Detailed Course Scheme

Bachelor of Science (Hons.)

Agriculture

Semester- III

(2024- 28)

DOC202410100008

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 (July-December) Odd Semester 2025 along with examination pattern is as follows:

Course Scheme

Semester –III

S. No.	Course Code	Course Category	Course Name	L	T	P	Credits
1.	SECA77005	SEC-V	Beneficial insect farming Lab	0	0	4	2
2.	AECA55007	AEC-9	Entrepreneurship Development and Business Communication	2	0	0	2
3.	AECA55008	AEC-10	Entrepreneurship Development and Business Communication Lab	0	0	2	1
4.	AECA55009	AEC-11	Physical Education, First Aid, Yoga Practices and Meditation Lab	0	0	4	2
5.	BSAC42150	DSC PB-1a	Principle of Genetics	2	0	0	2
6.	BSAC42151	DSC PB-1b	Principle of Genetics Lab	0	0	2	1
7.	BSAC41200	DSC AG-3a	Crop Production Technology -I (Kharif crops)	1	0	0	1
8.	BSAC41201	DSC AG-3b	Crop Production Technology-I (Kharif crops) Lab	0	0	4	2
9.	BSAC48252	DSC HO-2a	Production Technology of Fruit and Plantation Crops	1	0	0	1
10.	BSAC81253	DSC HO-2b	Production Technology of Fruit and Plantation Crops Lab	0	0	2	1
11.	BSAC50150	DSC AC-2a	Fundamentals of Extension Education	1	0	0	1
12.	BSAC50151	DSC AC-2b	Fundamentals of Extension Education Lab	0	0	2	1
13.	BSAC56200	DSC NE-1a	Fundamentals of Nematology	1	0	0	1
14.	BSAC56201	DSC NE-1b	Fundamentals of Nematology Lab	0	0	2	1
15.	BSAC41202	DSC AG-4a	Principles and Practices of Natural Farming	1	0	0	1
16.	BSAC41203	DSC AG-4b	Principles and Practices of Natural Farming Lab	0	0	2	1
17.	WHNN99000		Workshop & Seminars / Human Value & Social Service / NSS	-	-	-	1
			Total	**09**		**24**	**22**

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
Academic and course involvement		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
Academic and course involvement		5
TOTAL	**50**	

External Assessment

Type	Marks
Practical	50

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.

1. 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.

2. Course Outcomes (COs)

Course	Course outcomes: - After completion of these courses students should be able to
SECA77005 - Beneficial insect farming Lab	**CO1:** Define Bee pasturage, bee foraging and communication. **CO2:** Classify the Honey bee species, castes of bees **CO3:** Identification and techniques for mass multiplication of natural enemies. **CO4:** Categorize to silkworm, voltinism and biology of silkworm. **CO5:** Choose Species of lac insect, host plant identification.
AECA55007- Entrepreneurship Development and Business Communication	**CO1:** Identify key characteristics of entrepreneurship, including motivational, social, and environmental factors that influence entrepreneurial success. **CO2:** Explain the fundamental concepts of entrepreneurial development, including the evolution, types, and functions of entrepreneurs, and the importance of entrepreneurship in economic growth. **CO3:** Apply methods of environment scanning and opportunity identification to spot viable business ideas and evaluate the need for supportive policies and institutional support for entrepreneurial development. **CO4:** Analyze the steps involved in establishing an enterprise, including product/service selection, ownership structure, registration, capital sourcing, and site selection. Develop a project plan for a proposed enterprise, covering areas such as financial management, production management, marketing strategy, and crisis management, ensuring a structured approach to business setup and sustainability
AECA55008 - Entrepreneurship Development and Business Communication Lab	**CO1:** Explain the role of small-scale industries, agro-industries, and financial institutions in the development of the agricultural sector. **CO2:** Analyze the challenges and opportunities faced by successful entrepreneurs and agri-entrepreneurs through direct interaction. **CO3:** Develop a project proposal by synthesizing knowledge about funding requirements and guidelines from various support agencies. **CO4:** Evaluate the viability and sustainability of small-scale and agro-industrial ventures based on data collected during industry visits. **CO5:** Apply entrepreneurial skills by formulating innovative strategies for starting and managing agri-business projects.

AECA55009-Physical Education, First Aid, Yoga Practices and Meditation	**CO1:** Explain concepts of physical education, training methods, and the effects of exercise on physiological systems. **CO2:** Analyze the role of diet and exercise on health, and evaluate aging-related physiological changes. **CO3:** Design fitness plans incorporating training methods, yoga, and first-aid techniques. **CO4:** Promote sportsmanship and personality development through sports and motivation theories. **CO5:** Apply yoga practices, training techniques, and posture corrections to enhance fitness.
BSAC42150-Principle of Genetics	**CO1:** Understand Mendelian and pre-Mendelian concepts of heredity, the architecture of chromosomes, and the chromosomal theory of inheritance to explain foundational genetic principles. **CO2:** Apply knowledge of model organisms, linkage, crossing over, and chromosome mapping to perform genetic analyses and experiments. **CO3:** Analyze genetic variations, such as structural and numerical chromosomal alterations, epistatic interactions, and dominance relationships, to interpret their implications in inheritance and evolution. **CO4:** Evaluate the role of cytoplasmic inheritance, mutations, and qualitative and quantitative traits to determine their influence on genetic diversity and adaptability. **CO5:** Create scientific presentations, assignments, and models that demonstrate the mechanisms of DNA and RNA function, including replication, transcription, translation, and gene regulation, to illustrate the molecular basis of genetics.
BSAC42151-Principle of Genetics Lab	**CO1:** Understand the principles and techniques of microscopy and analyze the structure of cells, including stages of mitosis and meiosis, to comprehend the basic unit of life. **CO2:** Perform experiments on Mendelian inheritance patterns, including monohybrid, dihybrid, trihybrid, test crosses, and back crosses, to illustrate genetic principles. **CO3:** Analyze epistatic interactions and inheritance patterns using test crosses and chi-square tests to determine genetic relationships and validate hypotheses. **CO4:** Evaluate linkage and crossover frequencies through two-point test cross data to determine genetic distances and construct genetic maps. **CO5:** Create models of DNA and RNA structures and investigate sex-linked inheritance patterns in Drosophila to demonstrate.

BSAC41200-Crop Production Technology – I (Kharif Crops)	**CO1:** Find the knowledge on Kharif season crops, its classification (cereal crops, oilseed crops, pulse crops, sugar crops, fodder crops) and its importance in agriculture and national economy. **CO2:** Illustrate the origin, geographical distribution and economic importance of Kharif crops **CO3:** Identify the soil and climatic requirements of Kharif crops **CO4:** Examine the cultural practices, varieties and yield of Kharif crops **CO5:** Identification of different weeds of Kharif season
BSAC41201- Crop Production Technology – I Lab (Kharif Crops)	**CO1:** List of Kharif crop with their botanical name **CO2:** Explain effect of sowing depth on germination of Kharif crops. **CO3:** Identification of weeds in Kharif season crops, **CO4:** Compare method of rice nursery rising. **CO5:** Importance of top dressing and foliar feeding of nutrients.
BSAC48252-Production Technology of Fruit and Plantation Crops	**CO1:** Understand the significance, nutritional value, and classification of major fruit and plantation crops in India, including their contribution to the economy and food security. **CO2:** Apply appropriate crop production techniques for tropical, sub-tropical, and temperate fruit crops, including planting density, propagation methods, and aftercare practices, to optimize growth and yield. **CO3:** Evaluate the effectiveness of various resource management strategies, including water, nutrient, and weed management, in enhancing the productivity and sustainability of fruit and plantation crops. **CO4:** Analyze the causes and impacts of physiological and pathological disorders in fruit and plantation crops, developing effective management strategies to address these challenges. **CO5:** Estimate the economic viability of different value addition techniques for fruit and plantation crops, assessing processing methods and market strategies to enhance profitability.

BSAC48253- Production Technology of Fruit and Plantation Crops Lab	**CO1:** Understand various propagation techniques for key fruit crops (mango, banana, papaya, guava, etc.) and the criteria for selecting high-quality planting materials and varieties to ensure optimal growth and productivity. **CO2:** Apply important cultural practices, including nursery management, seedling selection, and fertilizer application, to enhance the growth and yield of fruit crops such as grapes, citrus, pomegranate, and jackfruit. **CO3:** Develop and implement protocols for micro-propagation and mass multiplication of fruit crops, focusing on techniques for successful hardening of seedlings and ensuring their adaptability to field conditions. **CO4:** Identify nutritional disorders, pests, and diseases affecting coconut, arecanut, cocoa, tea, coffee, rubber, and cashew crops, and evaluate effective management strategies to mitigate these challenges. **CO5:** Visit commercial orchards and plantation industries to evaluate best practices in management, production techniques, and the economic viability of various fruit and plantation crops, enhancing their understanding of industry standards.
BSAC50150- Fundamentals of Extension Education	**CO1:** Understanding of the basic concepts, definitions, objectives, principles, and planning processes involved in education and extension education. **CO2:** Analyze the historical evolution and contemporary trends of extension systems in India, covering both pre-independence and post-independence efforts. **CO3:** Evaluate social justice and poverty alleviation programs, along with rural and community development initiatives, to understand their role in sustainable rural growth. **CO4:** Develop practical skills in communication, designing, implementing, and evaluating extension programs using various teaching methods and ICT tools. **CO5:** Explore the adoption of agricultural innovations and gain insights into agriculture journalism, farmer-led extensions, and roles of organizational entities like Commodity Interest Groups (CIGs)

BSAC50151-Fundamentals of Extension Education Lab	**CO1:** Become familiar with the functioning of the university extension system and develop hands-on experience in group discussions and rural leadership identification. **CO2:** Acquire practical skills in designing and utilizing audio-visual aids, and preparing various types of extension literature such as leaflets, booklets, and success stories. **CO3:** Enhance their presentation and micro-teaching abilities through practical exercises, fostering confidence and effectiveness in communication. **CO4:** Gain field exposure by visiting villages, NGOs, and development organizations, understanding rural challenges, PRA techniques, and the roles of key institutions in rural development. **CO5:** Develop media-related skills, including script writing for print and electronic media, and understand the production process for community radio and television programs.
BSAC56200-Fundamentals of Nematology	**CO1:** Recall the history, habitat, diversity, and economic importance of nematodes. **CO2:** Explain the general characteristics of plant-parasitic nematodes. **CO3:** Define nematodes and describe their general morphology and biology. **CO4:** List and classify nematodes up to the family level, emphasizing economically important **CO5:** Apply the classification of nematodes based on feeding/parasitic habits to identify field samples.
BSAC56201-Fundamentals of Nematology Lab	**CO1:** Recall the history, habitat, diversity, and economic importance of nematodes. **CO2:** Explain the general characteristics of plant-parasitic nematodes. **CO3:** Define nematodes and describe their general morphology and biology. **CO4:** List and classify nematodes up to the family level, emphasizing economically important genera. **CO5:** Apply the classification of nematodes based on feeding/parasitic habits to identify field samples.

BSAC41202-Principles and Practices of Natural Farming	**CO1:** Understand the Historical and Ecological Foundations of Natural Farming **CO2:** Illustrate the Principles and Practices of Natural Farming **CO3:** Organize the Environmental and Social Benefits of Natural Farming **CO4:** Develop Sustainable Farm Management Strategies **CO5:** Examine Economic and Entrepreneurial Opportunities in Natural Farming
BSAC41203-Principles and Practices of Natural Farming Lab	**CO1:** Label Natural Farming Principles through Field-Based Learning **CO2:** Utilize Indigenous Technical Knowledge (ITK) for Sustainable Farm Practices **CO3:** Build On-Farm Input and Organic Amendments **CO4:** Develop Techniques for Indigenous Seed Production and Resource Budgeting **CO5:** Evaluate Ecosystem Services and Sustainable Practices in Natural Farming
WHNN99000-Workshop & Seminars / Human Value & Social Service / NSS	**CO1:** Relate to the concept of cognitive development and Big Five personality characteristics. Explain the basic fundamentals of Emotional Intelligence. **CO2:** Develop ability to practice new problem-solving skills in a group and use these skills in personal life. Build coping strategies and adapt balanced self- determined behaviour. **CO3:** Find about the working and mechanism of human nature. Classify and explain group behavior at organizational level and individual level. **CO4:** Organize and plan organizational change and stress management practices. Discover various human values and their importance in real world. **CO5:** Create leadership skills to be effective leader and evaluate the hierarchy of human values.

7. CO PO Mapping

SECA77005	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3		2	3	3	2		2	
CO2	2	3	3	2		2	2		3	3	3	3
CO3	3	2		2	3	2	3	2	2		2	3
CO4	3	3	2	2	2		2		3	2	3	2
CO5	2	3				2	3	3	3	2	3	2

AECA55007	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2		2	2			2	2	2	3
CO2	2		2		3	3	2		2	2	2	3
CO3	3	3	3	3	3		3	2	2	3	3	2
CO4	2	3	3	3		2	2	3	3	2		2
CO5	2	3	3	3	3	2	2	2	2	2	2	2

AECA55008	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	2	2	3	3	2	2		3
CO2	3	3		2				2	2	2		2
CO3	3	3	2	2		2		2		2	2	
CO4	3	2			2		2	2			2	2
CO5	2	2	3	2	2	2	3	3	2	2		3

AECA55009	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3		2		2	2	2	2	2
CO2	3	2	3	2	2			3	3		1	
CO3	2	3	2	3			2	3	3	2		2
CO4	3	2			3	2	3			2	2	3
CO5	2		3	3	3	2		3	3	2	3	3

BSAC42150	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3		2			2	3	2	2
CO2	2			2	2		3	3	3		3	
CO3	3	3	2				2	2	3	2		2
CO4	3	2	2	3		2			2	3	2	2
CO5	2		3	3	3	3		3	3	3	3	3

BSAC42151	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	3	3		2	2	2		3	2
CO2		2		3	2	3	2	2	2	3	2	2
CO3	3	3	3		3	3	3			3	3	
CO4	2		2	2	2	3	3	2		3	3	2
CO5	3	3	3	3	3	3		2	3		3	

BSAC41200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3		3	3		2	3	1	3
CO2	3		3		2	2	3	2	2	2	3	2
CO3	2	3	3	3		3	3	3			3	3
CO4	2	2	2	3	3	2	3		2		3	3
CO5	2	2		3	3	2	3		2		3	3

BSAC41201	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3			2	2		3	2
CO2	3		3		2	2	3	2		2	3	2
CO3	3	3	3	3		3	3	3			3	3
CO4	2	2		3	3	2	3		2		3	3
CO5	3	3		3		3	3		2	3		3

BSAC48252	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	2	3	3	2	2	2	3
CO2	3	3	2	3	3		3	2	3	2		3
CO3	3	3	2	2	3	2	3	3	3		2	3
CO4	2	2	2	3		3	2		3	2	2	3
CO5	3	2	3	3		3		2	2	3	3	2

BSAC81253	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	3	3	3	3	2	3	2	3	2
CO2	2	3	2	3	2		2	3	2	3		2
CO3	3	3	3		3	2	3	2		2	2	3
CO4	3	3	2	3	3	3	2	3	2	3		3
CO5	2		3	2	3	2	3	2	3	2	3	3

BSAC50150	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2		2	2		2	2	3	3	
CO2	2	3	3	2		3	2		2	2	2	2
CO3	3	2		2	2	2	3		2		3	3
CO4	3	2	2	2	3		2	3	3		2	3
CO5	3	3	3	3		2	3	3	3	3		2

BSAC50151	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		3	2	2	2	3	2	2	3		2	3
CO2	3				3		3	3	2		3	2
CO3	2	2	2	2	2	2		2		2	2	
CO4	3	2		3		2	2	2	2	3		2
CO5	2	2	3	2	2		2		3		2	3

BSAC56200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	3	2	2	2	3		2
CO2	3	3	3			3	3	2	2	3	3	2
CO3	3	3	3	3	2	3	3	3	2	2		3
CO4	3	3	3	3	3	2		2	3	2	2	3
CO5	3	3	3	3	2		3	2		3	3	3

BSAC56201	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2		2	2	2	3	3		3	2
CO2	2	2	3	3		2	3	2	3	2	3	2
CO3	3	3	2	2	3		3	3	3	3	2	3
CO4	2		3	2	3	3	2		3	2	2	3
CO5	3	3	3	3	2	3	3	2		3	3	3

BSAC41202	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3		2	2		2	3	2		3
CO2	3	2	2	2	2	2		2	2	2	2	2
CO3	3		3	3	2	2	2			3	2	
CO4	3	3	2	2	2			2	2		2	2
CO5		2	2	3	2	3	2	3	2	2	3	3

BSAC41203	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3		2	3	3	2	2	3			3	2
CO2	3	3		3	2			2	2	3		2
CO3	2		2			3	2	3		3	2	
CO4	3	3	2	3	2	3	3	3		3		3
CO5	2	3			2	3	3		3		2	3

WHNN99000	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			2	3	3	2	2	2			3	2
CO2	3	3		3	2			2	2	3		2
CO3	2		2			3	2	3		3	2	
CO4	3	3	2	3	2	3	3	3		3		3
CO5	2	3			2	3	3		3		2	3

8. Curriculum

Course Name: Beneficial insect farming Lab

Course Code: SECA77005

Course Outline

Honey bee species and their castes, Bee keeping equipment's, Seasonal management and migration of honey bees, Honey bee pasturage, foraging and communication, Pests and diseases of honey bee, Types of silkworms, voltinism, Biology of silkworm, Cultivation of silkworm food plants, Rearing techniques of silkworm, Species of lac insect and their host plant identification.

Course Name: Entrepreneurship Development and Business Communication

Course Code: AECA55007

Course Outline

Unit-I: Development of entrepreneurship, motivational factors, social factors, environmental factors, characteristics of entrepreneurs, entrepreneurial attributes/competencies. Concept, need for and importance of entrepreneurial development. Evolution of entrepreneurship, objectives of entrepreneurial activities, types of entrepreneurs, functions of entrepreneurs, importance of entrepreneurial development, and process of entrepreneurship development. Environment scanning and opportunity identification need for scanning: spotting of opportunity, scanning of environment identification of product / service: starting a project; factors influencing sensing the opportunities. Infrastructure and support systems: good policies, schemes for entrepreneurship development; role of financial institutions, and other agencies in entrepreneurship development.

Unit-II: Steps involved in functioning of an enterprise. Selection of the product / services, selection of form of ownership; registration, selection of site, capital sources, acquisition of manufacturing know how, packaging and distribution. Planning of an enterprise, project identification, selection, and formulation of project; project report preparation, Enterprise Management. Production management: product, levels of products, product mix, quality control, cost of production, production controls, Material management. Production management: raw material costing, inventory control. Personal management: manpower planning, labour turn over, wages / salaries.

Unit-III: Financial management /accounting: funds, fixed capital and working capital, costing and pricing, long term planning and short-term planning, book keeping, journal, ledger, subsidiary books, annual financial statement, taxation. Marketing management: market, types, marketing assistance, market strategies. Crisis management: raw material, production, leadership, market, finance, natural etc.

Suggested Readings

1. Charantimath, P.M. 2009, Entrepreneurship Development and Small Business Enterprises. Pearson Publications, New Delhi.
2. Desai, V. 2015, Entrepreneurship: Development and Management, Himalaya Publishing House.
3. Gupta, C.B. 2001. Management Theory and Practice. Sultan Chand & Sons.
4. Indu Grover. 2008. Handbook on Empowerment and Entrepreneurship. Agrotech Public Academy.
5. Khanka, S.S. 1999. Entrepreneurial Development. S. Chand & Co.
6. Mehra, P. 2016, Business Communication for Managers. Pearson India, New Delhi.
7. Pandey, M. and Tewari, D. 2010, The Agribusiness Book. IBDC Publishers, Lucknow.
8. Singh, D. 1995. Effective Managerial Leadership. Deep & Deep Publ.
9. Singhal, R.K. 2013, Entrepreneurship Development & Management, Katson Books.
10. Tripathi, P.C. and Reddy, P.N. 1991. Principles of Management. Tata McGraw Hill.
11. Vasant Desai, 1997. Small Scale Industries and Entrepreneurship. Himalaya Publ. House.

Course Name: Entrepreneurship Development and Business Communication Lab

Course Code: AECA55008

Course Outline

Visit to small scale industries/agro-industries, Interaction with successful entrepreneurs/ agric- entrepreneurs. Visit to financial institutions and support agencies. Preparation of project proposal for funding by different agencies.

Course Name: Physical Education, First Aid, Yoga Practices and Meditation Lab

Course Code: AECA55009

Course Outline

Physical education; Training and Coaching - Meaning and Concept; Methods of Training; aerobic and aerobic exercises; Calisthenics, weight training, circuit training, interval training, Fartlek training; Effects of Exercise on Muscular, Respiratory, Circulatory and Digestive systems; Balanced Diet and Nutrition: Effects of Diet on Performance; Physiological changes due to ageing and role of regular exercise on ageing process; Personality, its dimensions and types; Role of sports in personality development; Motivation and Achievements in Sports; Learning and Theories of learning; Adolescent Problems and its Management; Posture; Postural Deformities; Exercises for good posture.

Yoga; History of Yog, Types of Yog, Introduction to Yog

• Asanas (Definition and Importance) Padmasan,san, Vajrajasan, Shashankasan, Pashchimotasan, Ushtrasan, Tadasan, Padhastasan, Ardhchandrasan, Bhujangasan, Utanpadasan, Sarvangasan, Parvatasan, Patangasan, Shishupalanasan – left leg-right leg, Pavanmuktasan, Halasan, Sarpasan, Ardhdhanurasan, Sawasan

• Suryanamskar Pranayama (Definition and Importance) Omkar, Suryabhedan, Chandrabhedan,

AnulomVilom, Shitali, Shitkari, Bhastrika, Bhramari

• Meditation (Definition and Importance), Yogic Kriyas (Kapalbhati), Tratak, Jalneti and Tribandh

• Mudras (Definition and Importance) Gyanmudra, Dhyanmudra, Vayumudra, Akashmudra, Pruthvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanmudra

• Role of yoga in sports

• Teaching of Asanas – demonstration, practice, correction and practice.

History of sports and ancient games, Governance of sports in India; Important national sporting events; Awards in Sports; History, latest rules, measurements of playfield, specifications of equipment, skill, technique, style and coaching of major games (Cricket, football, table Tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho) and Athletics

Need and requirement of first aid. First Aid equipment and upkeep. First aid Techniques, First aid related with Respiratory system. First aid related with Heart, Blood and Circulation. First aid related with Wounds and Injuries. First aid related with Bones, Joints Muscle related injuries. First aid related with Nervous system and Unconsciousness. First aid related with Gastrointestinal Tract. First aid related with Skin, Burns. First aid related with Poisoning. First aid related with Bites and Stings. First aid related with Sense organs, Handling and transport of injured traumatized persons. Sports injuries and their treatments.

Course Name: Principle of Genetics

Course Code: BSAC42150

Course Outline

Unit-I: Pre and post Mendelian concepts of heredity, Mendelian principles of heredity, Study of model organisms (Drosophila, Arabidopsis, Garden pea, E. coli, and mice), Architecture of chromosomes, chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere, special types of chromosomes, Chromosomal theory of inheritance- cell cycle and cell division-mitosis and meiosis. Probabilit and Chi-square. Types of DNA and RNA, Dominance relationships, Epistatic interactions with example, Introduction and definition of cytology, genetics and cytogenetics and their interrelation.

Unit-II: Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanism, chromosome mapping, Structural and numerical variations in chromosomes and their implications, Use of haploids, dihaploids and double haploids in Genetics, Mutation, classification, Methods of inducing mutations, mutagenic agents and induction of mutation. Qualitative and quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance, Nature, structure and replication of genetic material, Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation.

Suggested readings

1. Fundamentals of Genetics: B. D. Singh
2. Genetics: M. W. Strickberger.
3. Principles of Genetics: Gardner, Simmons and Snustad.
4. Principles of Genetics: Sinnott, Dunn and Dobzhansky

Course Name: Principle of Genetics Lab

Course Code: BSAC42151

Course Outline

Study of microscope, Study of cell structure, Mitosis and Meiosis cell division, Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Practice on mitotic and meiotic cell division, Experiments on probability and chi-square test, Determination of linkage and croo-over analysis (through two point test cross data), Study on sex linked inheritance in Drosophila. Study on models on DNA and RNA structures.

Course Name: Crop Production Technology-I (Kharif crops)

Course Code: BSAC41200

Course Outline

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Kharif crops. Cereals- rice, maize, sorghum, pearl millet, finger millet and other minor millets, pulses- pigeonpea, mungbean and urdbean; oilseeds- groundnut, soybean, sesame, castor; fibre crops- cotton and jute; forage crops- sorghum, cowpea, cluster bean, maize, guinea and napier.

Suggested Readings

1. B. Gurarajan, R. Balasubramanian and V. Swaminathan. Recent Strategies on Crop Production. Kalyani Publishers, New Delhi.
2. Chidda Singh.1997. Modern techniques of raising field crops. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Rajendra Prasad. Textbook of Field Crops Production - Commercial Crops. Volume II ICAR Publication.
4. S.R. Reddy. 2009. Agronomy of Field Crops. Kalyani Publishers, New Delhi.
5. S.S. Singh. 2005. Crop Management. Kalyani Publishers, New Delhi.
6. UAS, Bangalore. 2011. Package of Practice. UAS, Bangalore.
7. Subhash Chandra Bose, M. and Balakrishnan, V. 2001. Forage Production. South Asian Publishers, New Delhi.

Course Name: Crop Production Technology-I (Kharif crops) Lab

Course Code: BSAC41201

Course Outline

Rice nursery preparation, transplanting of rice, sowing of soybean, pigeon pea and mungbean, maize, groundnut and cotton, effect of seed size on germination and seedling vigour of Kharif crops, effect of sowing depth on germination of Kharif crops, identification of weeds in Kharif crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of Kharif crops, study of crop varieties and important agronomic experiments at experiential farm, recording biometric observations, Study of forage experiments, morphological description of Kharif crops, silage and hay making, visit to research centres of related crops.

Course Name: Production Technology of Fruit and Plantation Crops

Course Code: BSAC48252

Course Outline

Unit-I: Production status of fruit and plantation crops: Importance and scope of fruit and plantation crop industry in India; nutritional value of fruit crops; classification of fruit crops; area, production, productivity and export potential of fruit and plantation crops. Crop production techniques in tropical, sub-tropical and temperate fruit crops: Climate and soil requirements, varieties, propagation and use of rootstocks, planting density and systems of planting: High density and ultra-high density planting, cropping systems, after care – training and pruning; water, nutrient and weed management, fertigation, special horticultural techniques, plant growth regulation, important disorders, maturity indices and harvest, value addition.

Unit-II: Fruit crops: mango, banana, papaya, guava, sapota, citrus, grape, litchi, pineapple, pomegranate, apple, pear, peach, strawberry, nut crops Jackfruit and minor fruits- date, ber, apple, plantation crops-coconut, arecanut, cashew, tea, coffee and rubber.

Unit-III: Crop production techniques in palms and plantation crops: Climate and soil requirements, varieties, propagation, nursery management, planting and planting systems, cropping systems, after care, training and pruning for plantation crops, water, nutrient and weed management, intercropping, multi-tier cropping system, mulching, special horticultural practices, maturity indices, harvest and yield, pests and diseases, processing- value addition

Palms: Coconut, Arecanut, Oil palm and Palmyrah, Plantation crops: Tea, Coffee, Cocoa, Cashewnut, Rubber.

Suggested Readings

1. Banday, F.A. and Sharma, M.K.2010 Advances in temperate fruit production. Kalyani Publishers, Ludhiana
2. Bose, T.K., S.K. Mitra and D. Sanyal 2001. Fruits: Tropical and Subtropical (2 volumes) Naya Udyog, Calcutta.
3. Bose, T.K., S.K. Mitra, A.A. Farooqi and M.K. Sadhu (Eds). 1999. Tropical Horticulture Vol.1. Naya Prokash, Calcutta.
4. Chadha, K.L. 2001. Handbook of Horticulture. ICAR, Delhi
5. Chadha, T.R. 2001 Textbook of temperate fruits. ICAR, New Delhi
6. Chattopadhyay, T.K. 2001. A Text Book on Pomology (4 volumes). Kalyani Publishers, Ludhiana.
7. Chattopadhyay. 1998. A textbook on pomology (sub-tropical fruits) vol.III. Published by M/s. Kalyani publishers, Ludhiana, New Delhi, Noida. UP.
8. Chudawat, B. S.1990. Arid fruit culture Oxford &IBH, New Delhi
9. Das, B.C. and Das S.N. Cultivation of minor fruits. Kalyani Publishers, Ludhiana
10. David Jackson and N.E. Laone, 1999. Subtropical and temperate fruit production. CABI publications
11. H.P. Singh and M.M. Mustafa 2009. Banana-new innovations Westville publishing House, New Delhi
12. Kumar, N. 1997. Introduction to Horticulture. Rajalakshmi Publications, Nagercoil, Tamil Nadu.
13. Mitra, S.K., T.K. Bose and D.S. Rathore. 1991. Temperate fruits. Horticulture and allied Publishers, Calcutta.
14. Pal, J.S. 1997. Fruit Growing. Kalyani Publishers, New Delhi.
15. Radha, T. and Mathew, L.2007. Fruit crops. New India publishing Agency
16. Rajput, CBS and Srihari babu, R.1985. Citriculture, Kalyani Publishers, Ludhiana
17. Sadhu, M.K. and P.K. Chattopadhyay. 2001. Introductory Fruit Crops. Naya Prokash, Calcutta.
18. Singh, S.P. 2004. Commercial Fruits. Kalyani Publishers, Ludhiana
19. Symmonds. 1996. Banana, II Edn.Longman, London
20. Veeraragavathatham, D., Jawaharlal, M., Jeeva, S., Rabindran, R and Umapathy, G. 2004 (2nd edition). Scientific fruit culture. Published by M/s. Suri associates, 1362/4, Velraj Vihar Complex, Thadagam Road, Coimbatore- 2

21. W.S. Dhillon. 2013. Fruit production in India. Narendra publishing House, New Delhi
22. Kavino, M, V. Jegadeeswari, R. M. Vijayakumar and S. Balkrishnan. 2018. Production Technology of Fruits and Plantation Crops by Narendra Publishing House.
23. Kumar, N.J. B.M. Md. Abdul Khaddar, Ranga Swamy, P. and Irulappan, I. 1997. Introduction to spices, Plantation crops and Aromatic plants. Oxford & IBH, New Delhi.
24. Nair. 1979. Cashew, CPCRI, Kerela
25. Sharma, A., Kumar, P., Tripathi, V.K. 2024. Production Technology of Fruits and Plantation Crops. Elite Publishing House
26. Thampan, P.K.1981. Handbook of coconut palm. Oxford &IBH, New Delhi.
27. Thompson, P.K.1980. Coconut. Oxford &IBH, New Delhi
28. V. Ponnuswami, M. Kumar; S. Ramesh Kumar and C. Krishnamoorthy 2015. Fruit and Plantation Crops Narendra Publishing House.

Course Name: Production Technology of Fruit and Plantation Crops Lab

Course Code: BSAC48253

Course Outline

Propagation techniques, selection of planting material, varieties, important cultural practices for mango, banana, papaya, guava, sapota, grapes, Citrus (mandarin and acid lime), pomegranate, jackfruit, preparation and application of PGR's for propagation, Micro propagation, protocol for mass multiplication and hardening of fruit crops, Identification and description of varieties, mother palm and seed nut selection, nursery practices, seedling selection, fertilizers application, nutritional disorders, pests and diseases of Coconut, Arecanut and cocoa, Tea and coffee, Rubber and cashew, Visit to commercial orchard and plantation industries.

Course Name: Fundamentals of Extension Education

Course Code: BSAC50150

Course Outline

Unit-I: Education: Meaning, definition and Types; Extension Education: meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning: Meaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); Reorganised Extension System (T&V system) various extension/ agriculture development programs launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP, etc.). Social Justice and poverty alleviation programme: ITDA, IRDP/SGSY/NRLM.

Women Development Programme: RMK, MSY etc. New trends in agriculture extension: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc., Attributes of Innovation, DWCRA, Commodity Interest Groups (CIGs)., Farmers Producer Group (FPG).

Unit-II: Rural Development: concept, meaning, definition; various rural development programs launched by Govt. of India. Community Development: meaning, definition, concept and principles, Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; Method of identification of Rural Leader. Extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programs; transfer of technology: concept and models, capacity building of extension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies; communication: meaning and definition; Principles and Functions of Communication, models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

Suggested readings

1. Adivi Reddy, A. 2001. Extension Education, Sree Lakshmi press, Bapatla.
2. Dahama, O. P. and Bhatnagar, O.P. 1998. Education and Communication for Development, Oxford and IBH publishing Co. Pvt. Ltd, New Delhi.
3. Jalihal, K. A. and Veerabhadraiah, V. 2007. Fundamentals of Extension Education and Management in Extension, Concept publishing company, New Delhi.
4. MuthaiahManoraharan, P. and Arunachalam, R., Agricultural Extension, Himalaya Publishing House (Mumbai).
5. Sagar Mondal and Ray, G. L., Text Book on Rural Development, Entrepreneurship and Communication Skills, Kalyani Publications.
6. Rathore, O. S. et al. 2012. Handbook of Extension Education, Agrotech Publishing Academy, Udaipur.
7. Dudhani, C.M., Hirevenkatgoudar, L.V., Manjunath, L. Hanchinal, S.N. and Patil, S.L. 2004. Extension Teaching Methods and Communication Technology, UAS, Dharwad.
8. Sandhu, A.S. 1993. Text book on Agricultural Communication: Process and Methods. Oxford and IBH Publishing Pvt. Ltd, New Delhi.
9. Singh, A.K., Lakhan Singh, R. and Roy Burman. 2006. Dimensions of Agricultural Extension. Aman Publishing House, Meerut

Course Name: Fundamentals of Extension Education Lab

Course Code: BSAC50151

Course Outline

Unit-I: To get acquainted with university extension system. Group discussion- exercise; Identification of rural leaders in village situation; preparation and use of AV aids, preparation of extension literature (leaflet, booklet, folder, pamphlet news stories and

success stories); Presentation skills exercise; micro teaching exercise; A visit to village to understand the problems being encountered by the villagers/ farmers;

Unit-II: to study organization and functioning of DRDA/PRI and other development departments at district level; visit to NGO/FO/FPO and learning from their experience in rural development; understanding PRA techniques and their application in village development planning; exposure to mass media: visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

Course Name: Fundamentals of Nematology

Course Code: BSAC56200

Course Outline

Unit-I: Introduction: History of phytonematology, habitat and diversity, economic importance of nematodes. General characteristics of plant parasitic nematodes. Nematode: definition, general morphology and biology. Classification of nematodes up to family level with emphasis on groups containing economically important genera. Classification of nematodes on the basis of feeding/ parasitic habit.

Unit-II: Symptomatology, role of nematodes in disease development, Interaction between plant parasitic nematodes and disease-causing fungi, bacteria and viruses. Nematode pests of crops: Rice, wheat, vegetables, pulses, oilseed and fiber crops, citrus and banana, tea, coffee and coconut. Different methods of nematode management: Cultural methods, physical; methods, Biological methods, Chemical methods, Plant Quarantine, Plant resistance and INM.

Suggested readings

1. Economic Nematology-Edited by J.M. Webster
2. Plant Parasitic Nematodes (Vol-1) by Zukerman, Mai, Rohde
3. Plant Parasitic Nematodes of India: Problems and Progress by - Gopal Swarup, D. R. Dasgupta, P. K. Koshy.
4. Text book on Introductory Plant Nematology -R.K. Walia and H.K. Bajaj.

Course Name: Fundamentals of Nematology Lab

Course Code: BSAC56201

Course Outline

Sampling methods, collection of soil and plant samples; Extraction of nematodes from soil and plant tissues following Cobb's sieving and decanting technique, Baermann funnel technique, Picking and counting of plant parasitic nematode. Identification of economically important plant nematodes up to generic level with the help of keys and description: Meloidogyne, Pratylenchus; Heterodera, Tylenchulus, Xiphinema, and Helicotylenchus etc. Study of symptoms caused by important nematode pests of cereals,

vegetables, pulses, plantation crops etc. Methods of application of nematicides and organic amendments.

Course Name: Principles and Practices of Natural Farming
Course Code: BSAC41202

Course Outline

Unit-I: Indian Heritage of Ancient Agriculture, History of Natural Farming, Importance of natural farming in view of climate change, soil health, water use carbon sequestration, biodiversity conservation, food security and nutritional security, and sustainable development goals (SDGs), Concept of natural farming; Definition of natural farming; Objective of natural farming, Essential characteristics and Principles of natural farming; Scope and importance of natural farming. Main Pillars of natural farming; Methods/ types/schools of natural farming. Characteristics and design of a natural farm,

Unit-II: Concept of ecological balance, ecological engineering and community responsibility in natural versus other farming systems, Introduction to concept of ecological, water, carbon and nitrogen foot prints, Concept and evaluation of ecosystem services, integration of crops, trees and animals, cropping system approaches, Biodiversity, indigenous seed production, farm waste recycling, water conservation and renewable energy use approaches on a natural farm, Rearing practices for animals under natural farming, Nutrient management in natural farming and their sources, Insect, pest, disease and weed management under natural farming; Mechanization in natural farming,

Unit-III: Processing, labelling, economic considerations and viability, certification and standards in natural farming, marketing and export potential of natural farming produce and products. Initiatives taken by Government (central/state), NGOs and other organizations for promotion of natural farming and chemical free agriculture, Case studies and success stories in natural farming and chemical free traditional farming, Entrepreneurship opportunities in natural farming.

Suggested reading

1. Ayachit, S.M. 2002. Kashyapi Krishi Sukti (A Treatise on Agriculture by Kashyapa). Brig Sayeed Road, Secunderabad, Telangana: Asian Agri-History Foundation 4: 205.
2. Boeringa, R. (Eed.). 1980. Alternative Methods of Agriculture. Elsevier, Amsterdam, 199 pp.
3. Das, P., Das, S.K., Arya, H.P.S., Reddy, G. Subba, Mishra, A. and others: Inventory of Indigenous Technical Knowledge in Agriculture: Mission mode Project on Collection, Documentation and Validation of Indigenous Technical Knowledge, Document 1 To 7, Indian Council of Agricultural Research, New Delhi.
4. Ecological Farming -The seven principles of a food system that has people at its heart. May 2015, Greenpeace.

5. Ecological Farming, The Seven principles of a food system that has people at its heart. May 2015, Greenpeace
6. FAO. 2018. The 10 elements of agro-ecology: guiding the transition to sustainable food and agricultural system. https://www.fao.org/3/i9037en/i9037en.pdf Agro ecosystem Analysis for Research and Development Gordon R. Conway.1985.
7. Fukuoka, M. 1978. The One-Straw Revolution: An Introduction to Natural Farming. Rodale Press, Emmaus, PA. 181 pp
8. Fukuoka, M. 1985. The Natural Way of Farming: The Theory and Practice of Green Philosophy. Japan Publications, Tokyo, 280 pp.
9. Hill S.B and Ott. P. (Eeds.). 1982. Basic Techniques in Ecological Farming Berkhauser Verlag, Basel, Germany, 366 pp.
10. Hill, S.B. and Ott, P. (Eeds.). 1982. Basic Techniques in Ecological Farming. Berkhauser Verlag, Basel, Germany, 366 pp.
11. HLPE. 2019. Agroeeological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. A report by the High Level Panel of Experts on Food Security and nutrition of the Committee on World Food Security, Rome. https://fao.org/3/ea5602en/ea5602en.pdf.
12. INFRC. 1988. Guidelines for Nature Farming Techniques. Atami, Japan. 38 pp.
13. Khurana, A. and Kumar, V. 2020. State of Organic and Natural Farming: Challenges and Possibilities, Centre for Science and Environment, New Delhi.
14. Malhotra R. and S.D. Babaji. 2020. Sanskrit Non Translatable- The importance of Sanskritizing English. Amaryllis, New Delhi India.
15. Nalini, S. 1996. Vrikshayurveda (The Science of Plant Life) by Surapala. AAHF Classic Bulletin 1. Asian Agri-History Foundation, Brig Sayeed Road, Secunderabad, AP (now Telengana), India. 94pp.
16. Nalini, S. 1999. Krishi-Parashara (Agriculture by Parashara) by Parashara. Brig Sayeed Road, Secunderabad, Telangana: AAHF Classic Bulletin, Asian Agri-History Foundation. 104pp.
17. Nalini, S. 2011. Upavana Vinoda (Woodland Garden for Enjoyment) by Sarangdhara (13th century CE): AAHF Classic Bulletin 8. Asian Agri-History Foundation, Brig Sayeed Road, Secunderabad, AP (now Telangana), India. 64p.
18. Natural Asset Farming: Creating Productive and Biodiverse Farms by David B. Lindenmayer, Suzannah M. Macbeth, et al. (2022)
19. Natural Farming Techniques: Farming without tilling by Prathapan Paramu (2021)
20. Plenty for All: Natural Farming A to Z Prayog Pariwar Methodology by Prof. Shripad A. Dabholkar and Prayog Pariwar Prayog Pariwar (2021)
21. Reyes Tirado. 2015. Ecological Farming- The seven principles of a food system that has people at its heart. Greenpeace Research laboratories. University of Exeter, Ottho Heldringstraat.
22. Shamasastry, R. 1915. Kautilya's Arthashastra.
23. The Ultimate Guide to Natural Farming and Sustainable Living: Permaculture for Beginners (Ultimate Guides) by Nicole Faires (2016)
24. U. K. Behera. 2013. A text Book of Farming System. Agrotech Publishing House, Udaipur.

Course Name: Principles and Practices of Natural Farming Lab

Course Code: BSAC41203

Course Outline

Visit of natural farm and chemical free traditional farms to study the various components and operations of natural farming principles at the farm; Indigenous technical knowledge (ITK) for seed, tillage, water, nutrient, insect-pest, disease and weed management; On-farm inputs preparation methods and protocols, Studies in green manuring in-situ and green leaf manuring, Studies on different types of botanicals and animal urine and dung based non-aerated and aerated inputs for plant growth, nutrient, insect and pest and disease management; Weed management practices in natural farming; Techniques of Indigenous seed production- storage and marketing, Partial and complete nutrient and financial budgeting in natural farming; farming; Evaluation of ecosystem services in natural farming (Crop, Field and System).

9. Lesson Plan

SECA77005 - Beneficial Insects farming Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Honey bee species and their castes	P-1,2,3	Practical
Unit-I	Bee keeping equipment's	P-4,5,6	Practical
Unit-I	Seasonal management and migration of honey bees	P-7,8,9	Practical
Unit-I	Honey bee pasturage, foraging and communication	P-10,11,12	Practical
Unit-I	Pests and diseases of honey bee	P-13,14,15	Practical
Unit-I	Types of silkworm, voltinism	P-16,17,18,19	Practical
Unit-I	Biology of silkworm	P-20,21	Practical
Unit-I	Cultivation of silkworm food plants	P-22,23,24	Practical
Unit-I	Rearing techniques of silkworm	P-25,26,27	Practical
Unit-I	Species of lac insect and their host plant identification	P-28,29,30	Practical

AECA55007 - Entrepreneurship Development and Business Communication

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Development of entrepreneurship, motivational factors, social factors, environmental factors, characteristics of entrepreneurs, entrepreneurial attributes/competencies.	C-1	Lecture
Unit-I	Concept, need for and importance of entrepreneurial development. Evolution of entrepreneurship	C-2	Lecture
Unit-I	Concept, need for and importance of entrepreneurial development. Evolution of entrepreneurship	C-3	Lecture
Unit-I	Objectives of entrepreneurial activities, types of entrepreneurs, functions of entrepreneurs,	C-4	Lecture
Unit-I	Importance of entrepreneurial development, and process of entrepreneurship development.	C-5	Lecture
Unit-I	Environment scanning and opportunity identification need for scanning: spotting of opportunity, scanning of environment identification of product / service: starting a project; factors influencing sensing the opportunities	C-6	Lecture
Unit-I	Classroom Assignment	C-7	Classroom Assignment
Unit-I	Infrastructure and support systems: good policies, schemes for entrepreneurship development; role of financial institutions, and other agencies in entrepreneurship development	C-8	Lecture
Unit-I	Infrastructure and support systems: good policies, schemes for entrepreneurship development; role of financial institutions, and other agencies in entrepreneurship development	C-9	Lecture
Unit-II	Steps involved in functioning of an enterprise	C-10	Lecture
Unit-II	Selection of the product / services, selection of form of ownership; registration, selection of site,	C-11	Lecture

Unit-II	Quiz	C-12	Quiz
Unit-II	Capital sources, acquisition of manufacturing know-how, packaging and distribution.	C-13	Lecture
Unit-II	Clarification Class	C-14	Clarification Class
Unit-II	Planning of an enterprise, project identification,	C-15	Lecture
Unit-II	Selection, and formulation of project; project report preparation, Enterprise Management	C-16	Lecture
Unit-II	Production management: product, levels of products, product mix, quality control, cost of production	C-17	Lecture
Unit-II	Home Assignment		Home Assignment
Unit-II	Production controls, Material management. Production management: raw material costing, inventory control. Personal management:	C-18	Lecture
Unit-II	Production controls, Material management. Production management: raw material costing, inventory control. Personal management:	C-19	Lecture
Unit-II	Quiz	C-20	Quiz
Unit-II	Manpower planning, labour turn over, wages / salaries	C-21	Lecture
Unit-III	Financial management /accounting: funds, fixed capital and working capital, costing and Pricing	C-22	Lecture
Unit-III	Presentation	C-23	Presentation
Unit-III	Short-term planning, book keeping, journal, ledger, subsidiary books, annual financial statement, taxation.	C-24	Lecture
Unit-III	Short-term planning, book keeping, journal, ledger, subsidiary books, annual financial statement, taxation.	C-25	Lecture
Unit-III	Marketing management:	C-26	Lecture
Unit-III	Market, types, marketing assistance, market strategies. Crisis management:	C-27	Lecture
Unit III	Classroom Assignment	C-28	Classroom Assignment
Unit-III	raw material, production, leadership, market, finance, natural	C-29	Lecture
Unit-III	Clarification class	C-30	Clarification class

AECA55008 - Entrepreneurship Development and Business Communication Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Visit to small scale industries/agro-industries,	P-1,2,3	Practical
Unit-I	Interaction with successful entrepreneurs	P-4,5,6	Practical
Unit-I	Agric- entrepreneurs.	P-7,8,9	Practical
Unit-I	Visit to financial institutions and support agencies.	P-10,11,12	Practical
Unit-I	Preparation of project proposal for funding by different agencies.	P-13,14,15	Practical

AECA55009 - Physical Education, First Aid, Yoga Practices and Meditation

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Physical Education	P-1	Practical
Unit-I	Training and Coaching	P-2	Practical
Unit-I	Training Methods I	P-3	Practical
Unit-I	Training Methods II	P-4	Practical
Unit-I	Effects of Exercise I	P-5	Practical
Unit-I	Effects of Exercise II	P-6	Practical
Unit-I	Balanced Diet and Nutrition	P-7	Practical
Unit-I	Physiological Changes Due to Aging	P-8	Practical
Unit-I	Personality Development through Sports	P-9	Practical
Unit-I	Motivation and Achievement in Sports	P-10	Practical
Unit-I	Posture and Postural Deformities	P-11	Practical
Unit-I	History of Yoga	P-12	Practical
Unit-I	Introduction to Asanas	P-13	Practical
Unit-I	Practical Asanas I	P-14	Practical
Unit-I	Practical Asanas II	P-15	Practical
Unit-I	Suryanamaskar	P-16	Practical
Unit-I	Pranayama I	P-17	Practical
Unit-I	Pranayama II	P-18	Practical
Unit-I	Meditation and Mudras	P-19	Practical
Unit-I	Role of Yoga in Sports	P-20	Practical
Unit-I	History of Sports	P-21	Practical
Unit-I	Rules and Techniques of Major Sports I	P-22	Practical
Unit-I	Rules and Techniques of Major Sports II	P-23	Practical
Unit-I	Rules and Techniques of Major Sports III	P-24	Practical
Unit-I	Introduction to First Aid	P-25	Practical
Unit-I	First Aid Techniques I	P-26	Practical
Unit-I	First Aid Techniques II	P-27	Practical
Unit-I	Sports Injuries and Treatments	P-28	Practical
Unit-I	Transport of Injured Persons	P-29	Practical
Unit-I	Course Review and Evaluation	P-30	Practical

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BSAC42150 - Principle of Genetics

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Pre and post Mendelian concepts of heredity	C-1	Lecture
Unit-I	Mendelian principles of heredity	C-2	Lecture
Unit-I	Study of model organisms (Drosophila, Arabidopsis, Garden pea, E. coli, and mice)	C-3	Lecture
Unit-I	Architecture of chromosomes, chromonemata, chromosome matrix	C-4	Lecture
Unit-I	Quiz	C-5	Quiz
Unit-I	Chromomeres, centromere, secondary constriction and telomere,Special types of chromosomes	C-6	Lecture
Unit-I	Clarification class	C-7	Clarification class
Unit-I	Chromosomal theory of inheritance	C-8	Lecture
Unit-I	Cell cycle and cell division-mitosis and meiosis	C-9	Lecture
Unit-I	Class room assignment-I	C-10	Class room assignment
Unit-I	Probabilit and Chi-square	C-11	Lecture
Unit-I	Types of DNA and RNA	C-12	Lecture
Unit-I	Dominance relationships, Epistatic interactions with example	C-13	Lecture
Unit-I	Introduction and definition of cytology, genetics and cytogenetics and their interrelation	C-14	Lecture
Unit-I	Clarification class	C-15	Clarification class
Unit-I	Quiz	C-16	Quiz
Unit-II	Multiple alleles, pleiotropism and pseudoalleles	C-17	Lecture
Unit-II	Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics	C-18	Lecture
Unit-II	Home Assignment		Home Assignment
Unit-II	Linkage and its estimation, crossing over mechanism, chromosome mapping	C-19	Lecture
Unit-II	Structural and numerical variations in chromosomes and their implications	C-20	Lecture
Unit-II	Class room assignment	C-21	Class room assignment
Unit-II	Use of haploids, dihaploids and double haploids in Genetics	C-22	Lecture
Unit-II	Mutation, classification, Methods of inducing mutations, mutagenic agents and induction of mutation	C-23	Lecture
Unit-II	Clarification class	C-24	Clarification class
Unit-II	Presentation	C-25	Presentation
Unit-II	Qualitative and quantitative traits	C-26	Lecture

Unit-II	Polygenes and continuous variations, multiple factor hypothesis	C-27	Lecture
Unit-II	Cytoplasmic inheritance	C-28	Lecture
Unit-II	Nature, structure and replication of genetic material, Protein synthesis	C-29	Lecture
Unit-II	Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation	C-30	Lecture
Unit-II	Home Assignment		Home Assignment

BSAC42151 - Principle of Genetics Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Study of microscope,	P-1	Practical
Unit-I	Study of cell structure,	P-2	Practical
Unit-I	Mitosis and Meiosis cell division,	P-3	Practical
Unit-I	Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross,	P-4	Practical
Unit-I	Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross,	P-5	Practical
Unit-I	Experiments on epistatic interactions including test cross and back cross,	P-6	Practical
Unit-I	Experiments on epistatic interactions including test cross and back cross,	P-7	Practical
Unit-I	Practice on mitotic and meiotic cell division,	P-8	Practical
Unit-I	Practice on mitotic and meiotic cell division,	P-9	Practical
Unit-I	Experiments on probability and chi-square test,	P-10	Practical
Unit-I	Experiments on probability and chi-square test,	P-11	Practical
Unit-I	Determination of linkage and croo-over analysis (through two point test cross data),	P-12	Practical
Unit-I	Determination of linkage and croo-over analysis (through two point test cross data),	P-13	Practical
Unit-I	Study on sex linked inheritance in Drosophila. Study on models on DNA and RNA structures.	P-14	Practical
Unit-I	Study on sex linked inheritance in Drosophila. Study on models on DNA and RNA structures.	P-15	Practical

BSAC41200 - Crop Production Technology-I (Kharif crops)

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Cultivation of Rice	C-1	Lecture
Unit-I	Cultivation of Maize	C-2	Lecture
Unit-I	Cultivation of sorghum	C-3	Lecture
Unit-I	Cultivation of pearl millet	C-4	Lecture
Unit-I	Cultivation of finger millet and other minor millets	C-5	Lecture
Unit-I	Class Room Assignment	C-6	Class Room Assignment
Unit-I	Cultivation of mung bean and urd bean	C-7	Lecture
Unit-I	Cultivation of pigeonpea	C-8	Lecture
Unit-I	Quiz	C-9	Quiz
Unit-I	Cultivation of groundnut and Soybean	C-10	Lecture
Unit-I	Presentation	C-11	Presentation
Unit-I	Cultivation of sesame	C-12	Lecture
Unit-I	Home Assignment		Home Assignment
Unit-I	Cultivation of cotton	C-13	Lecture
Unit-I	Cultivation of jute & Castor	C-14	Lecture
Unit-I	Clarification Class	C-15	Clarification Class

BSAC41201 - Crop Production Technology-I (Kharif crops) Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Rice nursery preparation, transplanting of rice	P-1	Practical
Unit-I	Sowing of soybean, pigeonpea	P-2	Practical
Unit-I	Sowing of mung bean. Maize	P-3	Practical
Unit-I	Sowing of groundnut	P-4	Practical
Unit-I	Sowing of cotton	P-5	Practical
Unit-I	Effect of seed size on germination and seedling vigour of Kharif season crops	P-6	Practical
Unit-I	Effect of sowing depth on germination of Kharif crops	P-7	Practical
Unit-I	Identification of weeds in Kharif season crops	P-8	Practical
Unit-I	Identification of weeds in Kharif season crops	P9,10,11	Practical
Unit-I	Top dressing and foliar feeding of nutrients	P-12	Practical
Unit-I	Top dressing and foliar feeding of nutrients	P-13	Practical
Unit-I	study of yield contributing characters in Kharif crops	P-14	Practical
Unit-I	study of yield contributing characters in Kharif crops	P-15	Practical
Unit-I	study of yield calculation in Kharif crops	P-16	Practical
Unit-I	study of crop varieties at experimental farm	P-17	Practical
Unit-I	study of important agronomic experiments at experimental farm	P-18	Practical
Unit-I	study of important agronomic experiments at experimental farm	P-19	Practical
Unit-I	Study of forage experiments	P-20,21,22	Practical
Unit-I	Study of morphological description of Kharif crops	P-23	Practical
Unit-I	Silage and hay making,	P-24	Practical
Unit-I	Silage and hay making,	P-25,26	Practical
Unit-I	Visit to research centres of related crops	P-27	Practical
Unit-I	Visit to research centres of related crops	P-28,29,30	Practical

BSAC48252 - Production Technology of Fruit and Plantation Crop

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Production status of fruit and plantation crops: Importance and scope of fruit and plantation crop industry in India, Nutritional value of fruit crops	C-1	Lecture
Unit-I	Classification of fruit crops; area, production, productivity and export potential of fruit and plantation crops.	C-2	Lecture
Unit-I	Crop production techniques in tropical, sub-tropical and temperate fruit crops	C-3	Lecture
Unit-I	Climate and soil requirements, varieties, propagation and use of rootstocks, planting density and systems of planting: High density and ultra-high density planting, cropping systems.	C-4	Lecture
Unit-I	Quiz	C-5	Quiz
Unit-I	After care – training and pruning; water, nutrient and weed management, fertigation, special horticultural techniques, plant growth regulation, important disorders, maturity indices and harvest, value addition	C-6	Lecture
Unit-I	Home Assignment		Home Assignment
Unit-II	Crop production techniques of fruts crops-crops: mango, banana, papaya guava, sapota, citrus, grape, litchi, pineapple, pomegranate	C-7	Lecture
Unit-II	Apple, pear, peach, strawberry, nut crop, Jackfruit and minor fruits- date, ber, apple	C-8	Lecture
Unit-II	Class Assignment	C-9	Class Assignment
Unit-II	Plantation crops-coconut, arecanut, cashew, tea, coffee and rubber	C-10	Lecture
Unit-II	Crop production techniques in palms and plantation crops: Climate and soil requirements, varieties, propagation, nursery management, planting and planting systems, cropping systems,	C-11	Lecture
Unit-II	Presentation	C-12	Presentation
Unit-III	Cropping systems, after care, training and pruning for plantation crops, water, nutrient and weed management, intercropping, multi-tier cropping system, mulching, special horticultural practices, maturity indices, harvest and yield, pests and diseases, processing- value addition	C-13	Lecture
Unit-III	Palms: Coconut, Arecanut, Oil palm and Palmyrah, Plantation crops: Tea, Coffee, Cocoa, Cashewnut and Rubber.	C-14	Lecture
Unit-III	Clarification Class	C-15	Clarification Class

BSAC48253 - Production Technology of Fruit and Plantation Crop-Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Propagation techniques, selection of planting material, varieties, important cultural practices for mango and banana	P-1	Practical
Unit-I	Propagation techniques, selection of planting material, varieties, important cultural practices for papaya and guava.	P-2	Practical
Unit-I	Propagation techniques, selection of planting material, varieties, important cultural practices for sapota and grapes.	P-3	Practical
Unit-I	Propagation techniques, selection of planting material, varieties, important cultural practices for Citrus (mandarin and acid lime).	P-4	Practical
Unit-I	Propagation techniques, selection of planting material, varieties, important cultural practices for pomegranate and jackfruit	P-5	Practical
Unit-I	Preparation and application of PGR's for propagation.	P-6	Practical
Unit-I	Micro propagation.	P-7	Practical
Unit-I	Protocol for mass multiplication and hardening of fruit crops.	P-8	Practical
Unit-I	Identification and description of varieties, mother palm and seed nut selection, nursery practices, seedling selection, fertilizers application, nutritional disorders, pests and diseases of coconut.	P-9	Practical
Unit-I	Identification and description of varieties, mother palm and seed nut selection, nursery practices, seedling selection, fertilizers application, nutritional disorders, pests and diseases of arecanut.	P-10	Practical
Unit-I	Identification and description of varieties, mother palm and seed nut selection, nursery practices, seedling selection, fertilizers application, nutritional disorders, pests and diseases of cocoa	P-11	Practical
Unit-I	Identification and description of varieties, mother palm and seed nut selection, nursery practices, seedling selection, fertilizers application, nutritional disorders, pests and diseases of tea and coffee.	P-12	Practical
Unit-I	Identification and description of varieties, mother palm and seed nut selection, nursery practices, seedling selection, fertilizers application, nutritional disorders, pests and diseases of rubber.	P-13	Practical

Unit-I	Identification and description of varieties, mother palm and seed nut selection, nursery practices, seedling selection, fertilizers application, nutritional disorders, pests and diseases of cashew nut.	P-14	Practical
Unit-I	Visit to commercial orchard and plantation industries.	P-15	Practical

BSAC50150 - Fundamentals of Extension Education

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Education: Meaning, Definition, and Types; Extension Education: Meaning, Definition, Scope, and Process; Objectives and Principles of Extension Education	C-1	Lecture
Unit-I	Extension Programme Planning: Meaning, Process, Principles, and Steps in Programme Development	C-2	Lecture
Unit-I	Home Assignment		Home Assignment
Unit-I	Extension Systems in India: Pre-Independence Efforts (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.)	C-3	Lecture
Unit-I	Extension Systems in India: Post-Independence Efforts (Etawah Pilot Project, Nilokheri Experiment, T&V System, and Agriculture Development Programs by ICAR/Govt. of India such as IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP, etc.)	C-4	Lecture
Unit-I	Class Assignment	C-5	Class Assignment
Unit-I	Social Justice and Poverty Alleviation Programs: ITDA, IRDP/SGSY/NRLM; Women Development Programs: RMK, MSY, etc.	C-6	Lecture
Unit-I	New Trends in Agriculture Extension: Privatization, Cyber/E-Extension, Market-Led Extension, Farmer-Led Extension, Expert Systems, and Attributes of Innovation (DWCRA, CIGs, FPGs)	C-7	Lecture
Unit-I	Clarification Class	C-8	Clarification Class
Unit-II	Rural Development: Concept, Meaning, Definition, and Various Rural Development Programs by the Government of India	C-9	Lecture
Unit-II	Community Development: Meaning, Definition, Concept, Principles, and Philosophy; Rural Leadership: Concept, Definition, Types, and Methods of Identification	C-10	Lecture
Unit-II	Quiz	C-11	Quiz
Unit-II	Extension Administration: Meaning, Concept, Principles, and Functions; Monitoring and Evaluation of Extension Programs; Transfer of Technology: Concept, Models, and	C-12	Lecture

	Capacity Building of Extension Personnel		
Unit-II	Extension Teaching Methods: Meaning, Classification (Individual, Group, Mass Contact Methods)	C-13	Lecture
Unit-II	Presentation	C-14	Presentation
Unit-II	ICT Applications in TOT, Media Mix Strategies; Communication: Meaning, Principles, Functions, Models, and Barriers; Agriculture Journalism; Diffusion and Adoption of Innovations	C-15	Lecture

BSAC50151 - Fundamentals of Extension Education Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to University Extension Systems and Group Discussion Exercises	P-1	Practical
Unit-I	Identification of Rural Leaders in a Village Context: Methods and Practical Approaches	P-2	Practical
Unit-I	Preparation and Use of Audio-Visual Aids in Extension Activities	P-3	Practical
Unit-I	Development of Extension Literature: Leaflet, Booklet, Folder, Pamphlet, News Stories, and Success Stories	P-4	Practical
Unit-I	Presentation Skills: Practical Exercises and Techniques for Effective Communication	P-5	Practical
Unit-I	Micro-Teaching Exercises: Practicing Extension Education Delivery	P-6	Practical
Unit-I	Village Visit: Understanding Farmers' and Villagers' Problems and Challenges	P-7	Practical
Unit-I	Study of Organization and Functioning of DRDA (District Rural Development Agency) and PRI (Panchayati Raj Institutions)	P-8	Practical
Unit-II	Study of Development Departments at the District Level: Roles and Contributions	P-9	Practical
Unit-II	Visit to NGO/FO/FPO: Understanding Their Experiences in Rural Development	P-10	Practical
Unit-II	Participatory Rural Appraisal (PRA) Techniques: Concepts and Applications in Village Development Planning	P-11	Practical
Unit-II	Exposure to Mass Media: Visit to Community Radio Stations for Insights on Program Production	P-12	Practical
Unit-II	Visit to Television Studios: Understanding the Process of Program Production for Rural Audiences	P-13	Practical
Unit-II	Script Writing: Writing for Print Media and Developing Scripts for Radio and Television	P-14	Practical
Unit-II	Practical Exercises: Creating Media Content for Rural Development (Print, Radio, and TV)	P-15	Practical

BSAC56200 - Fundamentals of Nematology

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	History of phytonematology, habitat and diversity, economic importance of nematodes.	C-1	Lecture
Unit-I	General characteristics of plant parasitic nematodes.	C-2	Lecture
Unit-I	Nematode: definition, general morphology and biology	C3	Lecture
Unit-I	Class Room Assignment	C-4	Class Room Assignment
Unit-I	Classification of nematodes up to family level with emphasis on groups containing economically important genera.	C-5	lecture
Unit-I	Classification of nematodes on the basis of feeding/ parasitic habit	C-6	Lecture
Unit-I	Home Assignment		Home Assignment
Unit-II	Symptomatology, role of nematodes in disease development, Interaction between plant parasitic nematodes and disease-causing fungi, bacteria and viruses.	C-7	Lecture
Unit-II	Nematode pests of crops: Rice, wheat	C-8	Lecture
Unit-II	Quiz	C-9	Quiz
Unit-II	Nematode pests of crops: vegetables, pulses, oilseed	C-10	lecture
Unit-II	Home Assignment		Home Assignment
Unit-II	Nematode pests of crops: fiber crops, citrus and banana, tea, coffee and coconut.	C-11	Lecture
Unit-II	Presentation	C-12	Presentation
Unit-II	Different methods of nematode management: Cultural methods, physical; methods,	C-13	Lecture
Unit-II	Biological methods and Chemical methods of management, Plant Quarantine, Plant resistance and INM.	C-14	Lecture
Unit-II	Clarification Class	C-15	Clarification Class

BSAC56201 - Fundamentals of Nematology Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Sampling methods, collection of soil and plant samples	P-1	Practical
Unit-I	Extraction of nematodes from soil and plant tissues following Cobb's sieving and decanting technique	P-2	Practical
Unit-I	Baermann funnel technique,	P-3	Practical
Unit-I	Picking of plant parasitic nematode	P-4	Practical
Unit-I	Counting of plant parasitic nematode	P-5	Practical
Unit-I	Identification of economically important plant nematodes up to generic level with the help of keys and description: Meloidogyne	P-6	Practical
Unit-I	Identification of economically important plant nematodes up to generic level with the help of keys and description: Pratylenchus	P-7	Practical
Unit-I	Identification of economically important plant nematodes up to generic level with the help of keys and description: Heterodera	P-8	Practical
Unit-I	Identification of economically important plant nematodes up to generic level with the help of keys and description: Tylenchulus	P-9	Practical
Unit-I	Identification of economically important plant nematodes up to generic level with the help of keys and description: Xiphinema	P-10	Practical
Unit-I	Identification of economically important plant nematodes up to generic level with the help of keys and description: Helicotylenchus	P-11	Practical
Unit-I	Study of symptoms caused by important nematode pests of cereals	P-12	Practical
Unit-I	Study of symptoms caused by important nematode pests of pulses	P-13	Practical
Unit-I	Study of symptoms caused by important nematode pests of plantation crops	P-14	Practical
Unit-I	Methods of application of nematicides and organic amendments.	P-15	Practical

BSAC41202 - Principles and Practices of Natural Farming

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Indian Heritage of Ancient Agriculture & History of Natural Farming	C-1	Lecture
Unit-I	Importance of natural farming in view of climate change, soil health, water use carbon sequestration, biodiversity conservation, food security and nutritional security, and sustainable development goals (SDGs)	C-2,3	Lecture
Unit-I	Concept of natural farming; Definition of natural farming; Objective of natural farming, Essential characteristics and Principles of natural farming	C-4	Lecture
Unit-I	Home Assignment		Home Assignment
Unit-I	Scope and importance of natural farming. Main Pillars of natural farming; Methods/ types/schools of natural farming, Characteristics and design of a natural farm	C-5	Lecture
Unit-I	Concept of ecological balance, ecological engineering and community responsibility in natural versus other farming systems, Introduction to concept of ecological, water, carbon and nitrogen foot prints	C-6	Lecture
Unit-I	Class Room Assignment	C-7	Class Room Assignment
Unit-II	Concept and evaluation of ecosystem services, integration of crops, trees and animals, cropping system approaches, Biodiversity, indigenous seed production, farm waste recycling, water conservation and renewable energy use approaches on a natural farm	C-8,9	Lecture
Unit-II	Quiz	C-10	Quiz
Unit-II	Rearing practices for animals under natural farming, Nutrient management in natural farming and their sources, Insect, pest, disease and weed management under natural farming, Mechanization in natural farming,	C-11	Lecture
Unit-III	Processing, labelling, economic considerations and viability, certification and standards in natural farming, marketing and export potential of natural farming produce and products	C-12	Lecture
Unit-III	Home Assignment		Home Assignment

Unit-III	Initiatives taken by Government (central/state), NGOs and other organizations for promotion of natural farming and chemical free agriculture, Case studies and success stories in natural farming and chemical free traditional farming, Entrepreneurship opportunities in natural farming	C-13,14	Lecture
Unit-III	Clarification class	C-15	Clarification class

BSAC41203 - Principles and Practices of Natural Farming Lab

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Visit of natural farm and chemical free traditional farms to study the various components and operations of natural farming principles at the farm	P-1,2	Practical
Unit-I	Indigenous technical knowledge (ITK) for seed, tillage, water, nutrient, insect-pest, disease and weed management	P-3,4	Practical
Unit-I	On-farm inputs preparation methods and protocols	P-5	Practical
Unit-I	Studies about green manuring in-situ and green leaf manuring	P-6	Practical
Unit-I	Studies on different types of botanicals and animal urine and dung based non-aerated and aerated inputs for plant growth, nutrient, insect and pest and disease management	P-7,8	Practical
Unit-I	Weed management practices in natural farming	P-9,10	Practical
Unit-I	Techniques of Indigenous seed production-storage and marketing	P-11,12	Practical
Unit-I	Partial and complete nutrient and financial budgeting in natural farming	P-13	Practical
Unit-I	Evaluation of ecosystem services in natural farming (Crop, Field and System)	P-14,15	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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