Agro meteorology and Crop Weather Forecasting	AGRN -206	3 (2+1)

THEORY

UNIT I: Agro meteorology - aim, scope and development in relation to crop environment; composition of atmosphere, distribution of atmospheric pressure and wind.

UNIT II: Characteristics of solar radiation; energy balance of atmosphere system; radiation distribution in plant canopies, radiation utilization by field crops; photosynthesis and efficiency of radiation utilization by field crops; energy budget of plant canopies; environmental temperature: soil, air and canopy temperature.

UNIT III: Temperature profile in air, soil, crop canopies; soil and air temperature effects on plant processes; environmental moisture and evaporation: measures of atmospheric temperature and relative humidity vapor pressure and their relationships; evapotranspiration and meteorological factors determining evapotranspiration.

UNIT IV: Modification of plant environment: artificial rain making, heat transfer, controlling heat load, heat trapping and shading; protection from cold, sensible and latent heat flux, controlling soil moisture; monsoon and their origin, characteristics of monsoon; onset, progress and withdrawal of monsoon; weather hazards, drought monitoring and planning for mitigation.

UNIT V: Weather forecasting in India – short, medium and long range; aerospace science and weather forecasting; benefits of weather services to agriculture, remote sensing; application in agriculture and its present status in India; atmospheric pollution and its effect on climate and crop production; climate change and its impact on agriculture.

PRACTICAL

- Visit to agro-meteorological observatory and to record sun-shine hours, wind velocity, wind direction, relative humidity, soil and air temperature, evaporation, precipitation and atmospheric pressure
- Measurement of solar radiation outside and within plant canopy
- Measurement/estimation of evapo-transpiration by various methods
- Measurement/estimation of soil water balance
- Rainfall variability analysis
- Determination of heat-unit requirement for different crops

- Measurement of crop canopy temperature
- Measurement of soil temperatures at different depths
- Remote sensing and familiarization with agro-advisory service bulletins
- Study of synoptic charts and weather reports, working principle of automatic weather station.
- Visit to solar observatory

Agronomy of major Cereals and Pulses	**AGRN -207**	**3(2+1)**

THEORY

UNIT I: Rabi cereals – Wheat, Barely, Oats, etc.

UNIT II: Kharif cereals - Paddy, Maize, Bajra etc.

UNIT III: Rabi pulses - Gram, Lentit, Peas etc.

UNIT IV: Kharif pulses – Pigeon pea, Moong bean, Urd bean and Moth bean etc.

PRACTICAL

- Phenological studies at different growth stages of crop
- Estimation of crop yield on the basis of yield attributes
- Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities
- Working out growth indices (CER, CGR, RGR, NAR, LAD), aggressiveness, relative crowding coefficient, monetary yield advantage and ATER of prominent intercropping systems of different crops
- Estimation of protein content in pulses
- Planning and layout of field experiments
- Judging of physiological maturity in different crops
- Intercultural operations in different crops
- Determination of cost of cultivation of different crops
- Working out harvest index of various crops
- Study of seed production techniques in various crops
- Visit of field experiments on cultural, fertilizer, weed control and water management
- aspects
- Visit to nearby villages for identification of constraints in crop production

Agronomy of Oilseed, Fibre and Sugar Crops	AGRN -208	3 (2+1)

THEORY

UNIT I: Rabi oilseeds – Rapeseed and mustard, linseed, etc.

UNIT II: Kharif oilseeds - Groundnut, sesame, castor, sunflower, soybean etc.

UNIT III: Fiber crops - Cotton, jute, sunhemp etc.

UNIT IV: Sugar crops – Sugar-beet and sugarcane.

PRACTICAL

- Planning and layout of field experiments
- Cutting of sugarcane sets, its treatment and methods of sowing, tying and propping of sugarcane
- Determination of cane maturity and calculation on purity percentage, recovery percentage and sucrose content in cane juice phenological studies at different growth stages of crop
- Intercultural operations in different crops
- Judging of physiological maturity in different crops and working out harvest index
- Working out cost of cultivation of different crops
- Estimation of crop yield on the basis of yield attributes
- Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities
- Determination of oil content in oilseeds and computation of oil yield
- Estimation of quality of fiber of different fiber crops
- Study of seed production techniques in various crops
- Visit of field experiments on cultural, fertilizer, weed control and water management aspects
- Visit to nearby villages for identification of constraints in crop production

Agronomy of Medicinal, Aromatic and Narcotic Crops	AGRN -209	2 (1+1)

THEORY

UNIT I: Importance of medicinal and aromatic plants in human health, national economy and related industries, classification of medicinal and aromatic plants according to botanical

characteristics and uses.

UNIT II: Climate and soil requirements; cultural practices; yield and important constituents of medicinal plants (Isabgol, Rauwolfia, Poppy, Aloe-vera, Satavar, Stevia, Safed Musli, Kalmegh, Asaphoetida, Nux vomica, Rosadle etc).

UNIT III: Climate and soil requirements; cultural practices; yield and important constituents of aromatic plants (Citronella, Palmarosa, Mentha, Basil, Lemon grass, Rose, Patchouli,Geranium etc.).

UNIT IV: Climate and soil requirements; cultural practices; yield of under-utilized crops (Rice bean,Lathyrus, Sesbania, Clusterbean, French bean, Fenugreek, Grain Amaranth, Coffee, Tea and Tobacco).

PRACTICAL

- Identification of crops based on morphological and seed characteristics
- Raising of herbarium of medicinal, aromatic and under-utilized plants
- Quality characters in medicinal and aromatic plants
- Methods of analysis of essential oil and other chemicals of importance in medicinal and aromatic plants
- Tour and visit

Principles and Practices of Organic Farming	**AGRN -210**	**3 (2+1)**

UNIT I: Organic farming - concept and definition, its relevance to India and global agriculture and future prospects; land and water management - land use, minimum tillage; shelter zones,hedges, pasture management, agro-forestry.

UNIT II: Organic farming and water use efficiency; soil fertility, nutrient recycling, organic residues,organic manures, composting, soil biota and decomposition of organic residues,earthworms and vermicompost, green manures and bio-fertilizers.

UNIT III: Farming systems, crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity.

UNIT IV: Control of weeds, diseases and insect pest management, biological agents andpheromones, bio-pesticides.

UNIT V: Socio-economic impacts; marketing and export potential: inspection, certification, labeling and accreditation procedures; organic farming and national economy.

PRACTICAL

- Aerobic and anaerobic methods of making compost
- Making of vermin-compost
- Identification and nursery raising of important agro-forestry tress and tress for shelter belts
- Efficient use of bio fertilizers, technique of treating legume seeds with Rhizobium cultures, use of *Azotobacter, Azospirillum*, and PSB cultures in field
- Visit to an organic farm
- Quality standards, inspection, certification and labelling and accreditation procedures for farm produce from organic farms