Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC101	**Title of the Course**	Biofertilizer and biopesticide Production	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**0**	**0**	**2**	**2**
Course Objectives	To provide students with hands-on knowledge and skills in the identification, isolation, culturing, and formulation of biofertilizer and biopesticide microbes, to assess their quality parameters and entrepreneurial planning in sustainable agricultural inputs.						

Practical
Microscopic observation and identification of common biofertilizer microbes, Isolation and culturing of nitrogen-fixing (e.g. *Rhizobium*) and phosphate-solubilizing bacteria (PSB), Testing viability, purity, and contamination in biofertilizer samples, Microscopic observation and identification of microbial biopesticide agents (e.g. *Trichoderma*), Preparation of microbial (*Trichoderma harzianum*) and botanical (eg. neem based etc.) biopesticide formulations, environmental and economic impacts of biofertilizers and biopesticides, Demonstration of field-level application methods for biofertilizers and biopesticides, Preparing an entrepreneurship plan for biofertilizers and biopesticides.

Course Outcomes Students will be able to	
CO1	Learn the basic concepts and types of biofertilizers and biopesticides, including their role in sustainable agriculture.
CO2	Learn the methods of production and formulation of biofertilizers and biopesticides through both theoretical and practical approaches.
CO3	Apply and manage biofertilizers and biopesticides effectively to enhance soil fertility, pest control, and crop yield.
CO4	Analyze the environmental and economic impacts of biofertilizers and biopesticides, promoting their use for ecological sustainability.
CO5	Learn the skills required for entrepreneurship in the biofertilizer and biopesticide sector, including production techniques, regulatory requirements, and market strategies.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	3	3	3	3	3	2	2	2	3	2
CO2	2	3	3	3	3	2	2	2	2	3	3	3	3	2	2
CO3	1	2	2	2	3	3	3	3	3	2	2	2	2	2	2
CO4	2	3	2	2	2	3	3	2	2	3	2	3	2	2	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC102	**Title of the Course**	Mushroom production Technology	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**0**	**0**	**2**	**2**
Course Objectives	To provide students with foundational knowledge of mushroom biology, including internal structure, types, and their nutritional and medicinal value including cost-benefit analysis and marketing strategies.						

Practical
Internal Structure of Mushroom, History of Mushroom Cultivation. Types of Mushroom- edible mushrooms and poisonous mushrooms. Nutritional and medicinal value of edible mushrooms. Types of edible mushrooms available in India - *Volvariella volvacea*, *Pleurotus citrinopileatus*, *Agaricus bisporus*. Substrates (locally available) Polythene bag, vessels, Inoculation hook, inoculation loop, low-cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Pure culture: Medium, sterilization, preparation of spawn, multiplication. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation- Low-cost technology, Composting technology in mushroom production. Short-term storage (Refrigeration - upto 24 hours) Long term Storage (canning, pickels, papads), drying, storage in salt solutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content - Vitamins. Cost benefit ratio - Marketing in India and abroad

Course Outcomes Students will be able to	
CO1	Identify and classify different types of edible and medicinal mushrooms based on their morphology, anatomy, and propagation characteristics.
CO2	Analyze climatic and composting requirements essential for successful mushroom cultivation, including substrate preparation and management techniques.
CO3	Demonstrate practical skills in mushroom cultivation, from spawn preparation to harvesting, ensuring high yield and quality.
CO4	Implement disease and pest management strategies to minimize losses and maintain sustainable mushroom farming practices.
CO5	Develop value-added mushroom products such as pickles, powders, and dried mushrooms to enhance market potential and self-employment opportunities

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	1	1	1	2	2	1	1	3	2	2
CO2	2	3	3	2	3	2	1	1	2	2	1	1	3	3	2
CO3	2	3	3	3	3	2	1	2	2	3	2	2	3	3	3
CO4	2	3	3	2	3	3	2	2	3	3	2	2	3	3	3
CO5	2	2	2	2	3	3	2	2	3	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC104	**Title of the Course**	Post harvest Processing Technology	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**0**	**0**	**2**	**2**
Course Objectives	To provide students with hands-on knowledge and practical skills to minimize post-harvest losses, identify storage disorders, and apply post-harvest treatments and preservation techniques for improving shelf life and quality of horticultural produce. The course also aims to develop entrepreneurial capabilities in value addition and storage technologies.						

Practical
Identification of different types of post-harvest losses-mechanical, physiological, and pathological. Study of maturity indices and proper harvesting techniques. Handling and post-harvest practices for various horticultural crops. Identification of storage disorders such as chilling injury and shrivelling. Sorting, grading, and packaging of fruits and vegetables using suitable packaging materials. Application of post-harvest treatments: chemical dips, hot water treatment, and waxing. Preparation of value-added products such as jam, jelly, squash, pickles, and dehydrated products. Demonstration of pre-cooling, sun drying, and cabinet drying. Exposure to cold storage, Controlled Atmosphere (CA) storage, and Modified Atmosphere Packaging (MAP). Calculation and application of preservative doses like potassium metabisulphite (KMS) and citric acid. Field visits to cold storage units and horticultural processing industries for commercial insight.

Course Outcomes	
Students will be able to	
CO1	Identify the causes of post-harvest losses and apply appropriate handling and storage techniques to minimize them.
CO2	Develop hands-on skills in grading, sorting, packaging, and value-added product preparation from fruits and vegetables.
CO3	Capable of selecting and operating post-harvest machinery and equipment for small and medium-scale enterprises.
CO4	Understand and apply food safety guidelines, quality control parameters, and hygienic processing protocols.
CO5	Acquire entrepreneurial and technical knowledge to start small-scale food processing ventures or work in the post-harvest industry.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	2	1	3	2	3	1	2	2	1	1	3	1
CO2	2	2	2	2	1	1	2	3	1	2	2	3	2	2	2
CO3	2	2	3	1	1	3	2	2	1	2	2	2	3	2	1
CO4	1	2	3	1	1	1	2	2	1	1	2	3	3	2	1
CO5	2	2	2	1	1	3	2	2	2	2	2	3	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC109	**Title of the Course**	Poultry Production Technology	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	**0**	**0**	**2**	**2**
Course Objectives	To equip students with practical knowledge and hands-on skills in the rearing, management, and health care of poultry birds for meat and egg production along with essential record-keeping and first aid for flock health management.						

Practical
Orientation. Rearing of backyard poultry chicks (local and improved e.g., *Giriraja*). Setting and management of broiler poultry farm. Management of poultry for egg production (layers). Brooding and Management of Chicks; Setting up of brooder house, handling of chicks, vaccination. Feeding and Watering and lighting management. Management of Poultry birds; light management, vaccination, debeaking, feeding and watering. Egg collection and storage. Quality egg production. Factors affecting egg quality. Assessment of egg quality. Preparation of poultry feed. Factors affecting feed quality. Storage of feed ingredients. Record Maintenance. Management of farm equipment. Farm waste management; composting; vermicomposting; biogas production Economic analysis of poultry production. Maintaining the register for income and expenditure on the animals allotted to work out the economics. First Aid and flock health management.

Course Outcomes Students will be able to	
CO1	Understand the principles of poultry production, including breed selection, nutrition, and housing management.
CO2	Explain and implement disease prevention strategies, biosecurity measures, and vaccination protocols in poultry farming.
CO3	Apply efficient poultry management practices to optimize growth, egg production, and overall flock health.
CO4	Analyze and address challenges related to market fluctuations, animal welfare, and environmental sustainability in poultry production.
CO5	Develop problem-solving skills to enhance productivity, profitability, and sustainability in poultry farming.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	1	1	1	2	2	1	2	3	2	2
CO2	2	3	2	3	3	2	2	2	2	2	1	3	3	3	2
CO3	3	3	3	3	3	2	2	2	3	2	2	3	3	3	3
CO4	2	3	3	3	3	3	3	2	3	3	2	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC105	**Title of the Course**	Beneficial Insect Farming	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**0**	**0**	**4**	**4**
Course Objectives	To provide students with comprehensive knowledge on the identification, classification, and ecological roles of beneficial insects in agriculture, including pollinators and natural enemies and exploring entrepreneurial opportunities in beneficial insect farming for sustainable crop production.						

Practical
Importance of beneficial insects in Agriculture, Identification and classification of beneficial insects, Field observation and survey of beneficial insects in crop ecosystems, Methods of bee rearing, equipment used, seasonal management of bees, Demonstration of insect-pest interaction and natural pest control mechanisms, Mass-rearing techniques of beneficial insects (e.g., *Trichogramma*). Mass rearing techniques of host insects (*Corcyra* spp.). Study of pollination biology focusing on pollinators, Role of pollinators in enhancing the yield of crops. Entrepreneurial opportunities in beneficial insect farming

Course Outcomes Students will be able to	
CO1	Recognize different types of beneficial insects and understand their roles in agriculture.
CO2	Develop skills in rearing, handling, and maintaining beneficial insect populations.
CO3	Implement integrated pest management strategies using beneficial insects for sustainable agriculture.
CO4	Analyze the economic and environmental advantages of beneficial insect farming.
CO5	Gain entrepreneurial skills to establish businesses related to beneficial insect farming.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	1	2	1	2	2	1	1	3	2	3
CO2	3	3	2	2	2	2	2	1	2	2	1	2	3	3	3
CO3	3	3	3	2	2	2	2	1	2	2	2	2	3	3	3
CO4	2	2	3	3	2	3	2	2	3	2	2	3	3	3	3
CO5	2	2	3	3	3	3	2	2	3	3	2	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC106	**Title of the Course**	Horticulture Nursery Management	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**0**	**0**	**2**	**2**
Course Objectives	To equip students with practical knowledge and skills in nursery layout and design, propagation techniques, growing media preparation, and management of nursery plants and marketing strategies for commercial nursery operations.						

Practical
Layout and design of nurseries and identifying nursery tools and their maintenance. Preparation of growing media and practice of seed sowing and transplanting. Vegetative propagation methods: cuttings, layering, budding, and grafting. Introduction to propagation structures like polyhouses, mist chambers, and shade nets, and hardening techniques for nursery plants. Pest, disease, and weed management with emphasis on eco-friendly methods. Labeling, packaging, and record-keeping, Preparation of cost sheets and marketing plans for commercial nursery operations.

Course Outcomes Students will be able to	
CO1	Demonstrate knowledge of nursery layout and design, identify various nursery tools, and apply appropriate techniques for their usage and maintenance
CO2	Prepare suitable growing media and perform essential nursery operations such as seed sowing, transplanting, and watering practices.
CO3	Apply vegetative propagation techniques including cutting, layering, budding, and grafting for the multiplication of horticultural plants
CO4	Operate and manage plant propagation structures such as polyhouses, mist chambers, and shade nets, and implement hardening techniques for nursery-raised plants.
CO5	Demonstrate skills in labeling, packaging, record-keeping, cost sheet preparation, and marketing for commercial nursery ventures

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	3	2	3	1	2	2	1	1	3	1
CO2	2	2	2	2	3	1	2	3	1	2	2	3	2	2	2
CO3	2	2	3	1	3	3	2	2	1	2	2	2	3	2	1
CO4	1	2	3	1	3	1	2	2	1	1	2	3	3	2	1
CO5	2	2	2	3	3	3	2	2	2	2	2	3	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC114	**Title of the Course**	Agriculture Waste Management	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**0**	**0**	**4**	**4**
Course Objectives	To introduce students to the principles and practices of agricultural waste management, including the identification, classification, processing of crop and livestock residues and economic viability through case studies and cost-benefit analysis.						

Practical
Introduction to Agricultural Waste: Definition, classification, and characterization of crop residues and animal waste. Sources of Waste: Field residues (e.g., straw, husks), process waste (e.g., fruit peels, bagasse), and livestock waste (dung, urine). Waste Collection and Segregation: Sampling, analysis, and categorization based on degradability, nutrient content, and potential hazards. Composting Techniques: Pit method, heap method, NADEP, vermicomposting, aerobic vs. anaerobic decomposition, turning frequency, maturity indicators. Biogas Production: Components of a biogas plant, feedstock preparation, methane generation process, slurry utilization. Waste to Value-Added Products: Preparation of compost, liquid manures (Jeevamrit, Panchagavya), briquettes, and biodegradable packaging. Storage and Marketing: Packaging of compost and organic products, labeling, marketing channels, and entrepreneurship models. Cost-Benefit Analysis: Economics of small-scale composting units and biogas plants; case studies of successful ventures

Course Outcomes **Students will be able to**	
CO1	Identify and classify different types of agricultural wastes (crop residues, livestock waste, agro-industrial by-products) based on their origin, properties, and decomposition characteristics.
CO2	Analyze the environmental, social, and economic implications of improper waste disposal and the benefits of sustainable waste management.
CO3	Demonstrate practical skills in collection, segregation, composting, and processing of agricultural waste into reusable products.
CO4	Implement technologies like biogas production, vermicomposting, and biochar application for efficient and eco-friendly waste utilization.
CO5	Develop value-added products such as organic fertilizers, bio-pesticides, biodegradable packaging, and energy sources from agricultural wastes to promote self-employment and rural entrepreneurship.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	1	2	2	1	2	3	2	3
CO2	3	3	3	3	3	3	2	2	3	2	2	3	3	3	3
CO3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	2	2	3	2	2	3	3	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	SEC120	**Title of the Course**	Analytical techniques and instrumentation for Soil health cards	**L**	**T**	**P**	**C**
Year	I	**Semester**	II	**0**	**0**	**4**	**4**
Course Objectives	To equip students with fundamental knowledge and practical skills in analytical chemistry techniques relevant to soil health assessment, including the preparation of chemical solutions, safe laboratory practices, use of analytical instruments, and soil testing methods for evaluating physical, chemical, and biological properties to support sustainable agricultural practices.						

Practical
Introduction to analytical chemistry, Quality Control, Lab Safety, and Best Practices, Preparation of Molar, Molal, Normal and ppm solution, Introduction to Soil health and Soil health cards, Preparation of solutions for standard curves calibration, Introduction and working principle of pH meter, EC meter, Spectrophotometer, flame Photometer, AAS, Collection and preparation of soil samples for analysis, Determination of pH and electrical conductivity soil organic carbon, available nitrogen, available phosphorus, available potassium, available sulphur, DTPA Micronutrient (Zn, Fe, Cu and Mn), Boron in soil sample, Determination of Soil density and porosity, Moisture content, Soil Texture by Feel Method, texture trangle method, Boyoucos Method, Determination of Soil bacterial count, Soil rhizobium count, Soil dehydrogenate activity, Soil Health Card Generation and nutrient index.

Course Outcomes Students will be able to	
CO1	Understand the principles of analytical chemistry, lab safety, and quality control, and apply best practices in solution preparation (molar, molal, normal, ppm) for soil analysis.
CO2	Demonstrate proficiency in operating laboratory instruments such as pH meter, EC meter, spectrophotometer, flame photometer, and atomic absorption spectrophotometer (AAS)
CO3	Collect, prepare, and analyze soil samples to determine key chemical properties, including pH, EC, organic carbon, available N, P, K, S, and micronutrients like Zn, Fe, Cu, Mn, and B.
CO4	Assess soil physical properties such as density, porosity, moisture content, and texture using various standard methods, including the feel method and Bouyoucos hydrometer method.
CO5	Evaluate soil biological health by estimating bacterial count, Rhizobium population, and dehydrogenase activity, and integrate the results into a Soil Health Card and nutrient index for farm-level decision-making.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	1	2	1	2	2	1	3	3	2	3
CO2	3	3	3	3	3	1	2	2	3	2	2	3	3	3	3
CO3	2	3	3	3	3	1	3	3	3	3	3	3	3	3	3
CO4	3	3	3	2	3	1	3	2	2	3	2	2	3	3	2
CO5	3	3	3	3	3	1	3	3	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG138	**Title of the Course**	*Deeksharambh* (Induction-cum-Foundation Course)-Non gradial	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**0**	**0**	**2**	**2**
Course Objectives	1. Helping students from different backgrounds for cultural Integration 2. Knowing about the operational framework of academic process in university and Instilling life and social skills, leadership qualities, team working spirit. 3. Developing social awareness, ethics and values, creativity						

Course Outcomes	
Students will be able to	
CO1	Understand the university's academic and research framework through direct interactions with faculty and administrators.
CO2	Develop awareness of the subject area, traditional values, indigenous knowledge systems, and global perspectives.
CO3	Gain exposure to real-world success stories through interaction with alumni, employers, and domain experts.
CO4	Identify personal strengths and weaknesses through group activities and peer learning with expert guidance and Enhance personality, communication, and leadership skills through structured sessions on life skills and ethics.

Detailed Activity

i. Discussions on operational framework of academic process in the University, as well as interactions with academic and research managers of the University

ii. Interaction with alumni, business leaders, perspective employers, outstanding achievers in related fields, and people with inspiring life experiences

iii. Group activities to identify the strength and weakness of students (with expert advice for their improvement) as well as to create a platform for students to learn from each other's life experiences

iv. Activities to enhance cultural Integration of students from different backgrounds.

v. Field visits to related fields/ establishments

vi. Sessions on personality development (instilling life and social skills, social awareness, ethics and values, team work, leadership, etc.) and communication skills

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										2		3			
CO2										2		3			
CO3										2		3			
CO4										2		3			

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	LN133	**Title of the Course**	Communication Skills	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**1**	**0**	**1**	**2**
Course Objectives	To acquire competence in oral, written, and non-verbal communication, develop strong personal and professional communication skills, and demonstrate positive group communication.						

Course Outcomes	
Students will be able to	
CO1	Understand the concept, nature, and models of communication and demonstrate the ability to overcome barriers to effective verbal and non-verbal communication
CO2	Develop basic communication skills in listening, speaking, reading, and writing, and apply techniques for summarizing, abstracting, and preparing effective resumes or CVs.
CO3	Apply principles of structural grammar to form correct and coherent sentence structures using modifiers, connecting words, verbal phrases, and clauses
CO4	Demonstrate correct usage of parts of speech including nouns, pronouns, adjectives, adverbs, and articles, ensuring subject-verb agreement and proper sentence construction
CO5	Demonstrate effective communication skills through active listening, accurate note-taking, structured writing, confident oral presentations, and participation in group discussions and interviews, while applying appropriate vocabulary, stage presence, and event organization techniques in professional and academic settings.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Communication Process: The magic of effective communication; Building self-esteem and overcoming fears; Concept, nature, and significance of the communication process; Meaning, types, and models of communication. Verbal and non-verbal communication; Linguistic and non-linguistic barriers to communication and reasons behind communication gap/ miscommunication.	5	CO1
2	**Unit 2**	Basic Communication Skills: Listening, Speaking, Reading, and Writing Skills; Precis writing/ Abstracting/Summarizing; Style of technical communication, Curriculum vitae/resume writing; Innovative methods to enhance vocabulary, analogy questions.	5	CO 2
3	**Unit 3**	Structural and Functional Grammar: Sentence structure, modifiers, connecting words and verbal phrases, and clauses; Case: subjective case, possessive case, objective case	5	CO 3
4	**Unit 4**	Structural and Functional Grammar: Correct usage of nouns, pronouns, and antecedents, adjectives, adverbs, and articles; Agreement of verb with the subject: tense, mood, voice; Writing effective sentences; Basic sentence faults.	3	CO 4
Practical				
Listening and note taking; Writing skills: precis writing, summarizing and abstracting; Reading and comprehension (written and oral) of general and technical articles; Micro-presentations and Impromptu Presentations: Feedback on presentations; Stage manners: grooming, body language, voice modulation, speed; Group discussions; Public speaking exercises; vocabulary building exercises; Interview Techniques; organization of events.			30	CO 5

Suggested Readings:

- Business Communication: Process and Product by Mary Ellen Guffey & Dana Loewy
- Effective Communication Skills by John Nielsen
- The Art of Communicating by Thich Nhat Hanh Academic Writing: A Handbook for International Students by Stephen Bailey
- An Introduction to Functional Grammar by M.A.K. Halliday & Christian Matthiessen
- Soft Skills: The Software Developer's Life Manual by John Sonmez (applies broadly to practical skills)

e-Learning Source:

Integral University, Lucknow

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	1	-	-	-	-	-	-	-	2	2	3	3	-
CO2	-	-	1	-	-	-	-	-	-	-	1	3	3	3	-
CO3	-	-	1	-	-	-	-	-	-	-	-	2	3	2	-
CO4	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-
CO5	-	-	1	1	-	-	-	-	-	-	2	3	3	3	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG139	**Title of the Course**	Farming Based Livelihood Systems	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**2**	**0**	**1**	**3**
Course Objectives	1. To make the students aware about farming-based livelihood systems in agriculture 2 To disseminate the knowledge and skill how farming-based systems can be a source of livelihood						

Course Outcomes	
Students will be able to	
CO1	Analyze the status of agriculture in India and evaluate its impact on the income and livelihoods of rural and urban populations.
CO2	Identify and describe various farming systems and their components, including crops, livestock, horticulture, and integrated models, to understand their role in supporting livelihoods.
CO3	Evaluate the integration of small-, medium-, and large-scale enterprises within agricultural value chains to enhance rural income and sustainability.
CO4	Assess the feasibility of different farming-based livelihood models across diverse agro-climatic zones using case studies and real-world examples.
CO5	Analyze and evaluate diverse farming systems and agri-based livelihood models across agro-climatic zones, assess their components, production potential, and profitability, and apply this knowledge to formulate integrated agri-enterprise projects, including cost-benefit analysis and value chain integration.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Status of agriculture in India and different states, Income of farmers and rural people in India, Livelihood-Definition, concept and livelihood pattern in urban and rural areas, Different indicators to study livelihood systems. Agricultural livelihood systems (ALS): Meaning, approach, approaches and framework	7	CO1
2	**Unit 2**	Definition of farming systems and farming based livelihood systems Prevalent Farming systems in India contributing to livelihood. Types of traditional and modern farming systems. Components of farming system/ farming-based livelihood systems- Crops and cropping systems, Livestock (Dairy, Piggery, Goatry, Poultry, Duckry etc.), Horticultural crops, Agro--forestry systems, Aqua culture Duck/Poultry cum Fish, Dairy cum Fish, Piggery cum Fish etc.	7	CO 2
3	**Unit 3**	Small-, medium- and large- enterprises including value chains and secondary enterprises as livelihood components for farmers, Factors affecting integration of various enterprises of farming for livelihood. Feasibility of different farming systems for different agro-climatic zones, Commercial farming-based livelihood models by NABARD, ICAR and other organizations across the country, Case studies on different livelihood enterprises associated with the farming.	8	CO 3
4	**Unit 4**	Risk and success factors in farming-based livelihood systems, Schemes and programs by Central and State Government, Public and Private organizations involved in promotion of farming-based livelihood opportunities. Role of farming-based livelihood enterprises in 21st Century in view of circular economy, green economy, climate change, digitalization and changing life style.	7	CO 4
Practical				
Survey of farming systems and agricultural based livelihood enterprises, Study of components of important farming based livelihood models/ systems in different agro-climatic zones, Study of production and profitability of crop based, livestock based, processing based and integrated farming based livelihood models, Field visit of innovative farming system models. Visit of Agri-based enterprises and their functional aspects for integration of production, processing and distribution sectors and Study of agri-enterprises involved in industry and service sectors (Value Chain Models), Learning about concept of project formulation on farming-based livelihood systems along with cost and profit analysis, Case study of Start-Ups in agri-sectors.			30	CO 5

Suggested Readings:

Ashley, C. and Carney, D. 1999. Sustainable Livelihoods: Lessons from Early Experience; Department for International Development: London, UK; Volume 7.

Carloni, A. 2001. Global Farming Systems Study: Challenges and Priorities to 2030 – Regional Analysis: Sub-Saharan Africa, Consultation Document, FAO, Rome, Italy

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Dixon, J. and A. Gulliver with D. Gibbon. 2001. Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World. FAO & World Bank, Rome, Italy & Washington, DC, USA
Livelihood Improvement of Underprivileged Farming Community: Some Experiences from Vaishali, Samastipur, Darbhanga and Munger Districts of Bihar by B. P. Bhatt, Abhay Kumar, P.K. Thakur, AmitavaDeyUjjwal Kumar, Sanjeev Kumar, B.K. Jha, Lokendra Kumar, K. N. Pathak, A. Hassan, S. K. Singh, K. K. Singh and K. M. Singh ICAR Research Complex for Eastern Region ICAR Parisar, P.O. Bihar Veterinary College, Patna - 800 014, Bihar
Panwar et al. 2020. Integrated Farming System models for Agricultural Diversification, Enhanced Income and employment, Indian Council of Agricultural Research, New Delhi.
Singh, J.P., et al. 2015. Region Specific Integrated Farming System Models, ICAR-Indian Institute of Farming Systems Research, Modipuram.
Walia, S. S. and Walia, U. S. 2020. Farming System and Sustainable Agriculture, Scientific Publishers, Jodhpur, Rajasthan
e-Learning Source:
http://ndl.ethernet.edu.et/bitstream/123456789/90288/3/Farming%20system%20and%20LA%20handout.pdf \ https://www.scribd.com/document/781312218/CC-112-AGRO-122-Farming-Based-Livelihood-Systems-Theory-Notes-B-Kale

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	2	3	3	2	2	3	3	3	2
CO2	3	3	3	2	1	1	1	2	2	2	2	2	2	2	2
CO3	3	3	3	2	2	2	2	2	2	2	2	2	1	1	2
CO4	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	2	3	3	3	3	2	2	2	2	2	2	2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG140	**Title of the Course**	Rural Sociology and Educational Psychology	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**2**	**0**	**0**	**2**
Course Objectives	Provide knowledge on concept and importance of sociology and rural sociology as well as the relationship with Extension Education						

Course Outcomes	
Students will be able to	
CO1	Understand the fundamental concepts, scope and significance of extension education & role of rural sociology
CO2	Describe the structure and dynamics of social groups, stratification, culture, tradition & Social values
CO3	Analyze the composition & roles of social ogranizations, processes of social control & change along with leadership dynamics
CO4	Comprehend the concepts of educational psychology, intelligence, personality & teaching learning process along with their importance
CO5	Understand the fundamental concepts, scope and significance of extension education & role of rural sociology

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Extension Education and Agricultural Extension: Meaning, definition, scope, and importance. Sociology and rural sociology: Meaning, definition, scope, importance of rural sociology in Agricultural Extension, and interrelationship between rural sociology and Agricultural Extension. Indian Rural Society: important characteristics, differences and relationship between rural and urban societies	6	CO1
2	**Unit 2**	Social Groups: Meaning, definition, classification, factors considered information and organization of groups, motivation in group formation and role of social groups in Agricultural Extension. Social Stratification: Meaning, definition, functions, basis for stratification, forms of social stratification- characteristics and- differences between class and caste system. Cultural concepts: culture, customs, folkways, mores, taboos, rituals. Traditions: Meaning, definition and their role in Agricultural Extension. Social Values and Attitudes: Meaning, definition, types and role of social values and attitudes in agricultural Extension.	7	CO2
3	**Unit 3**	Social Organizations: Meaning, definition, types of organizations and role of social organizations in agricultural Extension. Social Control: Meaning, definition, need of social control and means of social control. Social change: Meaning, definition, nature of social change, dimensions of social change and factors of social change. Leadership: Meaning, definition, classification, roles of leader, different methods of selection of professional and lay leaders. Training of Leaders: Meaning, definition, methods of training, Advantages and limitations in use of local leaders in Agricultural Extension,	7	CO3
4	**Unit 4**	Psychology and educational psychology: Meaning, definition, scope, and importance of educational psychology in Agricultural Extension.	5	CO4
5	**Unit 5**	Intelligence: Meaning, definition, types, factors affecting intelligence and importance of intelligence in Agricultural Extension. Personality: Meaning, definition, types, factors influencing the personality and role of personality in agricultural	6	CO5

		Extension. Teaching: Learning process: Meaning and definition of teaching, learning, learning experience and learning situation, elements of learning situation and its characteristics. Principles of learning and their implication of teaching.		

Suggested Readings:

1. R. Desai -Rural Sociology in India
2. Dahama O. P. and Bhatnagar, O. P. - Education and Communication for Development
3. J.B. Chitambar -Introductory Rural Sociology
4. M.B. Ghorpade- Essential of psychology
5. R Velusamy Textbook on Rural Sociology and Educational Psychology
6. Ray, G. L. -Extension Communication and Management
7. Sandhu A. S. -Textbook on Agricultural Communication

e-Learning Source:

https://agri-bsc.kkwagh.edu.in/uploads/department_course/Rural_Sociology_and_Educational_Psychology.pdf

https://www.youtube.com/watch?v=g5ogEb16YZI

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	2	1	1	3	3	3	3	3	3	3	3	1
CO2	2	3	3	2	1	1	2	3	2	2	3	3	2	2	2
CO3	1	3	3	2	1	1	2	2	2	3	3	3	2	2	1
CO4	1	3	3	2	1	1	3	3	3	3	3	3	2	2	1
CO5	2	1	1	2	1	1	3	3	3	3	3	3	2	2	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG141	**Title of the Course**	Fundamentals of Agronomy	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**2**	**0**	**1**	**3**
Course Objectives	To impart the basic and fundamental knowledge of Agronomy						

Course Outcomes	
Students will be able to	
CO1	Understand agronomical aspects based on different principles.
CO2	Evaluate the crop establishment factors and their impact on crop yield.
CO3	Understand the principle of crop nutrition and their role in enhancing soil fertility.
CO4	Able to evaluate weed management and Integrated Nutrient Management (INM) strategies.
CO5	Students will gain practical knowledge and hands-on experience in identifying field crops, seeds, fertilizers, and weeds; understanding cropping systems and agro-climatic zones; operating tillage implements; performing crop cultivation practices; calculating seed and fertilizer requirements; and conducting seed germination, viability tests, and yield estimations.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Unit 1**	Agronomy and its scope: Definition, meaning and scope of Agronomy; art, science and business of crop production, relation of Agronomy with other disciplines of Agricultural Science, fields crops and classification, importance, ecology and ecosystem. Seeds and sowing: Definitions of crops, variety and seed. Factors affecting crop stands establishment: good quality seed, proper tillage, time of sowing seed rate, depth and method of sowing: broadcasting, drilling, dibbling, transplanting etc. Tillage and tilth: Definition, objectives, types, advantages and disadvantages of tillage including conservation tillage. Crop density and geometry: plant geometry and planting geometry, its effect on growth, yield.	8	CO 1
2	**Unit 2**	Crop nutrition: Definition of essential nutrients, criteria of essentiality, functional elements, classification of essential nutrients, role of macro and micro nutrients. Nutrient absorption, active and passive absorption of nutrients, forms of plant nutrients absorbed by plants, Combined /uncombined forms. Manures and fertilizers, nutrient use efficiency: Sources of nutrients: Inorganic (fertilizers), organic (manures) and bio-fertilizers; their classification and characteristics, method of preparation and role of organic manures in crop production.	7	CO 2
3	**Unit 3**	Integrated Nutrient Management (INM): Meaning, different approaches and advantages of INM. Green manure- role in crop production: Definition, objectives types of green manuring, desirable characteristics, advantages and limitations of green manuring. Water management: Water resources of the world, India and the state; Soil Moisture constants: gravitational water, capillary water, hygroscopic water, Soil moisture constants.	7	CO 3
4	**Unit 4**	Weeds: Definition, Importance and basics of classification of weeds and their control. Agroclimatic zones of India and the state, cropping systems: Factors affecting cropping systems, major cropping patterns and systems in the country. Sustainable crop production: Definition, importance and practices, natural resources and conservation pollution and pollutants, Allelopathy: Meaning and importance in crop production, Growth and development of crops: Definition, Meaning and factors affecting growth and development.	8	CO 4
Practical				
A visit to Instructional Crop farm and study on field crops, Identification of crops, seeds, fertilizers, pesticides, Crops and cropping systems in different Agro-climatic zones of the state, Study of some preparatory tillage implements, Study of inter tillage implements, Practice of ploughing / puddling, Study and practice of inter cultivation in field crops, Numerical exercises on calculation of seed, plant population and fertilizer requirement, Study of yield contributing characters and yield estimation of crops, Identification of weeds in different crops, Seed germination and viability test of seed, Practice on time and method of application of manures and fertilizers.			30	CO 5

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Suggested Readings:
Rao V S. 1992. Principles of Weed Science. Oxford and IBH Publishing Co. Ltd. New Delhi.
Reddy Yellamanda T and Shankar Reddy G H. 1995. Principles of Agronomy. Kalyani Publishers, Ludhiana.
Reddy, S. R. 2008. Principle of Crop Production, Kalyani Publisher, Ludhiana.
William L Donn. 1965. Meteorology. McGraw-Hill Book Co. New York.
Yawalkar K S and Agarwal J P. 1977. Manures and Fertilizers. Agricultural Horticultural Publishing House, Nagpur.
e-Learning Source:

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	1	2	2	2	3	3	3	3	3
CO2	2	2	1	2	2	3	3	3	3	3	2	3	2	3	3
CO3	3	2	2	2	1	1	2	2	2	2	2	3	3	3	3
CO4	2	2	2	3	3	2	2	2	3	2	2	3	2	2	2
CO5	2	2	2	2	2	2	1	2	3	3	3	3	2	2	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG142	**Title of the Course**	Fundamentals of Soil Science	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**2**	**0**	**1**	**3**
Course Objectives	To impart knowledge on soil genesis, basic soil properties with respect to plant growth						

Course Outcomes	
Students will be able to	
CO1	Understand soil forming factors and processes.
CO2	Analyze soil formation factors and processes to classify soils based on their properties and genesis.
CO3	Demonstrate diverse characteristics and functions of soil in relation to soil fertility, nutrient management and soil biology.
CO4	Implementation of integrated approaches of neutron probe, tensiometer, pressure plate methods for soil and land classification.
CO5	Acquire hands-on skills in soil sampling, analysis of physical properties, and water retention characteristics, along with practical experience in nursery raising, crop management, postharvest handling, and marketing, enabling them to apply integrated techniques for effective soil and crop management in agricultural systems.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Composition of earth's crust, soil as a natural body – major components. Eluviation, Illuviation formation of various soils. Rock and Minerals classification, Pedogenic process. Objectives of soil science research institute in India (NBSS and LUP, ISSS, LTFE and NSSTL).	5	CO 1
2	**Unit 2**	Physical parameters; texture – definition, methods of textural analysis, stock's law, assumption, limitations, textural classes, use of textural triangle; Absolute specific gravity/ particle density, definition, apparent specific gravity/bulk density – factors influencing, field bulk density. Relation between BD (bulk density), AD – practical problems. Pore space – definition, factors affecting capillary and non-capillary porosity, soil colour – definition, its significance, colour variable, value hue and chroma. Munsell colour chart, factors influencing, parent material, soil moisture, organic matter, Munsell colour chart, factors influencing, parent material, soil moisture, organic matter, soil structure, definition, classification, clay prism like structure, factors influencing genesis of soil structure, soil consistency, plasticity, Atterberg's constants. Soil air, air capacity, composition, factors influencing, amount of air space, soil air renewal, soil temperature, sources and distribution of heat, factors influencing, measurement	8	CO 2
3	**Unit 3**	chemical properties, soil colloids, organic, humus, inorganic, secondary silicate, clay, hydrous oxides. Ion exchange, cation-anion importance, soil water, forms, hygroscopic, capillary and gravitational, soil moisture constants, hygroscopic coefficient, wilting point, field capacity, moisture equivalent, maximum water holding capacity, energy concepts, PF scale, measurement, gravimetric – electric and tensiometer methods – pressure plate and pressure membrane apparatus–Neutron probe–oil water movement–classification. Soil Biology benefits and harmful effects	8	CO 3
4	**Unit 4**	Aerial photography– satellite of soil features – their interpretation; soil orders; land capability classification; soil of different eco-systems and their properties, Methods and objective of soil survey, Remote sensing application in soil and plant Studies, Soil degradation.	8	CO 4
Practical				
Collection and preparation of soil samples, estimation of moisture, EC, pH and bulk density. Textural analysis of soil by Robinson's pipette method. Description of soil profile in the field. Quantification of minerals and their abundance. Determination of Soil colour using Munsell Chart. Estimation of water			30	CO 5

holding capacity and hydraulic conductivity of soils. Estimation of Infiltration rate using double ring infiltrometer method. Estimation of soil moisture using gypsum block and neutron probe method. Soil compaction measurement with Pentrometer. Determination of pore space of soil. Determination of field capacity and permanent wilting point of soil. Determination of soil water potential characteristic curves by tensiometer and pressure plate apparatus. Aggregate size distribution analysis of soil. Air capacity of soil by fieldmeth Nursery raising/procurement and transplanting, management and maintenance of the crop, postharvest handling, quality control and marketing.		

Suggested Readings:

1. Das D K. 2011. Introductory Soil Science Third Revised Edition Kalyani Publishers. Ludhiana.
2. Fundamentals of Soil Science by Indian Society of Soil Science Second Revised Edition 2009. Indian Society of Soil Science. New Delhi.
3. Nyle C Brady and Weil Ray R. 2016. The Nature and Properties of Soils 15th Edition. Prentice Hall of India Pvt Ltd. New Delhi.
4. Sharma Pradeep K. 2017. Introduction to Soil Physics First Edition Westville Publishing House. New Delhi. REPORT OF THE ICAR SIXTH DEANS' COMMITTEE 888
5. Saha A K. 2008. Text Book of Soil Physics Reprinted. Kalyani Publishers. Ludhiana.
6. Sehgal J A. 2005. Textbook of Paedology Concepts and Applications Kalyani Publishers. Ludhiana.

e-Learning Source:

Open Access Books - Soil Science | InTechOpen https://www.intechopen.com/books/subject/soil-science/books/all/1/list

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	3	3	3	2	3	2	3	2	3	3
CO2	3	3	3	1	2	3	3	3	2	3	3	3	2	3	3
CO3	3	2	1	1	2	2	3	3	1	2	2	3	2	3	3
CO4	3	2	2	2	1	3	3	3	2	2	3	3	2	3	3
CO5	3	1	1	1	1	2	3	3	2	2	3	3	2	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	HT114	**Title of the Course**	Fundamentals of Horticulture	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**2**	**0**	**1**	**3**
Course Objectives	1. To provide knowledge of horticulture in a brief and prescribed manner 2. To familiarize students with principles and practices of management for Horticultural crops						

Course Outcomes	
Students will be able to	
CO1	Understand the significance of Horticulture and influence of climate and soil for production.
CO2	Understand the propagation methods, orchard management, cultural and nutrient application for horticultural crops.
CO3	Able to apply the principles of orchard establishments.
CO4	Know the use of bio-regulators for horticultural crops.
CO5	Identify and classify fruit crops, design orchard layouts, apply nursery and propagation techniques, manage training and pruning practices, prepare and apply fertilizers and plant growth regulators, operate irrigation systems, and carry out post-harvest operations including harvesting, grading, packaging, and storage of horticultural produce.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Horticulture: Its different branches, importance and scope, Horticulture and botanical classification, soil and climate for horticultural crops.	7	CO 1
2	**Unit 2**	Plant propagation: methods and propagation structures, seed dormancy and seed germination, Merits and demerits of sexual and asexual propagation Stock-scion relationship.	7	CO 2
3	**Unit 3**	Principles of orchard establishment, principles and methods of training and pruning of fruit crops, Juvenility and flower bud differentiation, unfruitfulness in horticultural crops, pollination, pollinizers and pollinators, fertilization and parthenocarpy	8	CO 3
4	**Unit 4**	Importance of bio regulators in horticultural crops, irrigation and its methods, Fertilizer application in horticultural crops.	7	CO 4
Practical				
Identification and nomenclature of fruit, Layout of an orchard, pit making and system of planting, Nursery raising techniques of fruit crops, Understanding of plant propagation structures, Propagation through seeds and plant parts, Propagation techniques for horticultural crops, Container, potting mixture, potting and repotting, Training and pruning methods on fruit crops, Preparation of fertilizer mixture and application, Preparation and application of PGR, Layout of different irrigation systems, Maturity studies, harvesting, grading, packaging and storage.			30	CO 5

Suggested Readings:

1. Basics of Horticulture by Jitendra Singh
2. Introduction to Horticulture by N. Kumar
3. Handbook of Horticulture by ICAR
4. Chattopadhyay T K 2013. A Textbook on Pomology Vol I-IV. Kalyani Publications. New Delhi
5. Kumar Prasad 2014. Principles of Horticulture 2nd edn. Agrobios India
6. Peter K V 2009. Basics Horticulture. New India Publishing Agency
7. Singh Neeraj Pratap 2005. Basic concepts of Fruit Science 1st edn. IBDC Publishers

e-Learning Source:

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	3	3	3	2	3	2	3	2	2	2
CO2	3	3	3	1	2	3	3	3	2	3	3	3	2	3	3
CO3	3	2	1	1	2	2	3	3	1	2	2	3	2	3	3
CO4	3	2	2	2	1	3	3	3	2	2	3	3	2	3	3
CO5	3	1	1	1	1	2	3	3	2	2	3	3	2	1	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG143	**Title of the Course**	National Service Scheme I	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**0**	**0**	**2**	**2**
Course Objectives	1. To provide an understanding of the history, objectives, and organizational structure of the National Service Scheme (NSS), including the roles and responsibilities of volunteers. 2. To familiarize students with NSS program activities, including regular and special camps, community surveys, and youth programs under the Government of India. 3. To develop skills in community mobilization, including identifying stakeholders, designing messages, and fostering youth-adult partnerships for social change. 4. To promote awareness of social harmony, national integration, and the role of youth in nation-building, conflict resolution, and peacebuilding. 5. To educate students on citizenship, the Indian Constitution, and human rights, including fundamental rights, consumer rights, and the role of family and community.						

Course Outcomes	
Students will be able to	
CO1	Learn about the history, objectives, principles, and organizational structure of the NSS, along with the code of conduct and responsibilities of NSS volunteers.
CO2	Learn how to plan and participate in NSS program activities, including village/slum adoption, community surveys, and youth programs initiated by the Government of India.
CO3	Learn the techniques of community mobilization, including identifying stakeholders, designing effective messages, and fostering youth-adult partnerships for social development.
CO4	Learn the role of youth in promoting social harmony, national integration, conflict resolution, and peacebuilding for a better society.
CO5	Learn about citizenship, the Indian Constitution, and human rights, including fundamental rights, duties, consumer awareness, and the importance of family and community in social development

Practical

Orientation: history, objectives, principles, symbol, badge; regular programs under NSS, Organizational structure of NSS, Code of conduct for NSS volunteers, points to be considered by NSS volunteers' awareness about health.

NSS program activities: Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analyzing guiding financial patterns of scheme, youth program/ schemes of GOI, coordination with different agencies and maintenance of diary. Understanding youth. Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change.

Community mobilization: Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilization involving youth-adult partnership. Social harmony and national integration. Indian history and culture, role of youth in nation building, conflict resolution and peacebuilding. Volunteerism and shramdaan. Indian tradition of volunteerism, its need, importance, motivation, and constraints; shaman as part of volunteerism. Citizenship, constitution, and human rights: Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information. Family and society. Concept of family, community (PRIs and other community-based organizations) and society

Suggested Readings:

- National Service Scheme: A Youth Volunteers Programme for Undergraduate Students as per UGC Guidelines, Amit Kumar Jain, Brijesh Kumar Rathi, J.D.S. Panwar, ISBN: 9789351247951, Publisher: Daya Publishing House, Year: 2025
- National Service Scheme: Perspectives, Transformation and Prospects, Savita Mishra, Sudip Bhui, Publishers: Jaipur Book Enclave, 2022.
- HAND BOOK National Service Scheme, Sri Vasavi Engineering College (A) Pedatadepalli, Tadepalligudem.

e-Learning Source:

https://nss.gov.in/sites/default/files/manualNss2006.pdf

https://srivasaviengg.ac.in/uploads/nss.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	2	2	2	3	3	3	2	2	2	2
2CO2	2	1	2	3	2	2	2	1	1	1	1	1	2	2	2
CO3	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	3	2	2	2	1	1	1	2	2	2	1	1	1	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	MT160	**Title of the Course**	Introductory Mathematics (Non-gradial)	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**1**	**0**	**0**	**1**
Course Objectives	To equip students with fundamental knowledge and analytical skills in algebra, calculus, and mathematical modeling, enabling them to solve mathematical problems and apply quantitative methods in agricultural and applied sciences.						

Course Outcomes	
Students will be able to	
CO1	Analyze the basic concepts of Algebra.
CO2	Evaluate the concept of matrices, determinants and their properties.
CO3	Evaluate the problems based on differentiation and maxima-minima of functions.
CO4	Analyze the problems based on integration and its methods.
CO5	Analyze the problems based on fitting of curves of various models.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Algebra	Progressions- Arithmetic, Geometric and Harmonic Progressions.	2	CO 1
2	Matrices & Determinants	Matrices: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3rd order by ad joint method, Properties of determinants up to 3rd order and their evaluation.	3	CO 2
3	Differential Calculus	Differential Calculus: Definition - Differentiation of function using first principle, Derivatives of sum, difference, product and quotient of two functions, Methods, Increasing and Decreasing Functions Application of Differentiation- Growth rate, Average Cost, and Marginal cost, Marginal Revenue. Partial differentiation: Homogeneous function, Euler's theorem, Maxima and Minima of the functions of the form y = f (x) and y = f (x1, x2).	4	CO 3
4	Integral Calculus	Integration -Definite and Indefinite Integrals-Methods- Integration by substitution, Integration by parts. Area under simple well-known curves.	3	CO 4
5	Mathematical Models	Agricultural systems, classification of mathematical models- Fitting of Linear, quadratic and exponential models to experimental data.	3	CO 5

Reference Books:

Rastogi SK. 2017 Biomathematics. Krishna Prakashan Media Pvt. Ltd.

Grewal B S. New Edition Higher Engineering Mathematics. Khanna Publishers Delhi.

e-Learning Source:

https://www.hzu.edu.in/agriculture/Mathematics.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3							2	2	3	3	1	3	3
CO2	1	3							2	2	3	3	1	3	3
CO3	1	3							2	1	3	3	1	3	3
CO4	1	3							2	2	3	3	1	2	3
CO5	3	3							2	3	3	3	3	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG119	**Title of the Course**	Introductory Biology	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**1**	**0**	**1**	**2**
Course Objectives	To introduce students to the fundamental concepts of biology including the origin and diversity of life, evolution, cell structure and division, plant morphology and classification, seed biology, and the significance of animals in agriculture, fostering a foundational understanding of biological systems relevant to agricultural sciences.						

Course Outcomes	
Students will be able to	
CO1	Understand the diversity and classification of life forms & their evolutionary relationship
CO2	Understand the concepts of evolution, principles of eugenics, bionomial nomenclature
CO3	Describe cellular structures, cell divisions
CO4	Develop practical skills in plant anatomy, specimen observation and laboratory techniques

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit I**	Introduction to the living world, diversity and characteristics of life, origin of life	7	CO 1
2	**Unit II**	Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division	7	CO 2
3	**Unit III**	Morphology of flowing plants. Seed and seed germination. Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture	8	CO 3
Practical				
Morphology of flowering plants – root, stem and leaf and their modifications. Inflorescence, flower and fruits. Cell, tissues & cell division. Internal structure of root, stem and leaf. Study of specimens and slides. Description of plants - Brassicaceae, Fabaceae and Poaceae.			30	CO 4

Suggested Readings:

1. Biology: The Essentials 2017. by Mariëlle Hoefnagels McGraw-Hill Publishers
2. Life: An Introduction to Biology by George Gaylord Simpson and William S. Beck, Longman Higher Education Publishers
3. Biology: Life on Earth with Physiology by Audesirk/Audesirk/Byers, Pearson Publishers

e-Learning Source:

https://www.cliffsnotes.com/study-guides/biology/biology/the-science-of-biology/introduction-to-biology
https://www.dscc.edu/sites/default/files/bwilliams/Handouts/01%20Introduction%20Lecture%20Notes.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	3	3	2	2	2	3	3	3	2	2	1	3
2CO2	1	1	2	3	2	2	2	1	1	1	1	1	2	2	2
CO3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
CO4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	CA111	**Title of the Course**	Introduction to Computer Applications in Agriculture	**L**	**T**	**P**	**C**
Year	I	**Semester**	I	0		1	1
Course Objectives	This course aims to equip students with foundational knowledge and practical skills in basic computer operations, including internal and external commands, Windows file management, and commonly used software applications such as MS Word, PowerPoint, and Excel fostering skills in digital information sourcing relevant to agriculture.						

Course Outcomes	
The students will	
CO1	Use computer systems efficiently, including hardware, software, and peripherals.
CO2	Have knowledge of word processing, spreadsheets, and presentation software to create and manage documents, spreadsheets, and presentations
CO3	Have the basic knowledge of Agriculture Database
CO4	Have basic knowledge of Biological and Agricultural database and tools
CO5	Use Information and Communication Technology in Agriculture

Practical	**Contact Hrs**	**Mapped CO**
Introduction to basic Computers, Internal/External Commands, Windows Explorer, Basics of spreadsheets: Rows, Columns, and Cells, Basic formulas and functions (SUM, AVERAGE, COUNT, etc.); Working with files and folders, setting time and date, Title Bar, Scroll Bars, Menu and Tool Bars, MS-Word and Power points (Basics) – Text, graphics, Text boxes, viewing the documents, character and paragraph formatting, page setup, header, footer. Memory, Input/Output/Storage Devices, Usage of Biological and Agricultural database and tools. Briefing about retrieval of scientific articles from PubMed database and NAL Online Catalog - AGRICOLA.	30	CO 1, 2, 3, 4, 5

Reference Books:

- Computer Fundamentals – Concepts, System and Applications (2004) by Pradeep K Sinha and Priti Sinha BPB Publications.
- Raja Raman V. (2004), "Introduction to Information Technology". PHL
- Computer Application (MS Office) By Dr S B Kishore; Das Ganu Prakashan, Nagpur
- Computers in Agriculture: Fundamentals and Applications (2016). Manish Kumar Sharma, Anil Bhat and M. Iqbal Jeelani Bhat. New India Publishing Agency- NIPA.
- Introduction to Bioinformatics by Teresa Attwood, David Parry-Smith 1st edition; Prentice Hall publications

e-Learning Source:

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	1	2	1	3	2	2	3	3	3	2	2	3
CO2	2	3	1	2	1	1	3	2	2	3	3	3	3	3	3
CO3	3	3	1	2	2	2	3	1	2	3	3	3	3	3	3
CO4	3	3	2	2	2	2	3	1	2	3	3	3	2	2	1
CO5	2	3	1	1	1	2	3	1	2	3	3	3	3	3	1

2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG144	**Title of the Course**	Personality Development	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	II	**1**	**0**	**1**	**2**
Course Objectives	To make students realize their potential strengths, cultivate their inter-personal skills and improve employability.						

Course Outcomes	
Students will be able to	
CO1	Define personality and explain major theories including Maslow's self-actualization theory and the Myers-Briggs Typology Indicator.
CO2	Assess their own personality types and understand the impact of different personality traits on behavior and performance.
CO3	Analyze individual behavior through models of perception, learning, motivation, and attribution in organizational settings.
CO4	Demonstrate improved emotional intelligence and interpersonal skills for effective team collaboration and conflict resolution.
CO5	Analyze personality types using MBTI and Firo-B tools, identify individual learning styles and motivational needs, and apply principles of interpersonal communication, teamwork, conflict management, and leadership. They will also develop skills to interpret group dynamics, build effective teams, and evaluate real-world organizational behavior through case studies.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Personality Definition, Nature of personality, theories of personality and its types. The humanistic approach - Maslow' s self-actualization theory, shaping of personality, determinants of personality, Myers-Briggs Typology Indicator, Locus of control and performance, Type A and Type B Behaviours, personality and Organizational Behaviour.	5	CO1
2	**Unit 2**	Foundations of individual behavior and factors influencing individual behavior, Models of individual behavior, Perception and attributes and factors affecting perception, Attribution theory and case studies on Perception and Attribution.	5	CO2
3	**Unit 3**	Learning: Meaning and definition, theories and principles of learning, Learning and organizational behavior, Learning and training, learning feedback. Attitude and values,	5	CO3
4	**Unit 4**	Intelligence- types of Intelligence, theories of intelligence, measurements of intelligence, factors influencing intelligence, intelligence and Organizational behavior, emotional intelligence. Motivation- theories and principles, Teamwork and group dynamics.	5	CO4
Practical				
MBTI personality analysis, Learning Styles and Strategies, Motivational needs, Firo-B, Interpersonal Communication, Teamwork and team building, Group Dynamics, Win-win game, Conflict Management, Leadership styles, Case studies on Personality and Organizational Behavior			30	CO5

Suggested Readings:

1.Andrews, Sudhir. 1988. How to Succeed at Interviews. 21st (rep.) New Delhi. Tata McGraw- Hill.
2. Heller, Robert. 2002. Effective Leadership. Essential Manager series. Dk Publishing.
3. Hindle, Tim. 2003. Reducing Stress. Essential Manager series. Dk Publishing.
4. Lucas, Stephen. 2001. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill.
5. Mile, D.J. 2004. Power of Positive Thinking. Delhi. Rohan Book Company.
6. Pravesh Kumar. 2005. All about Self- Motivation. New Delhi. Goodwill Publishing House.
7. Smith, B. 2004. Body Language. Delhi: Rohan Book Company.
8. Shaffer, D. R. 2009. Social and Personality Development (6th Edition). Belmont, CA: Wadswor.

e-Learning Source:

https://agri-bsc.kkwagh.edu.in/uploads/department_course/Rural_Sociology_and_Educational_Psychology.pdf

https://www.youtube.com/watch?v=g5ogEb16YZI

Integral University, Lucknow

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3	3	3	2	2	2	2	2	1	3	3	3
CO2	1	2	2	2	2	1	1	1	2	2	3	3	2	2	2
CO3	2	2	2	3	3	2	2	2	3	3	3	1	2	2	2
CO4	2	2	2	2	1	1	1	2	2	2	3	3	3	3	3
CO5	3	3	3	3	1	2	2	2	2	2	1	1	1	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AGV01	**Title of the Course**	Environmental Studies & Disaster Management	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	**2**	**0**	**1**	**3**
Course Objectives	To expose and acquire knowledge on the environment and to gain the state-of-the-art - skill and expertise on management of disasters						

Course Outcomes	
Students will be able to	
CO1	Understand the structure, scope, and significance of environmental studies and major environmental issues and their interrelationships.
CO2	Classify natural resources and suggest sustainable management practices for their conservation
CO3	Analyze the causes & impacts of different types of environmental pollution and propose relevant control and management strategies.
CO4	Interpret environmental laws, ethical concerns, and social responsibilities related to environmental protection and human welfare.
CO5	Recognize various types of natural and man-made disasters and apply disaster management principles and frameworks for effective risk mitigation and emergency response.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Introduction to Environment - Environmental studies: Definition, scope and importance - Multidisciplinary nature of environmental studies - Segments of Environment - Spheres of Earth - Lithosphere - Hydrosphere - Atmosphere - Different layers of atmosphere. Natural Resources: Classification - Forest resources. Water resources. Mineral resources Food resources. Energy resources. Land resources. Soil resources. Ecosystems: Concept of an ecosystem - Structure and function of an ecosystem - Energy flow in the ecosystem. Types of ecosystem. Biodiversity and its conservation: Introduction, definition, types. Biogeographical classification of India. Importance and Value of biodiversity. Biodiversity hot spots. Threats and Conservation of biodiversity.	7	CO1
2	**Unit 2**	Environmental Pollution: Definition, cause, effects and control measures of: a. Air pollution. b. Water pollution. c. Soil pollution. d. Marine pollution. e. Noise pollution. f. Thermal pollution h. Light pollution. Solid Waste Management: Classification of solid wastes and management methods, Composting, Incineration, Pyrolysis, Biogas production, Causes, effects and control measures of urban and industrial wastes. Social Issues and the Environment: Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.	7	CO2
3	**Unit 3**	Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Human Population and the Environment: Environment and human health: Human Rights, Value Education. Women and Child Welfare. Role of Information Technology in Environment and human health	8	CO3
4	**Unit 4**	Disaster management: Disaster definition - Types - Natural Disasters - Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves. Man Made Disasters: Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, road accidents, rail accidents, air accidents, sea accidents. International and National strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media in disaster management. Central, state, district and local administration in disaster control; Armed forces in disaster response; Police and other organizations in disaster management.	8	CO4
Practical				
Visit to a local area to document environmental assets river/forest/grassland/hill/mountain. Energy: Biogas production from organic wastes. Visit to wind mill / hydro power / solar			30	CO 5

power generation units. Biodiversity assessment in farming system. Floral and faunal diversity assessment in polluted and un polluted system. Visit to local polluted site - Urban/Rural/Industrial/Agricultural to study of common plants, insects and birds. Environmental sampling and preservation. Water quality analysis: pH, EC and TDS. Estimation of Acidity, Alkalinity. Estimation of water hardness. Estimation of DO and BOD in water samples. Estimation of COD in water samples. Enumeration of *E. coli* in water sample. Assessment of Suspended Particulate Matter (SPM). Study of simple ecosystem – Visit to pond/river/hills. Visit to areas affected by natural disaster.		

Suggested Readings:

1. De, A.K. 2010. Environmental chemistry. Published by New Age International Publishers, New Delhi. ISBN:13–978 81 224 2617 5. 384 pp
2. Dhar Chakrabarti, P.G. 2011. Disaster management - India's risk management policy frameworks and key challenges. Published by Centre for Social Markets (India), Bangalore. 36pp.
3. Erach Bharucha, Text book for Environmental studies. University Grants Commission, New Delhi
4. Parthiban, K.T. Vennila, Prasanthrajan, S., Umesh, M. and Kanna, S. 2023. Forest, Environment, Biodiversity and Sustainable development. Narendra Publishing House, New Delhi, India. (In Press).
5. Prasanthrajan M. and Mahendran, P.P. 2008. A text book on Ecology and Environmental Science. ISBN 81-8321-104-6. Agrotech Publishing Academy, Udaipur - 313 002. First Edition: 2008
6. Prasanthrajan M. 2018. Objective environmental studies and disaster management. ISBN 9789387893825. Scientific publishers, Jodhpur, India. Pp. 146.
7. Sharma, P.D. 2009. Ecology and Environment, Rastogi Publications, Meerut, India
8. Tyler Miller and Scot Spoolman. 2009. Living in the Environment (Concepts, Connections, and Solutions). Brooks/cole, Cengage learning publication, Belmont, USA

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	1	1	1	3	1	1	1	1	1	2	1
CO2	2	1	1	1	1	1	1	3	1	1	1	1	1	2	1
CO3	2	1	1	1	1	1	1	3	1	1	1	1	1	2	1
CO4	2	1	1	1	1	1	1	3	1	1	1	1	1	2	1
CO5	2	1	1	1	1	1	1	3	1	1	1	1	1	2	1

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG145	**Title of the Course**	Soil Fertility Management	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	II	**2**	**0**	**1**	**3**
Course Objectives	To provide a comprehensive knowledge of soil fertility, plant nutrition, fertilizers, and nutrient management						

Course Outcomes	
Students will be able to	
CO1	Describe the essential plant nutrients, their roles, deficiency and toxicity symptoms, and mechanisms of uptake and transport.
CO2	Analyze soil fertility using soil and plant analysis methods, interpret nutrient availability, and identify indicator plants.
CO3	Differentiate between types of fertilizers and manures, understand their properties, and apply them effectively in different agricultural settings.
CO4	Develop integrated nutrient management strategies and apply fertilizer recommendation approaches for improved crop production.
CO5	Develop practical skills in operating analytical instruments such as colorimeters and flame photometers, understand their principles and calibration, and gain hands-on experience in the chemical analysis of soils and plants for essential nutrients including nitrogen, phosphorus, potassium, sulfur, calcium, magnesium, and zinc.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of macro and micronutrients.	7	CO1
2	**Unit 2**	Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Introduction and importance of manures and fertilizers. Fertilizer recommendation approaches.	7	CO2
3	**Unit 3**	Integrated nutrient management. Chemical fertilizers: classification, composition and properties of major fertilizers, secondary and micronutrient fertilizers, Complex fertilizers, Customised fertilisers, water soluble fertilizers nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. Methods of fertilizer recommendations to crops.	8	CO3
4	**Unit 4**	Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions. STCR/RTNM/ IPNS, Carbon sequestration and Carbon Trading, Preparation and properties of major manures (FYM, Compost, Vermicompost, Green manuring, Oilcakes).	8	CO4
Practical				
Introduction of analytical instruments and their principles, calibration and applications of Coloremetry and flame photometry; Estimation of alkaline hydrolysable N in soils; Estimation of soil extractable P in soils; Estimation of exchangeable K in soils; Estimation of exchangeable Ca and Mg in soils; Estimation of soil extractable S in soils; Estimation of DTPA extractable Zn in soils; Estimation of N in plants; Estimation of P in plants; Estimation of K in plants; Estimation of S in plants.			30	CO 5

Suggested Readings:

1. Introductory Soil Science by Dilip Kumar Das, Kalyani Publishers
2. Soil Fertility and Nutrient Management by S. S. Singh, Kalyani Publishers
3. Soil Fertility and Fertilizers by Samual L. Tisdale, Werner L. Nelson and James D. Beaton, Macmillan Publishing Company, New York
4. The nature and Properties of Soils by Harry O. Buckman and Nyle C.

e-Learning Source:

Open Access Books - Soil Science | InTechOpen https://www.intechopen.com/books/subject/soil-science/books/all/1/list

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	1	2	2	1	2	2	1	3	2	3
CO2	3	2	2	3	2	1	1	1	1	2	3	3	2	2	3
CO3	3	1	2	3	3	1	2	2	1	3	3	1	3	2	3
CO4	3	2	2	3	1	1	1	2	2	2	3	3	3	3	3
CO5	3	3	3	3	1	2	2	2	2	2	1	1	3	3	3

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG146	**Title of the Course**	Fundamentals of Entomology	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	II	**2**	**0**	**1**	**3**
Course Objectives	1. To know the history of entomology, classification of insects and their relationship with other arthropods 2. To study the various morphological characters of class insect and their importance for classification of insects 3. To get an idea about the different physiological systems of insects and their roles in growth and development and communications of insects 4. To study the characteristics of commonly observed insect orders and their economically important families.						

Course Outcomes Students will be able to	
CO1	Explain the history and significance of entomology, and classify insects in relation to other arthropods.
CO2	Identify and describe morphological features of insects including body segmentation, mouthparts, antennae, wings, and legs.
CO3	Describe the structure and function of various physiological systems in insects and understand their role in growth, development, and communication.
CO4	Categorize insects based on ecological factors and understand the impact of abiotic and biotic elements on insect populations.
CO5	Identify and classify agriculturally important insect orders and families, demonstrate skills in insect collection, preservation, and dissection, distinguish key morphological features such as antennae, mouthparts, legs, wings, larvae and pupae types, and gain hands-on experience in insecticide formulations, pesticide application tools, and sampling techniques essential for integrated pest management.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Unit 1**	History of Entomology in India. Major points related to dominance of Insects in Animal kingdom. Classification of phylum Arthropoda up to classes. Relationship of class Insects with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of head, thorax and abdomen.	7	CO1
2	**Unit 2**	Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs.	7	CO2
3	**Unit 3**	Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors and biotic factors. Categories of pests. Systematics: Taxonomy - importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order.	8	CO3
4	**Unit 4**	Classification of class Insecta up to Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigoniidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.	8	CO4

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Practical		
Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. Insecticides and their formulations. Pesticide appliances and their maintenance. Sampling techniques for estimation of insect population and damage.	30	CO 5

Suggested Readings:

1. Fundamentals of Ecology - Eugene. P. Odum and Gray W. Barrett
2. Imm's General Text book of Entomology— O.W. Rechards and R.G. Davies
3. Introduction to the study of Insects –D. J. Borror and DeLong's

e-Learning Source:

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	3	2	2	2	2	2	3	3	3	3
CO2	1	2	2	2	2	3	1	3	3	2	3	3	2	2	2
CO3	2	2	2	3	3	2	2	2	3	3	3	3	3	3	2
CO4	3	2	2	2	1	3	3	2	3	3	3	3	3	3	3
CO5	3	3	3	3	1	3	2	2	2	3	1	3	1	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG147	**Title of the Course**	Livestock and Poultry Management	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	II	**1**	**0**	**1**	**2**
Course Objectives	1. Provide basic knowledge to the students about scientific livestock and poultry rearing practices. 2. Entrepreneurship development through Livestock/poultry and Agriculture Integrated Farming System						

Course Outcomes	
Students will be able to	
CO1	Understand the role of livestock in the national economy and learn the Housing principles of animals
CO2	Gain knowledge of key Indian and exotic breeds of major livestock and poultry species and acquire skills in housing, breeding, and scientific management of calves, heifers, milch animals, sheep, goats, swine, and poultry at different stages.
CO3	Learn procedures of digestion in livestock and poultry and Classification of feedstuffs
CO4	Understand animal nutrition, including feed classification, nutrient functions, and ration formulation using various feedstuffs and supplements.
CO5	Gain practical knowledge and skills in identifying and handling farm animals and poultry, planning livestock housing, judging and culling animals, managing hatchery and poultry operations, computing rations, and understanding clean milk production and farm economics, enabling them to efficiently manage and evaluate livestock and poultry production systems

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals.	5	CO1
2	**Unit 2**	Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry.	5	CO2
3	**Unit 3**	Improvement of farm animals and poultry. Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions.	5	CO3
4	**Unit 4**	Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.	5	CO4
Practical				
External body parts of cattle, buffalo, sheep, goat, swine and poultry. Handling and restraining of livestock. Identification methods of farm animals and poultry. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records. Judging of cattle, buffalo and poultry. Culling of livestock and poultry. Planning and layout of housing for different types of livestock. Computation of rations for livestock. Formulation of concentrate mixtures. Clean milk production, milking methods. Hatchery operations, incubation and hatching equipment. Management of chicks, growers and layers. Debeaking, dusting and vaccination. Economics of cattle, buffalo, sheep, goat, swine and poultry production			30	CO 5

Suggested Readings:

1.A Textbook of Animal Husbandry by G. C Banerjee

2. A text Book of Livestock Production management in Tropic by D. N. Verma

e-Learning Source:

Integral University, Lucknow

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	3	1	1	2	2	2	2	2	1	2	3	3
CO2	1	2	2	2	2	1	1	1	2	2	3	3	2	2	2
CO3	2	2	2	3	3	1	2	2	3	3	3	1	2	3	3
CO4	3	2	2	2	1	1	1	2	2	2	3	3	3	3	3
CO5	3	3	3	3	1	1	2	2	2	2	1	1	2	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG148	**Title of the Course**	Fundamentals of Plant Pathology	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	II	**2**	**0**	**1**	**3**
Course Objectives	1. To get acquainted with the role of different microorganisms in the development of plant disease 2. To get general concepts and classification of plant diseases 3. To get knowledge of general characteristics of fungi, bacteria, virus, and other microorganisms causing plant diseases 4. To acquaint the students with reproduction in fungi, and bacteria, causing plant diseases 5. To get acquainted with various plant disease management principles and practices						

Course Outcomes Students will be able to	
CO1	Explain the concept of plant diseases, their causes, and classify them based on causal agents and symptoms.
CO2	Describe the morphology, reproduction, and classification of plant pathogenic fungi, bacteria, viruses, and other microorganisms
CO3	Understand the mechanisms of parasitism, pathogenesis, and the development of disease through the disease triangle and disease cycle.
CO4	Identify various plant pathogens and their modes of transmission, including viruses, viroids, mollicutes, and parasitic plants.
CO5	Gain practical skills in using microscopes and laboratory equipment, identifying plant disease symptoms, preparing and staining microbial samples, isolating and purifying plant pathogens, diagnosing diseases using Koch's postulates, and understanding the formulation, application, and dosage calculations of fungicides for effective plant disease management.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Unit 1**	Introduction to Plant Pathology: Concept of disease in plants; Different terms used in Plant Pathology, History of Plant Pathology with special references to India; Causes of plant disease: Inanimate and animate causes;	7	CO1
2	**Unit 2**	Classification of plant disease; Parasitism and pathogenesis; Development of disease in plants: Disease Triangle, Disease cycle; Fungi and their morphology, reproduction and classification of fungi;	7	CO2
3	**Unit 3**	Bacteria: Morphology, reproduction classification of phytopathogenic bacteria; Other plant pathogens: Mollicutes; Flagellant protozoa; FVB; Greenalgae and parasitic higher plants; Viruses and viroids, virus transmission	8	CO3
4	**Unit 4**	Principles of Plant disease management: Disease management with chemicals, Host resistance, cultural and biological method of Integrated Disease Management (IDM).	8	CO4
Practical				
Study of the microscope; Acquaintance with laboratory material and equipment; Study of different plant disease symptoms; Microscopic examination of general structure of fungi; Simple staining of bacteria: Direct and indirect staining, Gram staining of bacteria; Microscopic examination of fungal diseased specimen; Microscopic examination of bacterial diseased specimen; Preparation of culture media; Isolation of plant pathogens: Fungi, bacteria and viruses; Purification of plant pathogens; Study on plant disease diagnosis: Koch's Postulates, Characteristics, formulation, methods of application and calculation on fungicides.			30	CO 5

Suggested Readings:

1.Agrios, G.N. 2010. Plant Pathology. Acad. Press.
2. Alexopoulos, Mims and Blackwel. Introductory Mycology.
3. Dhingra, O.D. and Sinclair, J.B. 1986. Basic Plant Pathology Methods. CRC Press, London, Tokyo.
4. Gibbs, A. and Harrison, B. 1976. Plant Virology - The Principles. Edward Arnold, London
5. Goto, M. 1990. Fundamentals of Plant Bacteriology. Academic Press, New York.

6. Hull R. 2002. Mathew's Plant Virology. 4th edn. Academic Press, New York.
7. Kamat, M. N. Introductory Plant Pathology. Prakash Pub, Jaipur.
8. Mehrotra, R.S. and Aggarwal, A. 2007. Plant Pathology. 7th edn. Tata Mc Graw Hill Publ. Co. Ltd.
9. Nene, Y.L. and Thapliyal, P.N. 1993. Fungicides in Plant Disease Control. 3rd Ed. Oxford & IBH, New Delhi.
10. Pathak, V. N. Essentials of Plant Pathology. Prakash Pub., Jaipur
11. Rajeev, K. and Mukherjee, R.C. 1996. Role of Plant Quarantine in IPM. Aditya Books.
12. Rhower, G.G. 1991. Regulatory Plant Pest Management. In: Handbook of Pest Management in Agriculture. 2nd edn. Vol. II. (Ed. David Pimental). CRC Press.
13. Singh R.S. 2008. Plant Diseases. 8 th Ed. Oxford & IBH. Pub. Co.
14. Singh R.S. 2013. Introduction to Principles of Plant Pathology. Oxford and IBH Pub. Co.
15. Verma, J.P. 1998. The Bacteria. Malhotra Publ. House, New Delhi.
16. Vyas SC. 1993. Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw Hill, New Delhi.

e-Learning Source:

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	2	3	3	3	2	2	2	3	2	1	3	1	3
CO2	1	2	2	2	2	3	1	1	2	2	3	3	2	2	2
CO3	2	2	2	3	3	2	2	2	3	3	3	1	2	2	2
CO4	2	3	2	2	1	3	1	2	2	3	3	3	3	2	3
CO5	3	3	3	3	1	3	2	2	2	2	1	1	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2025-2026							
Course Code	AG149	**Title of the Course**	National Service Scheme II	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	II	**0**	**0**	**1**	**1**
Course Objectives	To evoke social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skilled in executing democratic leadership, developing skill in program, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society						

Course Outcomes	
Students will be able to	
CO1	Explain the importance types & qualities of youth leadership & its role in community development
CO2	Apply life competencies like decision-making, communication, and problem-solving in community and personal settings
CO3	Understand the structure and objectives of youth development programs at national, state, and voluntary levels.
CO4	Understand the importance of health education, hygiene, nutrition, and their impact along with national health and sanitation initiatives.
CO5	Practice yoga and utilize it as a preventive and curative approach for maintaining a healthy and balanced lifestyle

Practical

Importance and role of youth leadership. Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership, Life competencies. Definition and importance of life competencies, problem-solving and decision-making, interpersonal communication. Youth development programs. Development of youth programs and policy at the national level, state level and voluntary sector; youth-focused and youth-led organizations. Health, hygiene and sanitation. Definition needs and scope of health education; role of food, nutrition, safe drinking water, waterborne diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programs and reproductive health. Youth health, lifestyle, HIV AIDS and first aid. Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid. Youth and yoga. History, philosophy, concept, myths, and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)														
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	3	3	3	2	2	2	2	2	3	3	2	3
CO2	1	2	2	2	2	1	1	1	2	2	3	3	2	2	2
CO3	1	2	2	3	3	2	2	2	3	3	3	3	2	2	2
CO4	1	2	2	2	1	1	1	2	2	2	3	3	3	3	3
CO5	1	3	3	3	1	2	2	2	2	2	1	3	1	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**