

**LUCKNOW UNIVERSITY LUCKNOW**  
**B.Sc. ( Hons.) Ag. Sem. VI NEP Syllabus**

S NO.	Code	PAPER TITLE	CREDIT	MARK DISTRIBUTION			
				INTERNAL	PRACTICAL	THEORY	
1	AG-601	Farming System, Precision Farming & Sustainable Agriculture	2(1+1)	20	30	50	
2	AG-602	Crop Improvement-11( <i>Rabicrops</i> )	2(1+1)	20	30	50	
3	AG-603	Manures Fertilizers and Soil Fertility Management	3(2+1)	20	30	50	
4	AG-604	Farm Management, Production & Resource Economics	2(1+1)	20	30	50	
5	AG-605	Diseases of Field and Horticultural Crops and their Management-II	3(2+1)	20	30	50	
6	AG-606	Post-harvest Management and Value Addition of Fruits and Vegetables	2(1+1)	20	30	50	
7	AG-607	Watershed and Wasteland Management	2(1+1)	20	30	50	
8	AG-608	Beneficial insects and Pest of Horticultural Crops and their Management	3(2+1)	20	30	50	
9	<b>Elective-2 (optional paper )</b>						
		AGE-61	Protected Cultivation	3(2+1)	20	30	50
		AGE-62	Hi-tech. Horticulture	3(2+1)	20	30	50
		AGE-63	Weed Management	3(2+1)	20	30	50
		AGE-64	System Simulation and Agro advisory	3(2+1)	20	30	50
		AGE-65	Agricultural Journalism	3(2+1)	20	30	50
	AGE-66	Composition cum Fishery/ Duck/ Quail/ Rabbit culture	3(2+1)	20	30	50	
10	AGT-99	EducationalTour	2 (0+2)	100	-	-	
Total Credit					24		

## **1. Farming System, Precision Farming and Sustainable Agriculture 2(1+1) AG-601**

### **Theory**

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Sustainable agriculture - problems and its impact on agriculture. conservation agriculture strategies. HEIA, LELA and LEISA and its techniques for sustainability, Integrated farming system components of IFS and its advantages, farming system and environment.

### **Practical**

- Tools for determining productions & efficiencies in cropping and farming systems.
- Indicators of sustainability of cropping & Farming systems
- Site specific development of IFS models for different agro-climatic zones.
- Visit of IFS models in different agro climatic zones of nearby state Universities/Institutes and farmer fields.

**Theory**

Centers of origin, distribution of species, wild relatives in different crops: cereal (Wheat); pulses (Chickpea, Pea); oilseeds (Rapeseed and Mustard, Sunflower); cash crop (Sugarcane); vegetable crop (Potato, Tomato); Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology of rabi crops. Ideotype concept and climate resilient crop varieties for future.

**Practical**

Floral biology, emasculation and hybridization techniques in different crop species namely Wheat, Chickpea, pea, Rapeseed Mustard, Sunflower, Tomato: Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed descent methods; Study of field techniques for seed production and hybrid seeds production in Rabi crops: Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments: Study of quality characters, study of donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops.

**Theory**

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management. Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil amendments. Fertilizer Storage, Fertilizer Control Order. 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 soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. 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. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

**Practical**

Estimation of soil organic carbon, Estimation of available N available P, available K; available S available Ca and Mg and available Zn in soils. Estimation of N, P & K in plants. manures and fertilizers. Elementary idea of determination micro nutrients.

**Theory**

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type use of production function in decision-making on a farm, factor-product. factor-factor and product-product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage. Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income. Net farm income, family labor income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. Importance of farm records and accounts in managing a farm. various types of farm records needed to maintain on farm, farm inventory, balancesheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises. Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies. Crop/ livestock/ machinery insurance-weather based crop insurance, features, determinants of compensation. Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss. solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

**Practical**

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

## 5. Diseases of Field and Horticultural Crops & their Management-II 3(2+1) AG-605

### Theory

Symptoms. etiology. disease cycle and management of major diseases of following crops:

Field Crops:

Wheat: Rusts, loose smut, Karnal bunt, powdery mildew. Alternaria blight and ear cockle; Sugarcane: red rot, smut, wilt and grassy shoot

Sunflower: Sclerotinia stem rot and Alternaria blight:

Mustard: Alternaria blight, white rust, downy mildew; Gram: wilt and Ascochyta blight; Lentil: Rust and wilt; Cotton: Vascular wilt and black arm; Pea: Downy mildew, powdery mildew and rust. Horticultural Crops: Mango: Anthracnose, malformation, powdery mildew; Citrus: canker and gummosis; Grape vine: Downy mildew, powdery mildew; Apple: scab and Fire blight; Peach: leaf curl; Cucurbits: downy mildew, powdery mildew and wilt; Onion and garlic: purple blotch and stemphylium blight; Chilli: anthracnose and leaf curl; Turmeric: leaf spot; Coriander: stem gall; Marigold: Botrytis blight; Rose: dieback, powdery mildew; Potato: Early and late blight, Common scab, powdery scab, black scurf and potato mosaic.

### Practical

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for herbarium. Note: Students should submit 10 pressed and well-mounted specimens.

## 6. **Post-harvest Management and Value Addition of Fruits and Vegetables** **2(1+1) AG-606**

### **Theory**

Importance of post harvest technology of fruits, vegetables and ornamental crops. Extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity and self life of fruits, vegetables and ornamental crops. Ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; role of ethylene; post harvest disease and disorders; heat, chilling and freezing injury; harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy - Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables –Concept and methods, osmotic drying. Canning- Concepts and Standards, packaging of products.

### **Practical**

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products– physico-chemical and sensory. Visit to processing unit/ industry.

**Theory**

Watershed management - Concept need, principles & components of watershed management integrated watershed management. Factors effecting watershed management run off & soil loss management in a watershed socio-economic concept of watershed. Peoples participation in watershed management. Policy approaches & management plan, problems of watershed management. Waste land management-Definition, concept & types of degraded & wasteland. Distribution & extent of watershed in India & Uttar Pradesh. factors responsible for land degradation, characteristics of different types of degradation & wasteland. Problems of degraded land in Uttar Pradesh. Appropriate techniques for management of different types of degraded & wasteland.

**Practical**

Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed.



**8. BENEFICIAL INSECTS and PESTS OF HORTICULTURAL CROPS AND THEIR MANAGEMENT** **3(2+1) AG-608**

**Theory**

Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties, methods of harvesting and preservation of leaves. Rearing of mulberry silkworm, rearing appliances, mounting and harvesting of cocoons. Pests and diseases of silkworm, management, and methods of disinfection. Importance of beneficial insects. bee keeping, pollinating plants and their cycle, bee biology, commercial methods of rearing, equipment used and seasonal management. Bee pasturage. Bee foraging and communication. Insect pests and diseases of honey bee. Species of lac insect, morphology, biology. Host plant and lac production-Processing of lac-seed lac, button lac. Shellac and lac-products. Identification of major parasitoids and predators commonly used in biological control.

**Practical**

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking horticultural crops - vegetable crops, fruit crops, plantation gardens, narcotics, spices & condiments. Visit to orchards and gardens. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Types of silkworm, voltinism and biology and rearing of silkworm and equipment. Honey bee species and castes of bees. Beekeeping appliances and seasonal management. Bee enemies and diseases. Bee pasturage, bee foraging and communication. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to sericulture, beekeeping., lac culture and natural enemies.

**9. Elective -2 ( Optional any choose any One )**

**1. Protected Cultivation**

**3(2+1)AGE-61**

**Theory**

Protected cultivation- importance and scope, Status of protected cultivation in India and Worldtypes of protected structure based on site and climate. Cladding material involved in greenhouse/ polyhouse. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management. Substrate management. Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops. Green house cultivation of important horticultural crops-rose, carnation, chrysanthemum, gerbera, orchid, anthurium, liliun, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc. Cultivation of economically important medicinal and aromatic plants. Off season production off lowers and vegetables. Insect pest and disease management.

**Practical**

Raising of seedlings and saplings under protected conditions, use of portrays in quality planting material production, Bed preparation and planting of crop for production, Intercultural operations. Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging ad misting.

**Theory**

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods. Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC.pH based fertilizer scheduling, canopy management, high density orcharding. Components of precision farming: Remote sensing. Geographical Information System(GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce. Practical Types of poly houses and shade net houses, Intercultural operations, tools and equipments identification and application, Micro propagation, Nursery-protrays, micro-irrigation. EC, pH based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery.

**Theory**

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds. Herbicide classification. Concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity. Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application. Integration of herbicides with non chemical methods of weed management. Herbicide Resistance and its management.

**Practical**

Techniques of weed preservation. Weed identification and their losses study. Biology of important weeds. Study of herbicide formulations and mixture of herbicide. Herbicide and agro-chemicals study. Shift of weed flora study in long term experiments. Study of methods of herbicide application, spraying equipments. Calculations of herbicide doses and weed control efficiency and weed index.

**Theory**

System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements. relational diagrams.

Evaluation of crop responses to weather elements; Elementary crop growth models; calibration, validation, verification and sensitivity analysis. Potential and achievable crop production - concept and modeling techniques for their estimation. Crop production in moisture and nutrients limited conditions; components of soil water and nutrients balance. Weather forecasting, types, methods, tools & techniques, forecast verification: Value added weather forecast, ITK for weather forecast and its validity; Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. Use of crop simulation model for preparation of Agro-advisory and its effective dissemination

**Practical**

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

**Theory**

Agricultural Journalism: The nature and scope of agricultural journalism characteristics and training of the agricultural journalist, how agricultural journalism is similar to and different from other types of journalism. Newspapers and magazines as communication media: Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. Form and content of newspapers and magazines: Style and language of newspapers and magazines. parts of newspapers and magazines. The agricultural story: Types of agricultural stories, subject matter of the agricultural story. structure of the agricultural story. Gathering agricultural information: Sources of agricultural information, interviews, coverage of events, abstracting from research and scientific materials, wire services, other agricultural news sources. Writing the story: Organizing the material, treatment of the story. Writing the news lead and the body, readability measures. Illustrating agricultural stories: Use of photographs, use of artwork (graphs, charts, maps, etc.), writing the captions. Editorial mechanics: Copy reading, headline and title writing, proofreading, lay outting.

**Practical**

Practice in interviewing. Covering agricultural events. Abstracting stories from research and scientific materials and from wire services. Writing different types of agricultural stories. Selecting pictures and art work for the agricultural story. Practice in editing, copy reading, headline and title writing, proof reading, lay outting. Testing copy with a readability formula. Visit to a publishing office.

**Fishery:**

Definition, common characteristics and position of fish in Animal Kingdom, fishery statistics preparation and management of fish pond, physical and chemical condition of water for fishery, feeds and feeding of fishes, breeding of fish, diseases and enemies of fishes, use of Duck/quality beats on fish feeds.

**Duckry:**

Definition, common features and advantages, breeds, incubation and hatching feeding of ducks, care and managements of duckling, grower, layer/broiler ducks. Characteristics of duck eggs, common diseases and vaccination schedule, duckry statistics.

**Quail:**

Definition, common features of quail farming, advantages, breeds, incubation and hatching, feeding of quails. Care and managements of quail chick, grower/layer/ broilers. Quail product technology, common diseases and vaccination schedule.

**Rabbitry:**

Introduction, scope and advantages of rabbit farming, breeds, breeding, housing, care and management of young and adult rabbit. feeds and feeding for rabbits, common problems of rabbitry including vaccination schedule, fur and meat production technology.

1. Fishery units, visit, Demonstration and report formulation.
2. Different type of fishes, deepwater, middle water, and surface water.
3. Evaluation of Duck Egg (candling) and Grading.
4. Vaccination schedule for duck and Quail.
5. Preparation Ration for Duck, Quail. Rabbit and Fish.
6. Preparation of different products from eggs.

**10. AGT-99: Educational Tour (0+2)**