

AGRONOMY, AGRICULTURAL METEOROLOGY

1.	Agron. 1.1 Agricultural Heritage (New Course) (1+0=1)
	Theory
	Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture; Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era; Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications; National agriculture setup in India; Current scenario of Indian agriculture; Indian agricultural concerns and future prospects.
2.	Ag. Met. 1.1 Introductory Agro meteorology & Climate Change (1+1=2)
	Theory
	Meaning and scope of agricultural meteorology; Earth atmosphere its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, cyclone, anticyclone, Land breeze and sea breeze; Atmospheric temperature, Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification: Monsoon-mechanism and importance in Indian agriculture, Weather hazards – drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold wave. Agriculture and weather relations Weather forecasting – types of weather forecast and their uses. Climate change, global warming, causes of climate change and its impact on regional and national Agriculture.
	Practical
	<ol style="list-style-type: none"> 1. Measurement of Bright sunshine hours, total, shortwave and long wave radiation. 2. Measurement of maximum, minimum air temperatures and soil temperature. 3. Measurement of wind speed and wind direction, preparation of wind rose. 4. Determination of vapor pressure and relative humidity. 5. Measurement of rainfall. 6. Analysis of rainfall data for climatological studies. 7. Measurement of Pressure

	<p>8. Estimation of heat indices.</p> <p>9. Measurement of open pan evaporation.</p> <p>10. Computation of PET and AET.</p>
3.	Agron. 2.2 Fundamentals of Agronomy (3+1=4)
	Theory
	Agronomy and its scope, seeds and sowing, tillage and tith, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, crop rotation and its principles, adaptation and distribution of crops, Harvesting and threshing of crops. Weeds- importance, classification, crop-weed competition, concepts of weed management, principles and methods, herbicides-classification, selectivity and resistance, allelopathy.
	Practical
	Identification of crops, seeds, fertilizers, pesticides and tillage implements, study of agro- climatic zones of India, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population and herbicides. Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill
4.	Agron. 3.3 Crop Production Technology-I (<i>Kharif</i> Crops) (1+1=2)
	Theory
	Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Kharif crops. Cereals - rice, maize, sorghum, pearl millet, vari and finger millet, pulses-pigeonpea, mungbean and urdbean, cluster bean, oilseeds- groundnut, Castor, Sesame and Soybean; fibre crops- cotton & Jute; forage crops sorghum, cowpea and Napier hybrid, fodder maize Cash crop- Bidi tobacco Green manure Crops-Sunhemp and Dhaincha.
	Practical
	Rice nursery preparation, transplanting of Rice, sowing of soybean, pigeon pea and mung bean. maize, groundnut and cotton, effect of seed size on germination and seedling vigour of kharif season crops, effect of sowing depth on germination of kharif crops, identification of weeds in kharif season crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of kharif season crops, study of crop varieties and important agronomic experiments at experimental farm. Study of forage experiments, morphological description of <i>kharif</i> season crops.
5.	Agron. 4.4 Crop Production Technology-II (<i>Rabi</i> Crops) (1+1=2)
	Theory

	<p>Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of <i>Rabi</i> crops; cereals – wheat and barley, pulses- chickpea, peas, oilseeds-rape seed, mustard, Linseed and sunflower; sugar crops- sugarcane; medicinal and aromatic crops-mentha, lemon grass, Isabgol and citronella, Forage crops-berseem, lucerne and oat, Spice crop- Coriander, Fennel, Ajwain, Fenugreek and Cumin.</p>
	<p>Practical</p>
	<p>Sowing methods of wheat and sugarcane, identification of weeds in <i>rabi</i> season crops, study of morphological characteristics of <i>rabi</i> crops, study of yield contributing characters of <i>rabi</i> season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of <i>rabi</i> crops at experimental farms. Study of <i>rabi</i> forage experiments, oil extraction of medicinal crops, visit to research stations of related crops.</p>
<p>6.</p>	<p>Agron. 4.5 Weed Management (2+1=3)</p>
	<p>Theory</p>
	<p>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.</p>
	<p>Practical</p>
	<p>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.</p>
<p>7.</p>	<p>Agron. 5.6 Farming System and Sustainable Agriculture (1+0=1)</p>
	<p>Theory</p>
	<p>Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and</p>

	<p>efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.</p>
8.	<p>Agron. 5.7 Geo-informatics and Precision Farming (1+1=2)</p>
	<p>Theory</p>
	<p>Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture;</p>
	<p>Practical</p>
<p>Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Projects formulation and execution related to precision farming.</p>	
9.	<p>Agron. 5.8 Practical Crop Production-I (Kharif Crops) (0+1=1)</p>
	<p>Practical</p>
<p>Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and</p>	

	integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.
10.	Agron. 6.9 Principles of Organic Farming (1+1=2)
	Theory
	Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.
	Practical
	Visit of organic farms to study the various components and their utilization; Preparation of enrich compost, Vermicompost, bio-fertilizers/bio-inoculants and their quality analysis; Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management; Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling.
11.	Agron. 6.10 Rainfed Agriculture and Watershed Management (1+1=2)
	Theory
	Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India ; Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio- morphological characteristics of the plants, Crop adaptation and mitigation to drought; Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.
	Practical
	Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India. Interpretation of meteorological data and

	<p>scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation. Studies on cultural practices for mitigating moisture stress. 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.</p>
12.	<p>Agron. 6.11 Practical Crop Production-II (<i>Rabi</i> Crops) (0+1=1)</p> <p>Practical</p> <p>Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.</p>
