.	20014800	Problematic Soils and their Management	2	0	0	2
8.	20014900	Production Technology for Fruit and Plantation Crops	1	0	0	1
9.	20015000	Production Technology for Fruit and Plantation Crops Lab	0	0	2	1
10.	20015100	Principles of Seed Technology	1	0	0	1
11.	20015200	Principles of Seed Technology lab	0	0	4	2
12.	20015500	Agricultural Marketing Trade & Prices	2	0	0	2
13.	20015600	Agricultural Marketing Trade & Prices Lab	0	0	2	1
14.	20026400	Introductory Agro-meteorology & Climate Change	1	0	0	1
15.	20026500	Introductory Agro-meteorology & Climate Change Lab	0	0	2	1
16.	20026800	Farming System & Sustainable Agriculture	1	0	0	1
17.		Human Values & Ethics**	1	0	0	1
18.	-	Elective-I	2	0	0	2

19.	-	Elective -I Lab	0	0	2	1
20.	20015900	Ability and Skill Enhancement IV	2	0	0	2
21.	99003300	Workshops &Seminars/ Human Values & Social Service/NCC/NSS	-	-	-	1
	Total		**16**	**0**	**18**	**26**

**Non-gradial courses

Electives

Elective	Course Code	Course Name
Elective I	20016000	Agribusiness Management
	20016100	Agribusiness Management Lab
	20016200	Agrochemicals
	20016300	Agrochemicals Lab
	20016400	Commercial Plant Breeding
	20016500	Commercial Plant Breeding Lab
	20016600	Landscaping
	20016700	Landscaping 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 evaluated internally 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
20014200 – Crop Production Technology –II (*Rabi* Crops)	**CO1:** Build the knowledge on the *Rabi* season crops, its classification and importance in agriculture and national economy. **CO2:** Examine the production techniques of *Rabi* crops and their origin, economic importance, geographical distribution and botanical description. **CO3:** Assess the sowing methods of *Rabi* crops in the field and their management. **CO4:** Discuss all *Rabi* crops (wheat, barley, pea, chickpea, mustard, sugarcane etc.) with their cultivation practices. **CO5:** Perceive the outcomes obtained by different breeding methods ensured for sustainable *Rabi* crop production
20014300 - Crop Production Technology –II (*Rabi* Crops) Lab	**CO1:** To know the sowing methods of different *Rabi* crops. **CO2:** Discuss about morphological characteristics of *Rabi* crops. **CO3:** Determine yield attributing characteristics. **CO4:** Examine sugar content of sugar crops. **CO5:** Importance of oil producing, medicinal and forage crops.
20014400 - Production Technology for Ornamental Crops, MAP and Landscaping	**CO1:** Identify different types of ornamental and medicinal crops. **CO2:** Examine various principles of landscaping, uses of landscape trees, shrubs and climbers, production technology of important ornamental crops, etc. **CO3:** Determine about Demonstrate various Package of practices for loose flowers and their transportation, storage house and required condition for cut and loose flower. **CO4:** Construct about the various problems with the production technology of medicinal and aromatic plants. **CO5:** Importance of Processing and value addition in ornamental crops and MAPs produce.
20014500 - Production Technology for Ornamental Crops, MAP and Landscaping Lab	**CO1:** Identify different types of ornamentals, Aromatic and medicinal crops. **CO2:** Explain Training and pruning of Ornamental plants **CO3:** Plan and layout of garden. **CO4:** Construct about the various problems with the production technology of medicinal and aromatic plants. **CO5:** Explain Intercultural operations in flowers and MAP. Harvesting and post-harvest handling of cut and loose flowers Processing of MAP.

20014600 - Renewable Energy and Green Technology	**CO1:** Define the environmental aspects of non-conventional energy resources. **CO2:** Explain the benefit from utilization the biomass, solar and wind energy. **CO3:** Develop the skill in utilization of renewable energy recourses/gadgets. **CO4:** Discover Ability to apply in renewable energy in the agricultural sector. **CO5:** Imagine the renewable energy as ultimate source of power.
20014700 - Renewable Energy and Green Technology Lab	**CO1:** What are renewable energy gadgets. **CO2:** Explain production process of biodiesel. **CO3:** Make use of biogas plants. **CO4:** Simplify the different solar energy gadgets. **CO5:** Analyze the different renewable energy production units.
20014800 - Problematic Soils and their Management	**CO1:** Define problematic soils, select a plan for their reclamation, and post-reclamation management in a manner that is sustainable. **CO2:** Explain how to improve soil fertility and productivity by application of fertilizers, macro & micronutrients based on soil test. **CO3:** Identify Multipurpose tree species for remediation of problematic soil. **CO4:** Analyze the use of remote sensing and GIS application to categorize the problematic soil for their reclamation. **CO5:** Determine the quality and standards of irrigation water.
20014900 - Production Technology for Fruit and Plantation Crops	**CO1:** Find out the importance of different fruit crops and plantation crops. **CO2:** Explain package of practices of the major crops like Mango, Banana, Guava, Citrus group, Date palm, papaya, Pineapple, Ber, Aonla, Bael, Apple, Pear, Peach Plum, Coffee, Coconut, Tea, Cocoa and Rubber. **CO3:** Utilize various concepts of high-density planting, new techniques of high-density planting, plant propagation, seed propagation, etc. **CO4:** Examine canopy architecture for higher productive fruit plants. **CO5:** To determine different propagation techniques in fruit and plantation crops.
20015000 - Production Technology for Fruit and Plantation Crops Lab	**CO1:** Show description and identification of fruit. **CO2:** Demonstrate propagation method for fruit and plantation crops. **CO3:** Make use of preparation of plant bio regulators and their uses, **CO4:** Classify important pests, diseases and physiological disorders of fruit and plantation crops. **CO5:** Explain seed propagation. Scarification and stratification of seeds.

20015100 - Principles of Seed Technology	**CO1:** Explain scope and importance of seed technology in agriculture and the role of officials & legislation, seed act, seed order in quality seed production. **CO2:** Develop an understanding of various seed production techniques for different field crops. **CO3:** Analyze the factors related to genetic and physical purity of seed and its health status of seeds of a variety during seed processing. **CO4:** Compare the various phases of seed certification, field inspection and seed purity testing. **CO5:** Interpret the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also.
20015200 - Principles of Seed Technology lab	**CO1:** Define seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. **CO2:** Demonstrate seed sampling and testing: Physical purity, germination, viability, etc **CO3:** Make use of seed certification: Procedure, Field inspection, Preparation of field inspection report. **CO4:** Examine seed and seedling vigor test. Genetic purity test: **CO5:** Recommend visit to seed production farms, seed testing laboratories and seed processing plant.
20015500 - Agricultural Marketing Trade & Prices	**CO1:** Explain about the agriculture marketing, market structure, marketing mix, marketing segmentation, demand, supply and producer surplus. **CO2:** classify the product life cycle and its different aspects, product, price, place, promotion, advertising, personal selling, sales promotion and publicity. **CO3:** Simplify marketing process and functions: Marketing process- concentration, dispersion and equalization. **CO4:** Discover understanding about role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions. **CO5:** Measure the marketing efficiency obtained from different marketing channel using different methods.
20015600 - Agricultural Marketing Trade & Prices Lab	**CO1:** Identify of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class; **CO2:** Interview to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning; **CO3:** Construct of index numbers; Visit to a local market to study various marketing functions performed by different agencies **CO4:** Apply of principles of comparative advantage of International Trade **CO5:** Build and study of demand and supply curves and calculation of elasticities

20026400 - Introductory Agro-meteorology & Climate Change	**CO1:** Explain about earth atmosphere and it's composition. **CO2:** Discuss about different forms and nature of solar radiation. **CO3:** Analyze precipitation and its nature. **CO4:** Develop knowledge about weather hazards. **CO5:** Elaborate information about climate change like global warming.
20026500 - Introductory Agro-meteorology & Climate Change Lab	**CO1:** Acquaintance with agro meteorological lab and equipment. **CO2:** Evaluation of albedo, maximum and minimum temperature. **CO3:** Discuss method of soil temperature measurement. **CO4:** Illustrate atmospheric pressure evaluation methods. **CO5:** Analyze wind speed, direction and evaporation.
20026800 - Farming System & Sustainable Agriculture	**CO1:** Define Farming System-scope, importance, and concept. **CO2:** Explain Farming system components and their maintenance. **CO3:** Build efficient cropping system and their evaluation, **CO4:** Compare HEIA, LEIA and LEISA. **CO5:** Determine production and efficiencies in cropping and farming system.
Human Values & Ethics	**CO1:** Identify core values and ethical principles**.** **CO2:** Analyze personal goals and life mission**.** **CO3:** Apply effective decision-making and motivation strategies**.** **CO4:** Evaluate ethical case studies and foster a positive spirit**.** **CO5:** Create a balanced integration of body, mind, and soul**.**
20015900 - Ability and Skill Enhancement IV	**CO1:** Design the resume and know about different format **CO2:** Know and classify the different types of interviews i.e. Mock Interview, HR Expert Mock Interview, Telephonic Interviews. **CO3:** Examine the Company Specific Research and Presentation. **CO4:** Build conversation skill **CO5:** Find out Industry suitable for internship or job.
20016000 - Agribusiness Management	**CO1:** Explain the transformation of agriculture into agribusiness. **CO2:** Importance of agribusiness in the Indian economy. **CO3:** Define distinctive features of agribusiness management. **CO4:** Discuss about management functions. **CO5:** Classify marketing management.

20016100 - Agribusiness Management Lab	**CO1:** Identify about agri-input markets: Seed, fertilizers, pesticides. **CO2:** Examine output markets: grains, fruits, vegetables, flowers. **CO3:** Define product markets, retails trade commodity trading, and value added products. **CO4:** Classify financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD **CO5:** Analyze case study of agro-based industries.
20016200 - Agrochemicals	**CO1:** Explain the type and role of agrochemicals in agriculture, effect on environment, soil, human and animal health. **CO2:** Outline the merits and demerits of agrochemicals uses in agriculture. **CO3:** Identify the different agrochemicals based on their mode of action. **CO4:** Classify the fertilizers based on soil, crops and their composition. **CO5:** Measure the optimum dose of different agrochemicals at field level.
20016300 - Agrochemicals Lab	**CO1:** How to use of different agrochemicals. **CO2:** Classify the systemic and non- systemic insecticide. **CO3:** Identify the different insecticides, fungicides and fertilizers. **CO4:** Experiment with different fungicides and insecticides against different plant diseases. **CO5:** Estimate the proper dose of different agrochemicals.
20016400 - Commercial Plant Breeding	**CO1:** Explain advances in hybrid seed production of different crops **CO2:** Compare the breeding methods in self- and cross-pollinated crops **CO3:** Contrast the production of qualityseed vegetable crops under open and protected environment. **CO4:** Discuss the modes of plant reproduction. **CO5:** Conclude the tissue culture techniques.
20016500 - Commercial Plant Breeding Lab	**CO1:** Define the concept of rogueing in seed production plot. **CO2:** Utilize the different seed production techniques in self- and cross-pollinated crops **CO3:** Identify the difficulties in hybrid seed production. **CO4:** Compare the screening techniques during seed processing viz., grading and packaging. **CO5:** Discuss the sampling and analytical procedures for purity testing and detection of spurious seed.
20016600 - Landscaping	**CO1:** Tell Importance and scope of landscaping. **CO2:** Interpret principles of landscaping, garden styles and types. **CO3:** Identify different palms, ferns, grasses and cacti succulents. Pot plants: **CO4:** Classify landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, **CO5:** principles and management, lawn establishment and maintenance.

20016700 - Landscaping Lab	**CO1:** Identification of trees, shrubs, annuals, pot plants. **CO2:** Explain Propagation of trees, shrubs and annuals. **CO3:** Plan Layout of formal gardens, informal gardens, special type of gardens **CO4:** Compare formal gardens, informal gardens, special type of gardens. **CO5:** Choose important gardens/ parks/ institutes to Visit.

7. CO PO Mapping

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8. Curriculum

Course Name: Crop Production Technology –II (*Rabi* Crops)

Course Code: 20014200

Course Outline

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Rabi*crops; cereals –wheat and barley, pulses-chickpea, lentil, peas, oilseeds-rapeseed, mustard and sunflower; sugar crops-sugarcane; medicinal and aromatic crops-mentha, lemon grass and citronella, Forage crops-berseem, lucerne and oat.

Course Name: Crop Production Technology –II (*Rabi* Crops) Lab

Course Code: 20014300

Course Outline

1. Sowing methods of wheat and sugarcane, identification of weeds in *Rabi* season crops.
2. Study of morphological characteristics of *Rabi* crops,
3. Study of yield contributing characters of *Rabi* season crops, yield and juice quality analysis of sugarcane,
4. Study of important agronomic experiments of *Rabi* crops at experimental farms.
5. Study of *Rabi* forage experiments, oil extraction of medicinal crops, visit to research stations of related crops.

Course Name: Production Technology for Ornamental Crops, MAP and Landscaping

Course Code: 20014400

Course Outline

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, cactus Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

Course Name: Production Technology for Ornamental Crops, MAP and Landscaping Lab

Course Code: 20014500

Course Outline

1. Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing.
2. Training and pruning of Ornamental plants. Planning and layout of garden.
3. Bed preparation and planting of MAP. Protected structures – care and maintenance.
4. Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers.
5. Processing of MAP. Visit to commercial flower/MAP unit.

Course Name: Renewable Energy and Green Technology

Course Code: 20014600

Course Outline

Unit I

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bio-alcohol, biodiesel and bio-oil production and their utilization as bioenergy resource.

Unit II

Introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.

Course Name: Renewable Energy and Green Technology Lab

Course Code: 20014700

Course Outline

1. Familiarization with renewable energy gadgets.
2. To study biogas plants,
3. To study gasifier,
4. To study the production process of biodiesel,
5. To study briquetting machine,
6. To study the production process of bio-fuels.
7. Familiarization with different solar energy gadgets.
8. To study solar photovoltaic system: solar light, solar pumping, solar fencing.
9. To study solar cooker, To study solar drying system.
10. To study solar distillation and solar pond.

Course Name: Problematic Soils and their Management

Course Code: 20014800

Course Outline

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils. Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils. Multipurpose tree species, bio remediation through MPTs of soils, land capability and
classification, land suitability classification. Problematic soils under different Agro-ecosystems.

Course Name: Production Technology for Fruit and Plantation Crops

Course Code: 20014900

Course Outline

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks; Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, sapota, apple, pear, peach, walnut, almond and; minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry, plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Course Name: Production Technology for Fruit and Plantation Crops Lab

Course Code: 20015000

Course Outline

1. Seed propagation. Scarification and stratification of seeds.
2. Propagation methods for fruit and plantation crops.
3. Description and identification of fruit.
4. Preparation of plant bio regulators and their uses,
5. Important pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchards.

Course Name: Principles of Seed Technology

Course Code: 20015100

Course Outline

Unit I

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables.

Unit II

Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgenic contamination in non-GM crops, GM crops and organic seed production. Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing.

Unit III

Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies.

Course Name: Principles of Seed Technology Lab

Course Code: 20015200

Course Outline

1. Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi.
2. Seed production in major pulses: Urd, Mung, Pigeon pea, Lentil, Gram, Field bean, pea.
3. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard. Seed production in important vegetable crops
4. Seed sampling and testing: Physical purity, germination, viability, etc.
5. Seed and seedling vigour test. Genetic purity test:
6. Grow out test and electrophoresis.
7. Seed certification: Procedure, Field inspection, Preparation of field inspection report.
8. Visit to seed production farms, seed testing laboratories and seed processing plant.

Course Name: Agricultural Marketing Trade & Prices

Course Code: 20015500

Course Outline

Unit I

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities.

Unit II

Product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions: Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel, number of channel levels.

Unit III

Marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India; Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; ad ministered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

Suggested Readings

1. Ghosal, SN., Agricultural Financing in India, Asia Publishing House, Bombay, 1966
2. Johi, S.S. and C.V.Moore., Essentials of Farm Financial Management, Today and Tommorow's Printers and Publishers, New Delhi, 1970
3. John, J.Hamptron., Financial Decision Making: Concepts, Problems and Cases, Prentice-Hall of India , New Delhi, 1983
4. Kenneth, Duft D., Principles of Management in Agribusiness, Reston Publishing Company, Reston, 1979
5. Mamoria, C.B. and R.D. Saksena., Co-operation in India, Kitab Mahal, Allahabad, 1973
6. Mamoria, C.B. and Saxena., Agricultural Problems in India, Kitab Mahal, Allahabad

7. Mukhi, H R. 1983. Cooperation in India and Abroad. New Heights Publishers, New Delhi.

8. Muniraj, R., Farm Finance for Development, Oxford & IBH Publishing Company Private Ltd., New Delhi, 1987
9. Subba Reddy, S. and P. Raghuram, Agricultural Finance and Management, Oxford & IBH Publishing Company Private Ltd., New Delhi, 2005
10. Subba Reddy, S., P. Raghuram., P. Sastry, T.V.N. and Bhavani Devi I. 2010. Agricultural Economics., Oxford & IBH Publishing Company Private Ltd., New Delhi, 2010
11. William, G. Murray and Nelson Aarson, G., Agricultural Finance, The Iowa State University Press, Ames, Iowa, 1960

Course Name: Agricultural Marketing Trade & Prices lab

Course Code: 20015600

Course Outline

1. Plotting and study of demand and supply curves and calculation of elasticities;
2. Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities;
3. Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies,
4. identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class;
5. Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning;
6. Application of principles of comparative advantage of International Trade

Course Name: Introductory Agro-meteorology & Climate Change

Course Code: 20026400

Course Outline

Unit I

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze; Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, long wave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature.

Unit II

Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification; Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Modifications of crop microclimate, climatic normal for crop and livestock production. Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

Course Name: Introductory Agro-meteorology & Climate Change lab
Course Code:20026500

Course Outline

1.Visit of Agro-meteorological Observatory, site selection of observatory, exposure of instruments and weather data recording.
2. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law.
3. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS.
4. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis.
5. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity.
6. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions.
7. Measurement of wind speed and wind direction, preparation of windrose. Measurement, tabulation and analysis of rain.
8. Measurement of open pan evaporation and evapotranspiration. Computation of PET and AET.

Suggested Readings:

1. De, Gopal Chandra 1989, Fundamentals of Agronomy. Oxford & IBH Publishing Co., New-Delhi
2. ICAR 1989 Handbook of Agriculture, Indian Council of Agricultural Research, NewDelhi
3. Michael, A.M. and Ojha, T.P. 1986. Principles of Agricultural Engineering, Vol.II Jain Brothers, New Delhi.
4. Morachan, Y.B. 1986, Crop production and management, Oxford & IBH Publishing Co., New-Delhi.
5. Porwal, B.L. and Sharma, D.D. 1991. SashyaVigyanKeAdhunicSiddhant (Hindi) Alka Publishers, Ajmer.
6. Darashikoh – Nuskha Dar Fanni – Falahat (The Art of Agriculture). Translated from Persian to English by Razia Akbar (2000) with commentaries by K.L. Mehra, K.L. Chadhan, J.S. Kanwar and Y.L. Nene. Asian Agri- History Foundation, Secunderabad, Bull No. 3, pp : 136.
7. Murithy, K, and Radha, V. 1995. Practical Manual on Agricultural Meteorology ,Kalyani Publishers, New-Delhi.

Course Name: Farming System & Sustainable Agriculture

Course Code: 20026800

Course Outline

Unit I

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system;

Unit II

Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

Suggested Readings:

1. Panda, S.C.2004. Cropping Systems and Farming Systems, Agrobios (India), Jodhpur.
2. Panda, S.C.2012. Modern Concepts and Advance Principles in Crop Production. Agrobios (India), Jodhpur
3. Sharma, Arun K. 2002. A Handbook of Organic Farming, Agrobios (India) Ltd., Jodhpur
4. Balasubramaniyan, P. and Palaniappan, S.P.2016. Principles and Practices of Agronomy (2nd edition), Agrobios (India), Jodhpur.
5. Shukla, Rajeev K. 2004. Sustainable Agriculture, Surbhee Publications, Jaipur
6. Palaniappan, S.P.1985. Cropping Systems in the Tropics: Principles and Management, Wiley Easter Ltd. and TNAU, Coimbatore.
7. Reddy S. R. 2016. Principles of Agronomy (5th edition), Kalyani Publishers, Ludhiana.

Course Name: Human Values & Ethics

Course Code:

Course Outline

Unit I

Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self-Exploration. Self-Awareness. Self-Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.

Course Name: Ability and Skill Enhancement Module IV

Course Code:20015900

Course Outline - Final Assessment – Mock Interviews & PI Kit Submission

Unit I : Tele – Etiquettes

Receiving Calls, Placing a call, Ending Calls, Transferring calls, Taking Message/ Voice Mails, Placing call on hold, Handling Complaints.

Unit II: Confidence Building & Brain Storming

How to build confidence by positive thinking, identifying negative thoughts, how to control negative thoughts entering our mind, identifying personal talents, and its ways to improve, how to develop good habits and having principles and follow them at all times.

Need to learn new things, ideas and skills, what is brain storming, why do we need it, what are the different ways of brain storming through logics and reasoning, Brain Storming Session.

Unit III: PI Kit

What is resume, Format of Resume, Formatting, Resume Preparation, Covering Letter, PI Kit.

Unit IV: Interview Skills

Mastering the art of giving interviews in - selection or placement interviews, web /video conferencing, Mock Interview, HR Expert Mock Interview, Telephonic Interviews.

Unit V: Internship Preparation: Company Specific Research and Presentation

Identifying domain specific industries, researching the industry, Industry analysis, Presentation on specific industry/company.

Course Name: Agri-business Management

Course Code: 20016000

Course Outline

Unit I

Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture.

Unit II

Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, polices procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance. Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behavior analysis, Product Life Cycle (PLC). Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

Course Name: Agri-business Management Lab

Course Code: 20016100

Course Outline

1. Study of agri-input markets: Seed, fertilizers, pesticides.
2. Study of output markets: grains, fruits, vegetables, flowers.
3. Study of product markets, retails trade commodity trading, and value added products.
4. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD.
5. Preparations of projects and Feasibility reports for agribusiness entrepreneur.
6. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques.
7. Case study of agro-based industries.
8. Trend and growth rate of prices of agricultural commodities.
9. Net present worth technique for selection of viable project.
10. Internal rate of return.

Suggested Readings

1. G. L. Meena, S. S. Burark, D. C. Pant and Rajesh Sharma, 2017. Fundamentals of Agribusiness Management, Agrotech Publishing Academy, Udaipur, ISBN: 978-818321-418-6. First edition.
2. Gittinger, J.P, 1984, Economic Analysis of Agricultural Projects, John Hopkins University Press.
3. Kotler, Philip, 1999, Marketing Management, Prentice Hall of India, New Delhi,
4. L.L. Somani and G. L. Meena, 2017. Agribusiness & Farm Management at a Glance, Vol-2, Basic & Applied Fundamentals, Agrotech Publishing Academy, Udaipur, ISBN: 978-81-8321-429-2. Second edition.
5. Mamoria, C. B., Joshi, R. L. and Mulla, N. I. 2005, Principles and Practices of Marketing in India, Kitab Mahal, Allahabad.
6. Sudha, G.S, 2000, Business Management, RBSA Publishers, Jaipur.
7. Tripathi, P. C. and Reddy, P. N, Principles of Management, Tata McGraw Hill Education Private Limited, New Delhi, 2008.

Course Name: Agrochemicals

Course Code: 20016200

Course Outline

Unit I

An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture.

Herbicides-Major classes, properties and important herbicides. Fate of herbicides.

Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxychloride.

Organic fungicides- Mode of action- Dithio-carbamates-characteristics, preparation and use of Zineb and maneb.

Unit II

Systemic fungicides- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use. Introduction and classification of insecticides: inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Bio-pesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses.

Unit III

Fertilizers and their importance. Nitrogenous fertilizers: Feedstock and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N-fertilizers. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate.
Mixed and complex fertilizers: Sources and compatibility–preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitro phosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

Course Name: Agrochemicals Lab

Course Code: 20016300

Course Outline

1. Sampling of fertilizers and pesticides.
2. Pesticides application technology to study about various pesticides appliances.
3. Quick tests for identification of common fertilizers.
4. Identification of anion and cation in fertilizer.
5. Calculation of doses of insecticides to be used.

6. To study and identify various formulations of insecticide available kin market.
7. Estimation of nitrogen in Urea.
8. Estimation of water soluble P_2O_5 and citrate soluble P_2O_5 in single super phosphate.
9. Estimation of potassium in Muriatic of Potash/ Sulphate of Potash by flame photometer.
10. Determination of copper content in copper oxychloride.
11. Determination of sulphur content in sulphur fungicide.
12. Determination of thiram.
13. Determination of ziram content.

Course Name: Commercial Plant Breeding

Course Code: 20016400

Course Outline

Unit I

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production. Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools.

Unit II

IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India. Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.

Course Name: Commercial Plant Breeding Lab

Course Code: 20016500

Course Outline

1. Floral biology in self and cross pollinated species, selfing and crossing techniques.
2. Techniques of seed production in self and cross pollinated crops using A/B/R and two line system.
3. Learning techniques in hybrid seed production using male-sterility in field crops.
4. Understanding the difficulties in hybrid seed production.
5. Tools and techniques for optimizing hybrid seed production.
6. Concept of rouging in seed production plot.
7. Concept of line its multiplication and purification in hybrid seed production.
8. Role of pollinators in hybrid seed production.
9. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops.
10. Sampling and analytical procedures for purity testing and detection of spurious seed.

11. Seed drying and storage structure in quality seed management.
12. Screening techniques during seed processing viz., grading and packaging.
13. Visit to public private seed production and processing plants.

Suggested Readings

1. Chopra, V.L. 2000. Breeding of Field Crops (Edt.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Mandal, AK., P.K. Ganguli and S.P. Banerjee. 1991. Advances in Plant Breeding. Vol. I and II. CBS Publishers and Distributors, New Delhi.
3. Manjit S. Kang 2004. Crop Improvement: Challenges in the Twenty-First Century (Edt). International Book Distributing Co. Lucknow.
4. Poehlman, J.M. 1987. Breeding of Field Crops. AVI Publishing Co.. INC, East Port, Conneacticut, USA.
5. Ram, H.H. and H.G. Singh. 1994. Crop Breeding and Genetics. Kalyani Publishers, New Delhi.
6. Sharma, A.K. 2005. Breeding Technology of Crop Plants (Edt.). Yash Publishing House, Bikaner.
7. Ram. H.H. 2005. Vegetable Breeding — Principles and Practices. Kalyani Publishers, New Delhi.
8. Agarwal, R.L.1991.Seed Technology. Oxford & IBH Publishing Co. Delhi. 9. Dhirenra Khare and Mohan S. Bhale.2000. Seed Technology. Scientific Publishers India), Jodhpur.
9. Maloo,S.R., Intodia, S.K. and Pratap Singh.2008. Beej Pradyogiki. Agrotech Publishing Academy.
10. A.K. Joshi and B.D. Singh.2005.Seed Technology. Kalyani Publishers, New Delhi.
11. Arya, P.S. 2001. Vegetable Breeding and Seed Production. Kalyani Pub., Ludhiana.
12. Singh, B.D. 2005. Plant Breeding. Kalyani Publishing House, New Delhi.
13. Singh, P. 2001.Essentials of Plant Breeding-Principles and Methods. Kalyani Publishing House, New Delhi.
14. Shekhawat, S. S. (ed) (2016). Advances and Current Issues in Agriculture, VoI. III. Shiksha Prakashan, S. M. S. Highway, Jaipur.

Course Name: Landscaping

Course Code: 20016600

Course Outline

Unit I

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme,

Unit II

Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus

station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

Course Name: Landscaping Lab

Course Code: 20016700

1. Identification of trees, shrubs, annuals, pot plants.
2. Propagation of trees, shrubs and annuals.
3. Care and maintenance of plants, potting and repotting.
4. Identification of tools and implements used in landscape design, training and pruning of plants for special effects.
5. Lawn establishment and maintenance.
6. Layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house.
7. Use of computer software.
8. Visit to important gardens/ parks/ institutes.

Suggested Readings

1. Arora J. S. 2006 Introductory Ornamental Horticulture. Kalyani Publishers, Ludhiana
2. Gopalaswamiengar, K.S. The Complete Gardening in India. The Hosali Press, Bangalore.
3. Bose, T.K. Malti, R.G. Dhua, R.S. & Das, P. Floriculture and Landscaping (2004), Nayaprakash.
4. Bose, T.K. and Mukherjee, D. Gardening in India (2004) Oxford & IBH Publishers.
5. Chadha, K.L. and Chaudhary, B. Ornamental Horticulture in India (1986) ICAR
6. H.S.Grewal and Parminder Singh. Landscape designing and ornamental plants (2014)
7. K.V.Peter. Ornamental plants (2009) New India publishing agency.
8. R.K. Roy Fundamentals of Garden designing (2013) New India publishing agency.
9. Rajesh Srivastava, Fundamentals of Garden designing (2014) Agrotech press, Jaipur
10. Randhawa, G.S. Amitabha Mukhopadhyay Floriculture in India (2004) Allied Publishers Pvt. Ltd., New Delhi
11. Tiwari, A.K. Fundamentals of Ornamental Horticulture and Landscaping Gardening NIPA
12. Tiwari, A.K. Fundamentals of Ornamental Horticulture and Landscaping Gardening NIPA.

9. Lesson Plans

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

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to *Rabi* crops: Overview and importance	C-1	Lecture
Unit-I	Wheat: Origin, geographical distribution, economic importance	C-2	Lecture
Unit-I	Wheat: Soil and climatic requirements, varieties, cultural practices, and yield	C-3	Lecture
Unit-I	Barley: Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices, yield	C-4	Lecture
Unit-I	Clarification Class	C-5	Clarification Class
Unit-I	Chickpea: Origin, geographical distribution, economic importance	C-6	Lecture
Unit-I	Chickpea: Soil and climatic requirements, varieties, cultural practices, and yield	C-7	Lecture
Unit-I	Lentil and Peas: Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, practices, yield	C-8	Lecture
Unit-I	Presentation	C-9	Presentation
Unit-I	Rapeseed and Mustard: Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, practices, yield	C-10	Lecture
	Home Assignment		Home Assignment
Unit-I	Sunflower: Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, practices, yield	C-11	Lecture
Unit-I	Sugarcane: Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices, yield	C-12	Lecture
Unit-I	Class Assignment	C-13	Class Assignment
Unit-I	Medicinal and Aromatic Crops: Mentha, Lemon grass, Citronella - Origin, distribution, importance, requirements, varieties, practices, yield	C-14	Lecture

Unit-I	Forage Crops: Berseem, Lucerne, Oat - Origin, distribution, importance, requirements, varieties, cultural practices, yield	C-15	Lecture

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

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Sowing methods of wheat: Demonstration and hands-on practice.	P-1	Practical
Unit-I	Sowing methods of sugarcane: Demonstration and hands-on practice.	P-2	Practical
Unit-I	Identification of weeds in Rabi season crops: Field study.	P-3	Practical
Unit-I	Morphological characteristics of wheat: Observation and documentation.	P-4	Practical
Unit-I	Morphological characteristics of sugarcane: Observation and documentation.	P-5	Practical
Unit-I	Morphological characteristics of other Rabi crops: Observation and documentation.	P-6	Practical
Unit-I	Yield contributing characters of wheat: Data collection and analysis.	P-7	Practical
Unit-I	Yield contributing characters of sugarcane: Data collection and analysis.	P-8	Practical
Unit-I	Yield and juice quality analysis of sugarcane: Lab work and report writing.	P-9	Practical
Unit-I	Study of important agronomic experiments of wheat at experimental farms.	P-10	Practical
Unit-I	Study of important agronomic experiments of sugarcane at experimental farms.	P-11	Practical
Unit-I	Study of other important agronomic experiments of Rabi crops.	P-12	Practical
Unit-I	Study of Rabi forage experiments: Field study and analysis.	P-13	Practical
Unit-I	Oil extraction of medicinal crops: Demonstration and practice.	P-14	Practical
Unit-I	Visit to research stations of related Rabi crops: Observation and interaction with researchers.	P-15	Practical

20014400 –Production Technology for Ornamental Crops, MAP and Landscaping

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping.	C-1	Lecture
Unit-I	Principles of landscaping. Landscape uses of trees, shrubs and climbers.	C-2	Lecture
Unit-I	Class Room Assignment	C-3	Class Assignment
Unit-I	Production technology of important cut flowers like tuberose, chrysanthemum under open conditions.	C-4	Lecture
	Quiz	C-5	Quiz
Unit-I	Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus	C-6	Lecture
Unit-I	Home Assignment		Home Assignment
Unit-I	Package of practices for loose flowers like marigold and jasmine under open conditions.	C-7	Lecture
Unit-I	Home Assignment		Home Assignment
Unit-I	Class Room Assignment	C-8	Class Assignment
Unit-I	Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus	C-9	Lecture
Unit-I	Clarification Class	C-10	Clarification Class
Unit-I	Production technology of important medicinal plants like Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver.	C-11	Lecture
Unit-I	Power Point Presentation	C-12	Presentation
Unit-I	Processing and value addition in ornamental crops and MAPs produce.	C-13	Lecture
Unit-I	Class Room Assignment	C-14	Class Assignment
Unit-I	Power Point Presentation	C-15	Presentation

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

S. No.	Particulars	Class No.	Pedagogy of Class
Unit-I	Identification of Ornamental Plants	P-1	Practical
Unit-I	Identification of Medicinal and Aromatic Plants	P-2	Practical
Unit-I	Nursery Bed Preparation	P-3	Practical
Unit-I	Seed Sowing	P-4	Practical
Unit-I	Training and Pruning of Ornamental Plants	P-5	Practical
Unit-I	Planning and Layout of Garden	P-6	Practical
Unit-I	Bed Preparation and Planting of MAP	P-7	Practical
Unit-I	Protected Structures – Care and Maintenance	P-8	Practical
Unit-I	Intercultural Operations in Flowers	P-9	Practical
Unit-I	Intercultural Operations in MAP	P-10	Practical
Unit-I	Harvesting of Cut and Loose Flowers	P-11	Practical
Unit-I	Post-Harvest Handling of Cut and Loose Flowers	P-12	Practical
Unit-I	Processing of MAP	P-13	Practical
Unit-I	Visit to Commercial Flower Unit	P-14	Practical
Unit-I	Visit to Commercial MAP Unit	P-15	Practical

20014600 –Renewable Energy and Green Technology

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

20014700–Renewable Energy and Green Technology Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Familiarization with renewable energy gadgets.	P-1	Practical
Unit-I	To study biogas plants	P-2	Practical
Unit-I	To study gasifier	P-3	Practical
Unit-I	To study the production process of biodiesel	P-4	Practical
Unit-I	To study briquetting machine	P-5	Practical
Unit-I	To study the production process of bio-fuels	P-6	Practical
Unit-I	Familiarization with different solar energy gadgets	P-7	Practical
Unit-I	To study solar photovoltaic system: solar light, solar pumping, solar fencing	P-8, 9	Practical
Unit-I	To study solar cooker, To study solar drying system	P-10, 11	Practical
Unit-I	To study solar distillation and solar pond	P-12, 13	Practical
Unit-I	Familiarization with renewable energy gadgets.	P-14, 15	Practical

20014800 –Problematic Soils and their Management

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Soil Quality and Health	C-1	Lecture
Unit-I	Distribution of Waste Land and Problem Soils in India	C-2	Lecture
Unit-I	Categorization of Problem Soils	C-3	Lecture
Unit-I	Reclamation and Management of Saline Soils	C-4	Lecture
	Presentation	C-5	Presentation
Unit-I	Reclamation and Management of Sodic Soils	C-6	Lecture
Unit-I	Reclamation and Management of Acid Soils	C-7	Lecture
	Clarification Class	C-8	Clarification Class
Unit-I	Reclamation and Management of Acid Sulphate Soils	C-9	Lecture
Unit-I	Reclamation and Management of Eroded Soils	C-10	Lecture
	Class Assignments	C-11	Class Assignments
Unit-I	Reclamation and Management of Compacted Soils	C-12	Lecture
Unit-I	Reclamation and Management of Flooded Soils	C-13	Lecture
Unit-I	Reclamation and Management of Polluted Soils	C-14	Lecture
	Home Assignments		Home Assignments
Unit-I	Quiz	C-15	Quiz
Unit-I	Irrigation Water Quality and Standards	C-16	Lecture
Unit-I	Utilization of Saline Water in Agriculture	C-17	Lecture
Unit-I	Presentation	C-18	Presentation
Unit-I	Remote Sensing in Diagnosis and Management of Problem Soils	C-18	Lecture
Unit-I	GIS in Diagnosis and Management of Problem Soils	C-20	Lecture
Unit-I	Multipurpose Tree Species (MPTs)	C-21	Lecture
Unit-I	Clarification Class	C-22	Clarification Class
Unit-I	Bio Remediation through MPTs of Soils	C-23	Lecture
Unit-I	Land Capability Classification	C-24	Lecture

Unit-I	Land Suitability Classification	C-25	Lecture
	Class Assignments	C-26	Class Assignments
Unit-I	Problematic Soils under Different Agro-ecosystems: Introduction	C-27	Lecture
Unit-I	Problematic Soils under Different Agro-ecosystems: Case Studies	C-28	Lecture
	Home Assignments		Home Assignments
Unit-I	Student Presentations on Soil Health and Reclamation Techniques	C-29	Lecture
Unit-I	Field Visit and Practical Demonstration: Soil Quality Assessment and Reclamation Techniques	C-30	Lecture

20014900 –Production Technology for Fruit and Plantation Crops

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Importance and Scope of Fruit and Plantation Crop Industry in India	C-1	Lecture
Unit-I	Importance of Rootstocks: Role of rootstocks in fruit production, types, and benefits	C-2	Lecture
Unit-I	Production Technologies for Mango: Cultivation practices, pest management, harvesting, and post-harvest handling	C-3	Lecture
	Class Assignment	C-4	Class Assignment
Unit-I	Production Technologies for Banana: Cultivation practices, pest management, harvesting, and post-harvest handling	C-5	Lecture
Unit-I	Production Technologies for Citrus and Grape	C-6	Lecture
Unit-I	Production Technologies for Guava and Litchi	C-7	Lecture
Unit-I	Production Technologies for Papaya and Sapota	C-8	Lecture
	Presentation	C-9	Presentation
Unit-I	Production Technologies for Apple, Pear, and Peach	C-10	Lecture
Unit-I	Production Technologies for Walnut and Almond	C-11	Lecture
	Home Assignment		Home Assignment
Unit-I	Production Technologies for Minor Fruits	C-12	Lecture
Unit-I	Production Technologies for Plantation Crops: Coconut, Arecanut, and Cashew	C-13	Lecture
	Clarification Class	C-14	Clarification Class
Unit-I	Production Technologies for Plantation Crops: Tea, Coffee, and Rubber	C-15	Lecture

20015000–Production Technology for Fruit and Plantation Crop Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Seed propagation: Scarification and stratification of seeds	P-1	Practical
Unit-I	Seed propagation: Practical session on scarification	P-2	Practical
Unit-I	Seed propagation: Practical session on stratification	P-3	Practical
Unit-I	Propagation methods for fruit crops	P-4	Practical
Unit-I	Propagation methods for plantation crops	P-5	Practical
Unit-I	Practical session: Grafting and budding of fruit crops	P-6	Practical
Unit-I	Practical session: Propagation techniques for plantation crops	P-7	Practical
Unit-I	Description and identification of fruit	P-8	Practical
Unit-I	Preparation of plant bio regulators and their uses	P-9	Practical
Unit-I	Important pests, diseases, and physiological disorders of mango, banana, citrus, grape	P-10	Practical
Unit-I	Important pests, diseases, and physiological disorders of guava, litchi, papaya, sapota	P-11	Practical
Unit-I	Important pests, diseases, and physiological disorders of apple, pear, peach, walnut, almond, and minor fruits	P-12	Practical
Unit-I	Important pests, diseases, and physiological disorders of plantation crops	P-13	Practical
Unit-I	Practical session: Identification and management of pests and diseases	P-14	Practical
Unit-I	Visit to commercial orchards	P-15	Practical

20015100 –Principles of Seed Technology

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Seed and Seed Technology, definition and importance, Causes of crop variety deterioration and their control	C-1	Lecture
Unit-I	Maintenance of genetic purity during seed production, Seed quality: Definition and characters of good quality seed	C-2	Lecture
Unit-I	Different classes of seed, Foundation and certified seed production of cereals, pulses, oilseeds, fodder, and vegetables	C-3	Lecture
	Home Assignment		Home Assignment
Unit-II	Seed certification: Phases, procedure for seed certification, field inspection	C-4	Lecture
Unit-II	Seed Act and Seed Act enforcement, duty and powers of seed inspector	C-5	Lecture
Unit-II	Seeds Control Order 1983, Varietal Identification through Grow Out Test, Electrophoresis	C-6	Lecture
	Clarification Class	C-7	Clarification Class
Unit-II	Molecular and Biochemical tests, detection of genetically modified crops, Transgenic contamination	C-8	Lecture
Unit-II	Seed drying, processing steps, seed testing for quality assessment, seed treatment and packing	C-9	Lecture
	Class Assignment	C-10	Class Assignment
Unit-III	Seed storage: principles, stages, factors affecting seed longevity during storage	C-11	Lecture
Unit-III	Measures for pest and disease control during seed storage, seed marketing structure and organization	C-12	Lecture
	Presentation	C-13	Presentation
Unit-III	Sales generation activities, promotional media, factors affecting seed marketing	C-14	Lecture
Unit-III	Role of WTO and OECD in seed marketing, private and public sectors in seed production and marketing	C-15	Lecture

20015200–Principles of Seed Technology Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Seed Production	P-1	Practical
Unit-I	Seed Production in Major Cereals: Wheat	P-2	Practical
Unit-I	Seed Production in Major Cereals: Rice	P-3	Practical
Unit-I	Seed Production in Major Cereals: Maize	P-4	Practical
Unit-I	Seed Production in Major Cereals: Bajra and Ragi	P-5, 6	Practical
Unit-I	Seed Production in Major Pulses: Urd Mung and Gram,	P-7,9	Practical
Unit-I	Seed Production in Major Pulses: Pigeon pea and Lentil,	P-10,11	Practical
Unit-I	Seed Production in Major Pulses: Field bean and Pea	P-12, 13	Practical
Unit-I	Seed Production in Major Oilseeds: Soybean and Sunflower,	P-14, 15	Practical
Unit-I	Seed Production in Major Oilseeds: Groundnut and Rapeseed & Mustard	P-16, 17	Practical
Unit-I	Seed Production in Important Vegetables	P-18, 19	Practical
Unit-I	Seed Sampling and Testing	P-20, 21	Practical
Unit-I	Seed and Seedling Vigor Test	P-22, 23	Practical
Unit-I	Genetic Purity Test	P-24	Practical
Unit-I	Grow Out Test and Electrophoresis	P-25, 26	Practical
Unit-I	Seed Certification	P-27	Practical
Unit-I	Field Trip Preparation	P-28	Practical
Unit-I	Visit to Seed Production Farms	P-29	Practical
Unit-I	Visit to Seed Processing Plant	P-30	Practical

20015500 –Agricultural Marketing Trade & Prices

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to the subject	C-1	Lecture
Unit-I	Agricultural Marketing: Concepts and definitions of market	C-2	Lecture
Unit-I	Agricultural marketing & market structure	C-3	Lecture
Unit-I	Marketing mix and market segmentation, classification and characteristics of agricultural markets	C-4	Lecture
Unit-I	Demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products	C-5	Lecture
Unit-I	Producer's surplus – meaning and its types, marketable and marketed surplus	C-6	Lecture
	Class Assignment	C-7	Class Assignment
Unit-I	Factors affecting marketable surplus of agri-commodities	C-8	Lecture
Unit-I	Clarification Class	C-9	Clarification Class
Unit-II	Meaning and stages in PLC; characteristics of PLC;	C-10	Lecture
Unit-II	PLC strategies in different stages of PLC pricing and promotion strategies: pricing considerations and approaches	C-11	Lecture
	Presentation	C-12	Presentation
Unit-II	Cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits	C-14	Lecture
Unit-II	Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling	C-15	Lecture
Unit-II	Physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark)	C-16	Lecture
Unit-II	Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels	C-17	Lecture
Unit-II	Clarification Class	C-18	Clarification Class

Unit-II	Class Assignment	C-19	Class Assignment
Unit-III	Marketing channels for different farm products; Integration, efficiency, costs and price spread	C-20	Lecture
Unit-III	Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs	C-21	Lecture
	Presentation	C-24	Presentation
Unit-III	Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India	C-22	Lecture
Unit-III	Presentation	C-23	Presentation
Unit-III	Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading	C-25	Lecture
Unit-III	Agricultural prices and policy: Meaning and functions of price; ad ministered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage	C-26	Lecture
Unit-III	Class Assignment	C-27	Class Assignment
Unit-III	Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (Ao A) and its implications on Indian agriculture; IPR	C-28	Lecture
Unit-III	Clarification Class	C-29	Clarification Class
Unit-III	Index study	C-30	Lecture

20015600 –Agricultural Marketing Trade & Prices Lab

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

20026400 – Introductory Agro-meteorology & Climate Change

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Meaning and scope of agricultural meteorology	C-1	Lecture
Unit-I	Earth atmosphere- its composition, extent and structure	C-2	Lecture
Unit-I	Atmospheric weather variables; Atmospheric pressure, its variation with height	C-3	Lecture
Unit-I	Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze	C-4	Lecture
Unit-I	Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo	C-5	Lecture
	Class Assignment	C-6	Class Assignment
Unit-I	Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature	C-7	Lecture
	Home Assignment		Home Assignment
Unit-II	Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud	C-8	Lecture
Unit-II	Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification	C-9	Lecture
	Clarification Class	C-10	Clarification Class
Unit-II	Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture	C-11	Lecture
Unit-II	Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations	C-12	Lecture
	Presentation	C-13	Presentation
Unit-II	Modifications of crop microclimate, climatic normals for crop and livestock production. Weather forecasting- types of weather forecast and their uses	C-14	Lecture
Unit-II	Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture	C-15	Lecture

20026500 – Introductory Agro-meteorology & Climate Change lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Visit of Agro-meteorological Observatory	P-1	Practical
Unit-I	Site selection of observatory	P-2	Practical
Unit-I	Exposure of instruments	P-3	Practical
Unit-I	Weather data recording	P-4	Practical
Unit-I	Measurement of total, shortwave and long wave radiation, and its estimation using Planck's intensity law	P-5	Practical
Unit-I	Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS	P-6	Practical
Unit-I	Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis	P-7	Practical
Unit-I	Measurement of soil temperature and computation of soil heat flux	P-8	Practical
Unit-I	Determination of vapor pressure and relative humidity	P-9	Practical
Unit-I	Determination of dew point temperature	P-10	Practical
Unit-I	Measurement of atmospheric pressure and analysis of atmospheric condition	P-11	Practical
Unit-I	Measurement of wind speed and wind direction, preparation of wind rose	P-12	Practical
Unit-I	Measurement, tabulation and analysis of rain.	P-13	Practical
Unit-I	Measurement of open pan evaporation and evapo-transpiration	P-14	Practical
Unit-I	Computation of PET and AET	P-15	Practical

20026800 – Farming System & Sustainable Agriculture

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Farming Systems	C-1	Lecture
Unit-I	Types and Systems of Farming Systems	C-2	Lecture
Unit-I	Learn about components of farming systems and their maintenance.	C-3	Lecture
Unit-I	Cropping Systems	C-4	Lecture
	Presentation	C-5	Presentation
Unit-I	Efficient Cropping Systems	C-6	Lecture
	Clarification Class	C-7	Clarification Class
Unit-I	Understand the importance of allied enterprises in farming systems.	C-8	Lecture
Unit-I	Tools for Production Efficiency	C-9	Lecture
	Class Assignment	C-10	Class Assignment
Unit-II	Problems in Sustainable Agriculture	C-11	Lecture
	Home Assignment		Home Assignment
Unit-II	Indicators of Sustainability	C-12	Lecture
	Clarification Class	C-13	Clarification Class
Unit-II	Conservation Agriculture Strategies	C-14	Lecture
Unit-II	Integrated Farming Systems and Site-Specific IFS Models	C-15	Lecture

xxxxxxxx–Human Values & Ethics

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Values and Ethics	C-1	Lecture
Unit-I	Goal and Mission of Life	C-2	Lecture
Unit-I	Vision of Life	C-3	Lecture
Unit-I	Principles and Philosophy	C-4	Lecture
	Clarification Class	C-5	Clarification Class
Unit-I	Self-Exploration and Self-Awareness	C-6	Lecture
Unit-I	Self-Satisfaction and Decision Making	C-7	Lecture
	Class Assignment	C-8	Class Assignment
Unit-I	Motivation and Sensitivity	C-9	Lecture
Unit-I	Success and Selfless Service	C-10	Lecture
Unit-I	Case Study of Ethical Lives	C-11	Lecture
	Presentation	C-12	Presentation
Unit-I	Positive Spirit and Body, Mind, and Soul	C-13	Lecture
	Home Assignment		Home Assignment
Unit-I	Attachment and Detachment	C-14	Lecture
Unit-I	Spirituality Quotient and Examination	C-15	Lecture

20015900 –Ability and Skill Enhancement IV

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Tele etiquettes Receiving Calls, Placing a call, Ending Calls, Transferring calls, Taking Message	C-1	Lecture
Unit-I	Tele etiquettes Placing Call on Hold and Handling Complaints	C-2	Lecture
Unit-I	Telephonic etiquettes	C-3	Lecture
Unit-I	Voice Calls	C-4	Activity
Unit-I	Clarification class	C-5	Clarification class
Unit-II	How to Build Confidence By Positive Thinking	C-6	Lecture
Unit-II	Take Home Assignment No1		Home Assignments
Unit-II	Identifying Negative thoughts and How to control it	C-7	Lecture
	Class Room Assignment No -2	C-8	Class Assignment
Unit-II	How to Build Confidence By Positive Thinking/Identify negative thoughts	C-9	Lecture
Unit-I	Class Assignment	C-10	Class Assignment
Unit-II	Identifying Personal Talent	C-11	Lecture
Unit-II	Activity	C-12	Activity
	Presentation	C-13	Presentation
Unit-II	what is brain storming	C-14	Activity
Unit -II	How to develop Good Habits and Principles to follow them and Learn New Things	C-15	Lecture
	Webinar	C-16	Webinar
Unit-II	What is Brainstorming Exercise	C-17	Activity
Unit-II	Different ways of Brain Storming Exercise Through Logic and Reasoning	C-18	Activity
Unit-II	Activity	C-19	Activity
	Seminar	C-20	Seminar
	Home Assignment	C-21	Home Assignment
	Clarification Class	C-22	Clarification class
Unit-III	Resume/CV	C-23	Lecture

Unit-III	What is Resume how prepare resume CV	C-24	Lecture
Unit-III	Covering Letter /PI kit	C-25	Lecture
Unit-IV	Interview Skills Mastering the art of giving interviews in-selection or placement interviews, web /video conferencing, Mock Interview	C-26	Activity
Unit-IV	Interview Skills Mastering the art of giving interviews in-selection or placement interviews, web /video conferencing, Mock Interview	C-27	Lecture
Unit-V	Clarification Class	C-28	clarification class
Unit-V	HR Expert interview questions	C-29	Lecture
Unit-V	Internship Preparation: Company Specific Research and Presentation Identifying domain specific industries, researching	C-30	Lecture

20016000 –Agribusiness Management (Electives)

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Transformation of agriculture into agribusiness	C-1	Lecture
Unit-I	Various stakeholders and components of agribusiness systems	C-2	Lecture
Unit-I	Importance of agribusiness in the Indian economy and New Agricultural Policy	C-3	Lecture
Unit-I	Distinctive features of Agribusiness Management	C-4	Lecture
Unit-I	Importance and needs of agro-based industries,	C-5	Lecture
Unit-I	Classification of industries and types of agro based industries	C-6	Lecture
Unit-I	Institutional arrangement, procedures to set up agro based industries.	C-7	Lecture
Unit-I	Constraints in establishing agro-based industries		Lecture
Unit-I	Agri-value chain; understanding primary and support activities and their linkages	C-8	Lecture
Unit-I	Business environment; PEST & SWOT analysis	C-9	Lecture
Unit-I	Management functions; roles and activities, organization culture	C-10	Lecture
Unit-I	Clarification class	C-11	Clarification class
Unit-I	Class assignment	C-12	Class assignment
Unit-I	Activity	C-13	Activity
Unit-II	Planning, meaning, definition, types of plans.	C-14	Lecture
Unit-II	Purpose or mission, goals or objectives, Strategies, polices, procedures, rules, programs and budget	C-15	Lecture
Unit-II	Components of a business plan, Steps in planning and implementation	C-16	Lecture
Unit-II	Organization setup; staffing, direction and motivation	C-17	Lecture
Unit-II	Ordering, leading, supervision, communications, control	C-18	Lecture
Unit-II	Capital Management and Financial management of Agribusiness	C-19	Lecture

Unit-II	Financial statements and their importance	C-20	Lecture
Unit-II	Marketing management: Segmentation, targeting & positioning	C-21	Lecture
Unit-II	Marketing mix and marketing strategies.	C-22	Lecture
	Presentation	C-23	Presentations
Unit-II	Product life cycle (plc).	C-24	Lecture
Unit-II	Sales & distribution management.	C-25	Lecture
Unit-II	Pricing policy, various pricing methods.	C-26	Lecture
Unit-II	Clarification class	C-27	Clarification
Unit-II	Project management; definition, project cycle	C-28	Lecture
Unit-II	Identification, formulation, appraisal, implementation, monitoring and evaluation	C-29	Lecture
Unit-II	Project Appraisal and evaluation techniques	C-30	Lecture

20016100 –Agribusiness Management Lab

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

20016200 –Agrochemicals

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to the subject.	C-1	Lecture
Unit-I	Type of agrichemicals and their role in agriculture.	C-2	Lecture
Unit-I	Effect of agrichemicals on Environmental factors.	C-3	Lecture
Unit-I	Merits, Demerits, and management of agrochemicals for Sustainable agriculture.	C-4	Lecture
Unit-I	Herbicides general overview and major classes.	C-5	Lecture
Unit-I	Properties and importance, the fate of herbicides.	C-6	Lecture
Unit-I	Class Assignment	C-7	Class Assignment
Unit-I	Sulfur and copper-based fungicide Mode of the action-Bordeaux mixture and copper oxychloride.	C-8	Lecture
Unit-I	Clarification Class	C-9	Clarification Class
Unit-I	Organic fungicides- Mode of action- Dithiocarbonates- characteristics, preparation, and use of zineb and maneb.	C-10	Lecture
Unit-I	Systemic fungicides- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics, and use.	C-11	Lecture
Unit-I	Introduction and classification of herbicides:	C-12	Presentation
Unit-I	Inorganic and organic Fungicides Classification.	C-13	Presentation
Unit-I	inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals,	C-14	Lecture
Unit-I	Introduction and classification of insecticides:	C-15	Lecture
Unit-I	Clarification Class	C-16	Clarification Class
Unit-I	insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant.	C-17	Lecture
Unit-I	IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses.	C-18	Lecture
Unit-I	Class Assignment	C-19	Class Assignment

	Fertilizers and their importance.	C-20	Lecture
Unit-I	Nitrogenous fertilizers: Feed stocks and Manufacturing of ammonium sulfate, ammonium nitrate, ammonium chloride, urea. Slow-release N-fertilizers.	C-21	Lecture
Unit-I	Phosphate fertilizers: feedstock and manufacturing of single superphosphate.	C-22	Lecture
Unit-I	Nitrogenous Fertilizers	C-23	Presentation
Unit-I	Effect of insecticides and fertilizer on the environment.	C-24	Presentation
Unit-I	Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulfate and potassium nitrate.	C-25	Lecture
Unit-I	Mixed and complex fertilizers, Complex fertilizers:	C-26	Lecture
Unit-I	Type of fertilizer and their application.	C-27	Class room Assignment
Unit-I	Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.	C-28	Lecture
Unit-I	Clarification Class	C-29	Clarification Class
Unit-I	Case study of overuse of fertilizer and agrochemicals.	C-30	Assignment

20016300 –Agrochemicals Lab.

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

20016400– Commercial Plant Breeding

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Types of crops and modes of plant reproduction	C-1	Lecture
Unit-I	Types of crops and modes of plant reproduction	C-2	Lecture
Unit-I	Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production	C-3	Lecture
Unit-I	Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production	C-4	Lecture
Unit-I	Genetic purity test of commercial hybrids	C-5	Lecture
Unit-I	Advances in hybrid seed production of maize, rice, sorghum, pearl millet	C-6	Lecture
Unit-I	Advances in hybrid seed production of maize, rice, sorghum, pearl millet	C-7	Lecture
Unit-I	Advances in hybrid seed production of castor, sunflower	C-8	Lecture
Unit-I	Advances in hybrid seed production of cotton, pigeon pea, brassica	C-9	Lecture
Unit-I	Advances in hybrid seed production of cotton, pigeon pea, brassica	C-10	Lecture
Unit-I	Quality seed production of vegetable crops under open and protected environment	C-11	Lecture
	Class Assignment	C-11	Class Assignment
Unit-I	Quality seed production of vegetable crops under open and protected environment	C-12	Lecture
Unit-I	Alternative strategies for the development of the line and cultivars: haploid inducer	C-13	Lecture
Unit-I	Alternative strategies for the development of the line and cultivars: haploid inducer	C-14	Lecture
Unit-I	Tissue culture techniques	C-15	Lecture
Unit-I	Bio-technological tools	C-16	Lecture
Unit-II	IPR issues in commercial plant breeding	C-17	Lecture
Unit-II	Class Assignment	C-18	Class Assignment

Unit-II	DUS testing and registration of varieties under PPV & FR Act	C-19	Lecture
Unit-II	DUS testing and registration of varieties under PPV & FR Act	C-20	Lecture
Unit-II	Quiz	C-21	Quiz
Unit-II	Variety testing, release and notification systems in India	C-22	Lecture
Unit-II	Variety testing, release and notification systems in India	C-23	Lecture
	Class Assignment	C-24	Class Assignment
Unit-II	Principles and techniques of seed production	C-25	Lecture
Unit-II	Types of seeds	C-26, 27	Lecture
Unit-II	Quality testing in self- and cross-pollinated crops	C-28, 29	Lecture
Unit-II	PPT	C-30	PPT

20016500 – Commercial Plant Breeding Lab

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

20016600 –Landscaping

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Importance and scope of Landscaping	C-1	Lecture
Unit-I	Principles of Landscaping	C-2	Lecture
Unit-I	Garden styles- terrace gardening, vertical gardening	C-3	Lecture
Unit-I	Garden styles- garden components, adornments,	C-4	Lecture
Unit-I	Lawn making, rockery, water garden, walk-paths, bridges, other constructed features	C-5	Lecture
Unit-I	Gardens for special purposes	C-6	Lecture
Unit-I	Evaluate any garden in your neighborhood and analyses its style.	C-7	Class Assignment
Unit-I	Trees: selection for establishment of Landscape	C-8	Lecture
Unit-I	Clarification Class	C-9	Clarification Class
Unit-I	Propagation, planting schemes and canopy management	C-10	Lecture
Unit-I	Selection and propagation of shrubs and herbaceous perennials	C-11	Lecture
Unit-I	Mughal gardens	C-12	Presentation
Unit-I	Landscaping in arid region	C-13	Presentation
Unit-I	Planting schemes and architecture for use of shrubs and herbaceous perennials	C-14	Lecture
Unit-I	Planting schemes and architecture of climbers and creepers	C-15	Lecture
Unit-I	Annuals: selection, propagation and planting scheme	C-16	Lecture
Unit-II	Use of palms, ferns, grasses and cacti succulents in developing landscape	C-17	Lecture
Unit-II	Clarification Class	C-18	Clarification Class
Unit-II	Identify the plants for developing Landscape of RNB Global University	C-19	Class Assignment
Unit-II	Pot plants: selection, arrangement, management	C-20	Lecture
Unit-II	Bio-aesthetic planning: definition, need, planning	C-21	Lecture
Unit-II	Landscaping of urban and peri-urban areas	C-22	Lecture

Unit-II	Develop the landscape of hotel in your vicinity	C-23	Presentation
Unit-II	How you can develop landscape of your house using annuals	C-24	Presentation
Unit-II	Landscaping of rural areas	C-25	Lecture
Unit-II	Landscaping of schools, bus stand and railway station, and other public places	C-26	Lecture
Unit-II	Development of landscape of hospitals	C-27	Class Assignment
Unit-II	Bonsai: principles and management	C-28	Lecture
Unit-II	Clarification Class	C-29	Clarification Class
Unit-II	CAD application	C-30	Lecture

20016700 –Landscaping Lab

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