

## **Syllabus (Agriculture Technology)**

### **Unit-I: Agriculture & its importance**

Agriculture and its scope and importance in national economy, National & International agricultural research institutes in India. Agro climatic zones of India, Agro-ecological zones of India and revolutions in agriculture. Tillage - Concept, types, tools and implements. Crop stand establishment and planting geometry and their effect on crop. Modern concepts of tillage and conservation agriculture. Land capability classification, Alternate land use and Agro forestry systems-objectives and components of agroforestry. Shifting cultivation; Concept of sustainable agriculture. Precision agriculture. Concept of secondary agriculture. Natural /zero budget farming.

### **Unit-II: Soil Fertility and Nutrient Management**

Soil and its concept, soil profile, physical properties of soil. Soil structure and its types. Soils of India. Clay minerals and its classification. Soil organic matter. Soil as a medium of plant growth and its composition, mineral and organic constituents of the soil and their role in crop production. Fertilizers and manures- classifications, green manuring, recycling of organic wastes, composting and vermicomposting. Soil fertility and soil productivity, factors affecting soil fertility and productivity, relation between nutrient supply and crop growth; criteria of essentiality of nutrients; essential plant nutrients and their functions, nutrient deficiency symptoms; transformation and dynamics of major plant nutrients. Concept of nutrient use efficiency, slow release fertilizers, nitrification inhibitors and their use for crop production; Principles and methods of fertilizer application, integrated nutrient management and bio-fertilizers.

### **Unit-III: Weed management**

Scope and principles of weed management; Weed classification, biology, ecology and allelopathy; Weed seed dormancy and crop weed competition. Herbicide classification, formulations, mode of action, selectivity and resistance; Persistence of herbicides in soils and plants; Application methods and equipments; Cultural, physical, chemical and biological weed control, bio-herbicides: Integrated weed management; Special weeds, parasitic and aquatic weeds and their management in cropped and non-cropped lands.

### **Unit-IV: Dryland farming**

Concept of dry, dryland and rainfed farming, significance and constraints of dryland agriculture in India. Types of drought, effect on plant growth, drought resistance, drought avoidance, drought management; Crop Planning including contingency, crop diversification, varieties, cropping systems and mid-season corrections for aberrant weather conditions and techniques of soil moisture conservation. Concept of watershed and watershed management, anti-transpirants and its types. Growth regulators.

### **Unit-V: Crop production technology**

Basic principles of crop production, classification of crops, Crop production techniques for cereals (rice, wheat, maize, barley), pulses (chickpea, rajmash, greengram, soybean, lentil), oilseeds (rapeseed mustard, brown sarson), sugarcane and fodder crops (oats, berseem) including origin, climate, soil, season, latest varieties, seed rate, fertilizer requirements, row and plant-plant geometry, intercultural operations, water requirement, weed control and harvest. Cropping system-Definition, principles and classification. Soil health and organic matter. Integrated farming system: concepts, models for different ecosystems, components of

IFS and its merits. Organic farming, principles and its scope in India. Organic and bio inputs.

#### **Unit-VI: Soil-Plant-Water Relationship**

Importance of water in agriculture; runoff and infiltration, role of water in plants. Soil water relations, water retention by soil, soil moisture characteristics, field capacity, permanent wilting point, plant available water and extractable water. Soil water potential and its components; Movement of soil water-saturated and unsaturated water flow and Evapotranspiration (ET). Water loss through transpiration and factors affecting it. Water uptake by plants and its movement mechanism. Weather parameters influencing soil-water-plant relations. Crop water requirements; concepts of irrigation scheduling, concept of critical stages of crop growth in relation to water supplies; Methods of irrigation viz. surface, subsurface and pressurized irrigation methods, merits and demerits. Concept of Soil and Water conservation, Relevance of soil and water conservation in Agriculture, Problems caused by soil erosion, factors affecting soil erosion and types of soil erosion.

#### **Unit-VII: Agrometeorology and climate change**

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables, nature and properties of solar radiation, solar constant, short wave, longwave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, precipitation; formation and types, cloud formation and classification; Artificial rainmaking, Weather forecasting- types of weather forecast and their uses, remote sensing. Climate change, climatic variability, Greenhouse effect, global warming, causes of climate change and its impact on regional and national Agriculture.

#### **Unit-VIII: Agricultural economics and extension**

Farm management, scope, importance and objectives, market agencies, economic holding, marginal and small farmers. Types and systems of farming, farm planning and budgeting, Agriculture price, production functions and its types. Concept of farming system and farm business, agribusiness institutions & entrepreneurship development in India. Role of co-operatives in agricultural economy. Objectives and principles of agri. extension education, basic philosophy of extension, Extension teaching methods and its classification, adoption process and communication. Role of KVKs in dissemination of agricultural technology. Farm mechanization and its role in agricultural production and rural employment. Training programmes for extension workers, lab to land programmes. Recent schemes and programmes for farming community. Important rural development programmes in India. Organizational set up of Agricultural research, education and extension in India.

#### **Unit-IX: Genetics and plant breeding**

Structure and function of cell organelles; mitosis and meiosis; Mendelian genetics; elementary knowledge of photosynthesis; respiration, and transpiration; structure and

functions of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Elements of Genetics and plant breeding as applied to improvement of major field crops, development of plant hybrids. Seed production in self and cross pollinated crops. Concept and types of pure seeds.

**Unit-X: Plant protection**

Serious pests and diseases of major crops; cereals (rice, wheat, maize, barley), pulses (chickpea, rajmash, greengram, soybean, lentil), oilseeds (rapeseed mustard, brown sarson), sugarcane and fodder crops (oats, berseem), causes and classification of plant diseases, principles of pest control, Integrated control of pests and diseases.