Course No. H/AGRO-242 **Course Title: Introduction to Major Field Crops**

Credit hours - (1+1) 2 **Semester: IV**

Theroy

Classification and distribution of field crops, definitions and concept of multiple cropping, mixed cropping, intercropping, relay and alley cropping, cultural practices for raising major cereals, pulses, oil seeds and fodder crops, green manuring, crop rotation.

Practical

Identification of crop plants, seeds and weeds. Preparation of cropping scheme. Application of herbicides in field crops.

Theory		
Sr. No.	**Topic**	**Weightages**
1	Agronomy **–** Definition, scope and importance, it's relationship with other sciences, historical sketch of agronomy.	**25**
2	Agro-climatic zones of India and Maharashtra State. National and International Agricultural Research Organizations in India.	
3	Classification of Crops. Origin, geographic distribution, economic importance of *kharif* crops	
4	Selection of seed, different sowing methods.	
5	Tillage- objectives, classification and function of tillage.	
6	Cropping Scheme and Cropping System- different types of cropping system: intercropping, mixed cropping, intensive cropping, relay cropping, Alley cropping etc., definition and advantages with examples.	
7	Crop Rotation - objectives types and advantage.	
8	Classification of Manures and Fertilizers, Green Manuring.	
9-10	Cultivation of Cereals- Rice, Maize, Sorghum, Pearl millet and Minor millets	**20**
11-12	Cultivation of Pulses- Pigeon pea, Green gram, Black gram, Horse gram, Cowpea, Moth beans	**20**
13-14	Cultivation of Oilseeds – Ground nut, sunflower, Sesamum, Soyabean, Castor, Niger	**15**
15	Cultivation of Fibre crops – Cotton, Jute, Sunhemp, Dhaincha	**15**
16	Cultivation of Forage crops - Sorghum, Maize, Pearl millet, Cow pea, Napier, Rainfed and Irrigated Grasses	**5**

Practical

Identification of crop plants, seeds and weeds. Preparation of cropping scheme. Application of herbicides in field crops.

Practical :	
1	Identification of Field Crops and preparation of crop herbarium.
2	Study of tillage implements and operations.
3	Practice of field preparation, Seed bed preparation and sowing of *Kharif* crops.

4	Rice nursery preparation, Practice of puddling and transplanting.
5	Study of seeding equipment's, Different methods of sowing.
6	Identification of manures, fertilizers and green manure crops.
7	Calculation of seed rate and fertilizers.
8	Effect of seed size on germination and seedling vigour of soybean / groundnut.
9	Effect of sowing depth on germination of different *Kharif* crops.
10	Study of inter-culture implements and practices, thinning and gap filling.
11	Identification of weeds in *Kharif* crops.
12	Practice of methods of fertilizer and Herbicide application.
13	Preparation of fertilizers mixture and spray solutions; Compost making.
14	Study of growth and yield contributing characters and yield estimation.
15	Participation in ongoing field operations. Study of crop varieties and important agronomic experiments.
16	Preparation of calendar of operations of different *Kharif* field crops.

Suggested Reading:

Reference books:

B. Gurarajan, R.Balasubramanian and V.Swaminathan. Recent Strategies on Crop Production. Kalyani Publishers, New Delhi.

Chidda Singh.1997. Modern techniques of raising field crops. Oxford

and IBH Publishing Co. Pvt. Ltd., New Delhi.

Rajendra Prasad. Textbook of Field Crops Production - Commercial Crops. Volume II ICAR Publication.

Rajendra Prasad. Textbook of Field Crops Production - Foodgrain Crops. Volume I ICAR Publication.

S.R.Reddy. 2009. Agronomy of Field Crops. Kalyani Publishers, New

Delhi. S.S.Singh. 2005. Crop Management. Kalyani Publishers, New

Delhi.

UAS, Bangalore. 2011. Package of Practice. UAS,

Bangalore. Chidda Singh 1983. Modern Techniques

of raising Field crops.Oxford & IBH, Publishing Co., New Delhi

Rajendra Prasad 2002. Text Book of Field crops Production,ICAR, New

Delhi. Reddy, S.R. 2004. Agronomy of Field crops, Kalyani Publishers,

Ludhiana. Subhash Chandra Bose, M. and Balakrishnan, V. 2001.

Forage Production South Asian Publishers, New Delhi.

e-reading: **http://ecourses.iasri.res.in/**

Course No. H/AGRO-351 **Course Title: Organic Farming**

Credits:(1+1) 2 **Semester: V**

Theory

Introduction, concept, relevance in present context; Organic production requirements; Biological intensive nutrient management-organic manures, vermicomposting, green manuring, recycling of organic residues, biofertilizers; Soil improvement and amendments; Integrated diseases and pest management – use of biocontrol agents, biopesticides pheromones, trap crops, bird perches; Weed management; Quality considerations, certification, labeling and accreditation processors, marketing, exports.

Practical

Raising of vegetable crops organically through nutrient, diseases and pest management; vermicomposting; vegetable and ornamental nursery raising; macro quality analysis, grading, packaging, postharvest management.

Lesson Plan

S.N.	Topic	Weightages
1-2	Introduction, concept, relevance in present context; Organic production requirements	11
3	Biological intensive nutrient management	13
4-6	organic manures-FYM, vermicomposting, green manuring	16
7-8	recycling of organic residues, biofertilizers	13
9-10	Soil improvement and amendments; Integrated weed, diseases and pest management;	14
11-13	use of biocontrol agents, biopesticides pheromones, trap crops, bird perches	17
14-16	Quality considerations, certification, labeling and accreditation processors, marketing, exports	16
	Total	**100**

Practical:

SN	Title of the Exercise
1	Preparation of FYM, compost and green manuring
2	Preparation of vermicompost
3	Raising of agronomic/vegetable crops organically
4	Calculation of nutrient requirement for organically raised crops using different sources.
5	Preparation of phosphor-compost by using minerals.
6	Use of phosphor- compost to organically grown, fruits and vegetable crops
7	Study of parameters and their characteristics and favorable conditions required for production of quality compost
8	Study of relative suitability of different organic materials for composting according to ease of decomposition.
9	Use of concentrated organic manures (oil cakes, slaughter house waste, fish meal and poultry manures etc.) in organically grown different horticultural crops.

10	Use of bio-stimulants in organically grown horticultural crops
11	Preparation of vermin-wash for vegetable seedlings
12	Pest management in organically raised crops
13	Disease management in organically grown vegetable crops
14	Use of bio fertilizer for seed treatment of vegetable crops
15	Nutritional management in organically grown orchards, pest management in organically grown floriculture Nutritional management in organically grown vegetable crops. Grading, packaging, post-harvest management and marketing of organically raised produce.
16	Visit to bio-control lab, bio fertilizer unit and vermicomposting unit.

Suggested Reading:

A.K.Dahama. 2007. *Organic farming for sustainable agriculture*. Agrobios (India), Jodhpur. Arun. K. Sharma. 2011. *Handbook of Organic farming*. Agrobios (India), Jodhpur.

S.P. Palaniappan and K.Annadurai. 2010. *Organic farming – Theory and Practice*. Scientific Publishers. Jodhpur.

U.Thapa and P. Tripathy. 2006. *Organic farming in India- Problems and Prospects*. Agrotech publishing agency, Udaipur.

G.K.Veeresh. 2006. *Organic farming*. Foundation Books. New Delhi.

Purshit,S.S.2006.*TrendsinOrganicFarminginIndia*.AgrosBios(INDIA), Jodhpur.

Thampan,P.K.1995.*OrganicAgriculture*.
PeckaytreeCropsDevelopmentFoundation, Cochin,Kerala.

Sathe,T. V. 2004.*VermicultureandOrganicFarming*. DaysPublishingHouse,NewDelhi.

e-reading: **http://ecourses.iasri.res.in/**

Course No. H/AGROMET-111 Course Title: Agro-meteorology and Climate Change

Credits: (1+1) 2 Semester: I

Theory: Agricultural Meteorology- Introduction, definition of meteorology, scope and practical utility of Agricultural meteorology. Composition and structure of atmosphere and definition of weather and climate, aspects involved in weather and climate, atmospheric temperature, soil temperature, solar radiation, atmospheric pressure, atmospheric humidity, evaporation and transpiration, monsoons, rainfall, clouds, drought, weather disasters and their management atmospheric pollution and role of meteorology.Basics of weather forecasting.Climate change-causes.Global warming-causes and remote sensing.Effect of climate change on horticulture Past and future changes in greenhouse gases within the atmosphere. Sources and sinks for greenhouse gases. Atmospheric chemistry. Plants sense and respond to changes in CO_2 concentration. Measurement of short-term effects and mechanisms underlying the observed responses in C_3 and C_4 species.plant development affected by growth in elevated CO_2. Physiology of rising CO_2 on nitrogen use and soil fertility, its implication for production. Methodology for studying effect of CO_2. Change in secondary metabolites and pest disease reaction of plants. The mechanisms of ozone and UV damage and tolerance in plants.Increased temperature and plants in tropical/sub-tropical climates- effect on growing season, timing of flowering, duration of fruit development and impacts on crop yields and potential species ranges, interaction of temperature with other abiotic/biotic stress.Mitigation strategies and prospects for genetic manipulation of crops to maximize production in the future atmosphere.Modifying Rubisco, acclimation, metabolism of oxidizing radicals, and sink capacity as potential strategies.

Practicals: Site selection for Agromet observatory; Measurement of temperature; Measurement of rainfall; Measurement of evaporation (atmospheric/soil); Measurement of atmospheric pressure; Measurement of sunshine duration and solar radiation; Measurement of wind direction and speed and relative humidity; Study of weather forecasting and synoptic charts. Visit to Meteorological observatory, Visit to IMD meteorological observatory-Lay out plan of standard meteorological observatory. Recording of air and soil temperature.Measurement of radiation and components, Measurement of rainfall-different types of raingauges, Measurement of wind speed and direction and atmospheric humidity, Recordingof evaporation.Synoptic charts and weather reports, symbols, *etc*.

Practical:

Experiment	Topic
1	Site selection for Agromet observatory
2	Measurement of temperatute
3	Measurement of rainfall
4	Measurement of evaporation (atmosphereic/ soil)
5	Measurement of atmospheric pressure
6 & 7	Measurement of sunshine duration and solar radiation
8	Measurement of wind direction and speed and relative humidity
9	Study of weather forecasting and synoptic charts.
10	Visit of Agrometeorological Observatory.
11	Visit to IMD meterological observatory –Layout plan of standard meterological observatory.
12	Recording of air and soil temperature.
13	Measurement of radiation and components,
14	Measurement of rainfall-different types of raingauges
15	Measurement of wind speed and direction and atmospheric humidity, recording of evaporation
16	Synoptic charts and weather reports, symbols etc.

Suggested Reading:

Reference books:

K. Srivastava and P. K. Tyagi, 2011. Practical Agricultural Meteorology. New Delhi Publishing Agency, New Delhi.

D. Lenka, 2006. Climate, Weather and Crops in India. Kalyani Publishers, New Delhi.

G. S.L. H. V. Prasad Rao, 2008. Agricultural Meteorology. Prentice Hall of India Pvt. Ltd., New Delhi. H. S. Mavi and Graeme J. Tupper, 2005. Agrometeorology-Principles and applications of climate

studies in agriculture. International Book Publishing Co. Lucknow.

H. S.Mavi, 1994. Introduction to Agrometeorology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

H. V. Nanjappa and B. K. Ramachandrappa, 2007. Manual on Practical Agricultural Meteorology. Agrobios India. Jodhpur.

S. R. Reddy, 1999. Principles of Agronomy. Kalyani Publishers, New Delhi.

T. Yellamanda Reddy and G. H. Sankara Reddi, 2010. Principles of Agronomy. Kalyani Publishers, New Delhi.

Pattersen, S. 1958. Introductionto Meteorology. Me. Graw Hill BookCo. Inc., New York

Tailor, J. T. 1967. Agricultural Climatology. Pergman Press Ltd. Headington Hill Hall, Oxford, Englamd

Trewarthe, T. G. 1968. AnIntroductionto Climate. Me Graw Hill Book Co. Ine., New York

Mavi, H. S. 1985. Introductionto Agrometeorology. Oxford & IBH Publishing Co. New Delhi.

e-reading: **http://ecourses.iasri.res.in/**