

## Scheme of Examinations

Code No	Subject	Credit			Total Marks	Scheme			
		T	P	Total		Theory		Practical	
						CFA	ESE	CFA	ESE
<b>I Semester</b>									
18AGD0101	Soil and Nutrient Management	3		3	100	40	60		
18AGD0102	Soil and Nutrient Management - practical		1	1	50			25	25
18AGD0103	Principles of Agronomy	3		3	100	40	60		
18AGD0104	Principles of Agronomy - practical		1	1	50			25	25
18AGD0105	Agricultural Meteorology and Land Use Systems	3		3	100	40	60		
18AGD0106	Agricultural Meteorology and Land Use Systems - practical		1	1	50			25	25
18AGD0107	Irrigation Agronomy	3		3	100	40	60		
18AGD0108	Irrigation Agronomy - practical		1	1	50			25	25
18AGD0109	Dairy Cattle Production	3		3	100	40	60		
18AGD0110	Dairy Cattle Production - practical		1	1	50			25	25
18AGD0111	Rural Development	3		3	100	40	60		
18AGD0112	Rural Development - practical		1	1	50			25	25
	<b>Total</b>	<b>18</b>	<b>6</b>	<b>24</b>	<b>900</b>				
<b>II Semester</b>									
18AGD0201	Agronomy of Field Crops - I	3		3	100	40	60		
18AGD0202	Agronomy of Field Crops – I - practical		1	1	50			25	25
18AGD0203	Fundamentals of Plant Protection	3		3	100	40	60		
18AGD0204	Fundamentals of Plant Protection - practical		1	1	50			25	25
18AGD0205	Introduction to Horticulture and Fruit Production	3		3	100	40	60		
18AGD0206	Introduction to Horticulture and Fruit Production - practical		1	1	50			25	25
18AGD0207	Environmental Science and Organic Farming	3		3	100	40	60		
18AGD0208	Environmental Science and Organic Farming - practical		1	1	50			25	25
18AGD0209	Dairy Technology	3		3	100	40	60		
18AGD0210	Dairy Technology - practical		1	1	50			25	25
18AGD0211	Principles of Plant Breeding and Seed Science Technology	3		3	100	40	60		
18AGD0212	Principles of Plant Breeding and Seed Science Technology - practical		1	1	50			25	25
	<b>Total</b>	<b>18</b>	<b>6</b>	<b>24</b>	<b>900</b>				
<b>III Semester</b>									
18AGD0301	Agronomy of Field Crops – II	3		3	100	40	60		
18AGD0302	Agronomy of Field Crops – II - practical		1	1	50			25	25
18AGD0303	Crop Insect Pest Management	3		3	100	40	60		
18AGD0304	Crop Insect Pest Management - practical		1	1	50			25	25
18AGD0305	Vegetable Production	3		3	100	40	60		
18AGD0306	Vegetable Production - practical		1	1	50			25	25
18AGD0307	Farm Power and Machinery	3		3	100	40	60		
18AGD0308	Farm Power and Machinery - practical		1	1	50			25	25
18AGD0309	Introduction to Agricultural Extension	3		3	100	40	60		
18AGD0310	Introduction to Agricultural Extension - practical		1	1	50			25	25
18AGD0311	Agricultural Economics	3		3	100	40	60		
18AGD0312	Agricultural Economics - practical		1	1	50			25	25
	<b>Total</b>	<b>18</b>	<b>6</b>	<b>24</b>	<b>900</b>				
18AGD0313	Village Placement Programme*	0	4	4	100				
<b>IV Semester</b>									
18AGD0401	Farm Management	3		3	100	40	60		
18AGD0402	Farm Management - practical		1	1	50			25	25
18AGD0403	Crop Disease Management	3		3	100	40	60		
18AGD0404	Crop Disease Management - practical		1	1	50			25	25
18AGD0405	Floriculture and Plantation Crops	3		3	100	40	60		
18AGD0406	Floriculture and Plantation Crops - practical		1	1	50			25	25
18AGD0407	Soil and Water Conservation	3		3	100	40	60		
18AGD0408	Soil and Water Conservation - practical		1	1	50			25	25
18AGD0409	Livestock and Chicken Production	3		3	100	40	60		
18AGD0410	Livestock and Chicken Production - practical		1	1	50			25	25
18AGD0411	Extension Methods and Audio - Visual Aids	3		3	100	40	60		
18AGD0412	Extension Methods and Audio - Visual Aids - practical		1	1	50			25	25
	<b>Total</b>	<b>18</b>	<b>6</b>	<b>24</b>	<b>900</b>				

Note:\* V.P.P. marks will not be considered for the calculation of GPA & CGPA.

## I SEMESTER

### 18 AGD 0101 SOIL AND NUTRIENT MANAGEMENT (3+1)

#### OBJECTIVES

- To develop knowledge about elements of soil and its management
- To inculcate about the soil nutrient resources viz., manures, fertilizers and biofertilizers
- To develop hope to meet the farming community with strong knowledge in nutrient management

#### LEARNING OUTCOME

The students can understand about the basics of soils and their influencing parameters with relevant to soil fertility, fertilizers and manures and they can develop confidence about the Nutrient Management and fertilizer recommendation

#### THEORY

**UNIT I Soil:** Definition – Composition of soil – Types of soils found in India and Tamil Nadu- Physical properties of soil – Texture – Structure, colour, particle density, Bulk density, Pore space, Consistency, Soil air and Soil water Soil temperature – Significance of physical properties in plant growth – Chemical properties of soil. Soil colloids pH, EC.

**UNIT II Soil-Fertility:** Definition and importance – Soil fertility and productivity – Organic matter – Influence on fertility – Soil reaction – Problem soils – Acid, Saline, Sodic and Saline sodic soils – their reclamation, Management and suitable crops.

**UNIT III Nutrient management:** Essential plant nutrients and their sources – Foliar diagnosis deficiencies and toxicity symptoms – corrective measures – Time and methods of fertilizer application – Precautions in applying fertilizers – Methods to improve fertilizer use efficiency – Integrated nutrient management (INM) – Soil test crop recommendations (STCR).

**UNIT IV Manures:** Definition – Classification – Bulky Organic Manures (BOM) and Concentrated Organic Manures (COM) – Preparation of different types of compost including industrial waste, coir waste, press mud – Vermicompost – enriched FYM etc – Green manures (GM) and Green Leaf Manures (GLM) – their Benefits and significance. Bio - fertilizers and their types – Application of Bio - Fertilizers

**UNIT V Fertilizers:** Fertilizers–classification–sourcesof fertilizers–Straight, mixed and complexfertilizers–Nutrientcontentinfertilizers nitrogenous fertilizers, phosphatic fertilizersand Potassic fertilizers–slow release N fertilizers – Nitrification inhibitors – typesofmixedfertilizers–Micronutrient mixtures

## **LECTURE SCHEDULE**

1. Definition and Composition of soil
2. Types of soils found in India and TamilNadu
3. Physical properties of soil – Texture, Structure
4. Soil colour
5. Particle density, Bulk density, Pore space
6. Soil Consistency
7. Soil air and Soil water
8. Soil temperature
9. Significance of physical properties in plant growth
10. Chemical properties of soil - Soil colloids,pH, EC
11. Definitionandimportance of Soil fertility
12. Soilfertilityand productivity – Organic matter–Influence onfertility
13. Decomposition of organic matter
14. Soil reaction-Problemsoils
15. Acid soils - Reclamation, Management and suitable crops
16. Saline, Sodic and Saline sodic soils - Reclamation, Management and suitable crops
17. Essential plant nutrients and their sources
18. Foliar diagnosis deficiencies and toxicity symptoms
19. Corrective measures of nutrient deficiencies
20. Time and methods of fertilizer application
21. Precautions in applying fertilizers
22. Methods to improve fertilizer use efficiency
23. Integrated nutrient management (INM)
24. Soil test crop recommendations (STCR)
25. Manures:Definition – Classification
26. Bulky Organic Manures (BOM)
27. Concentrated Organic Manures (COM)

28. Preparation of different types of compost including industrial waste
29. Composting of coir waste
30. Composting of press mud
31. Vermicomposting
32. Enriched FYM
33. Green manures
34. Green Leaf Manures
35. Benefits and significance of organic manures
36. Bio - fertilizers and their types
37. Application of Biofertilizers
38. Fertilizers
39. Classification of fertilizers
40. Sources of fertilizers
41. Straight and complex fertilizers
42. Mixed fertilizers
43. Nutrient content in fertilizers
44. Nitrogenous fertilizers
45. Phosphatic fertilizers
46. Potassic fertilizers
47. Slow release fertilizers
48. Micronutrient mixtures

## **PRACTICAL SCHEDULE**

1. Methods of collection and processing of soil samples
2. Estimation of pH and EC in soils
3. Analysis of available N
4. Analysis of Organic carbon
5. Analysis of available P
6. Analysis of available K
7. Determination of soil moisture by oven dry method.
8. Analysis of soil test results, Interpretation and Fertilizers recommendation.
9. Foliar diagnosis and its corrective measures
10. Identification of manures, fertilizers and bio-fertilizer
11. Preparation of different types of compost

12. Method of application of composted coir pith, vermicompost and FYM.
13. Preparation of slow release fertilizers (Neem coated, Tar and Lac coated urea)
14. Calculation of fertilizers through straight, complex and mixed fertilizers for some field crops
15. Study of soil amendments, fertigation and foliar fertilizers application.
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Buckman, H.O. and N.C. Brady. 1990. Nature and properties of soil, The McMillan Co, New York, Indian Publishers – Eurasia Publishing House (P) Ltd., Ram Nagar, New Delhi.
2. Das, P.C. 1993. Manures and Fertilizers, Kalyani Publishers, New Delhi
3. Sahai, V.N. 1990. Fundamentals of Soil, Kalyani Publishers, New Delhi
4. Tistale, S.L., W.I. Nelson and J.D. Beaton. 1990. Soil Fertility and Fertilizers, The McMillan Company, New York.
5. White H 1989. Introduction to the Principles and Practices of Soil Science, Oxfords Publishers, London.

## I SEMESTER

### 18 AGD 0103 PRINCIPLES OF AGRONOMY (3+1)

#### OBJECTIVES

- To know about the principles and practices of crop production and management.

#### LEARNING OUTCOME

- Scope and importance of Agriculture in Indian economy
- To know about basic knowledge of crop adaption distribution, classification and economic importance of various crops.
- Basic knowledge about tillage objectives and modern concepts of tillage.
- To know about the cropping and farming system problems
- To know about characteristics of weed – weed dissemination and IWM.

#### THEORY

**UNIT I Introduction:** Agriculture – Definition scope of Agriculture in India and Tamil Nadu – Importance of Agriculture in Indian economy – Branches of Agriculture – History and Development of scientific Agriculture in World and India – Agronomy – Definition – Art, Science and Business of Crop Production - Relationship with other disciplines- role of an Agronomist.

**UNIT II Crop adaptation and distribution:** Classification of crops – Their economic importance – Major crops of India and Tamil Nadu – Adaptation and distribution – Factors affecting crop production – Internal or Genetic factors, external or environmental factors - Agricultural seasons of India and Tamil Nadu.

**UNIT III Tillage:** Principles and practices of agricultural operations – Tillage and Tilth – Characteristics of good tilth, objectives of tillage – Types of tillage, primary and secondary tillage and Intercultural operations. Implements and tools in Agriculture - Preparatory cultivation, after cultivation gap filling and thinning - Modern concepts of tillage – Seed and sowing – seed treatment Nursery and Transplanting. Harvesting, threshing drying and storage

**UNIT IV Cropping systems and Farming systems:** Systems of farming- Wet land, Garden land and dry Land Farming systems- Factors affecting choice of crop and varieties – Types of cropping systems – Mono cropping, multiple cropping, inter cropping, sequential cropping – Multi species and multi tier cropping – Crop rotation – Definition and advantages –Integrated Farming System (IFS) – Definition & types- Organic farming and precision farming- Definition and concepts

**UNIT V Weed Management:** Definition-classification of weeds - Characteristics of weeds –Dissemination of weeds – Harmful and beneficial effects of weeds - critical period of crop–weed competition - Principles of weed management - Methods of weed management – Cultural (mechanical, cropping and competition), chemical and biological methods – Chemical weed control - Classification of herbicides – Formulations – Mode of action - Time and methods of application – control of invasive weeds- Integrated weed management (IWM).

## **LECTURE SCHEDULE**

- 1 Introduction to Agriculture
- 2 Scope of Agriculture in India &Tamilnadu
- 3 Definition of Agriculture
- 4 Importance of Agriculture in Indian economy
- 5 Branches of Agriculture
- 6 History and Development of scientific agriculture in world and India
- 7 Agronomy – Definition
- 8 Agronomy in relationship other disciplines
- 9 Role of an agronomist
- 10 Classification of Crops – Their economic important
- 11 Major crops of India and Tamil Nadu
- 12 Adaption and distribution of major crops
- 13 Factors affecting crop production
- 14 Internal factors
- 15 Genetic factors
- 16 External factors
- 17 environmental factors
- 18 Agricultural seasons of India &Tamil Nadu
- 19 Tillage Definition and Characteristics
- 20 Objectives of tillage and tilth
- 21 Types of tillage – primary & secondary tillage & international operators.
- 22 Implements and tools in agriculture
- 23 Preparatory and after cultivation
- 24 Gas filling and Thinning
- 25 Modern concepts of tillage – main feed preparation
- 26 Seed and sowing
- 27 Seed treatment nursery & Transplanting

- 28 Harvesting, threshing drying & storage
- 29 Farming systems IFS concepts
- 30 Systems of Farming types of Farmings
- 31 Factors affecting choice of crop & variety
- 32 Types of Cropping systems – mono cropping & multiple cropping
- 33 Intercropping – sequential cropping
- 34 Multispecies & multitier cropping
- 35 Crop rotation
- 36 IFS – Definition of types
- 37 Organic Farming – Definition & concepts
- 38 Precision farming – Definition & concepts
- 39 Weed classification of weeds
- 40 Characteristics of weeds
- 41 Dissemination of weeds
- 42 Harmful & Beneficial effects of weeds
- 43 Critical period of crop weed competition
- 44 Principles & methods of weed management
- 45 Chemical weed control – classification of herbicides
- 46 Herbicides formulation – model of action
- 47 Time & methods of application of herbicides
- 48 Control of invasive weeds – Integrated weed management.

## **PRACTICAL SCHEDULE**

1. Identification of crops in wet land system of farming
2. Identification of garden system of farming
3. Identification of dry land system of farming
4. Identification of tillage implements and acquiring skill in tillage operation
5. Identification of seeds of various field crops
6. Practicing Nursery bed preparation for low land and upland crops.
7. Practicing different methods of sowing and other cultivation practices in field crops
8. Practicing harvesting and processing of important crops
9. Practicing of different cropping systems and farming systems
10. Calculating the growth and the yield components of major crops.
11. Identification of weeds in wet, garden land and Arid and Semi Arid land areas.
12. Acquiring skill in mechanical and cultural methods of weed control, use of tools and implements



13. Practicing the methods of application of herbicide for different field crops and perennial and invasive weeds.
14. Practicing the methods of application of herbicide for different perennial and invasive weeds.
15. Practicing the methods of application of herbicide for the control of water weeds
16. Final Practical Examination

## **REFERENCES**

### **Text books**

1. Gupta, O.P. 1998. Weed management principles and practices, Agro botanical Publishers. Bilaneers.
2. Hosmani, M.M. 1995. Integrated weed management in field crops, Hosmani Publishers, Dharward.
3. Rao, V.S. 1983. Principles of weed science. Oxford and IBH, New Delhi.
4. Sankaran, S. V.T.Subbiah Mudaliar. 1997. Principles of Agronomy, The Bangalore Printing and Publication Company Pvt. Ltd., Bangalore.
5. Yeilamanda Reddy and G.H. Sankara Reddi,1998. Principles of Agronomy, Kalyani Publishers, Ludhiana.

## I SEMESTER

### 18 AGD 0105 AGRICULTURAL METEOROLOGY AND LAND USE SYSTEMS (3+1)

#### OBJECTIVES

- To make the students understand the Principles of Agricultural Meteorology
- To improve knowledge and skills in Dry land Agriculture and Wasteland management

#### LEARNING OUTCOME

- Creation of basic knowledge on role of agricultural meteorology in crop production
- Scope and practical utility of agricultural meteorology in crop production
- Basic knowledge of alternate land use systems especially dry farming
- Scope and practical utility in studying dry land agriculture involving soil and water conservation efforts, integrated nutrient management, alternate land use systems especially agro forestry and watershed management in dry lands
- Creation of basic knowledge on forestry and wastelands and their practical utility in agriculture especially in dry lands

#### THEORY

**UNIT I Introduction:** Meteorology – Agricultural meteorology – Branches – their scope in Crop production – atmosphere – composition - climate and weather – weather elements and their importance – monsoons of India Rainfall and its distribution in India and Tamil Nadu – Agro climatic zones of India and Tamil Nadu – Agro ecological zones.

**UNIT II Weather Forecasting:** Weather forecasting – Types of weather forecasting – synoptic chart, weather calendar – Climatic change and weather modification – types – Artificial rain making – automatic weather station – Remote sensing and its role in agriculture.

**UNIT III Principles of Dry Farming:** Significance of dry farming in Indian Agriculture Indices of Aridity – Distribution of dry farming regions – Major dry land crops and cropping systems in India and Tamil Nadu – Drought – Types and effect on crop production

**UNIT IV Dry Farming Practices:** Integrated Dry land Development Technology and its components – Soil moisture conservation methods – Principles and practices – pre-monsoon sowing – Mid season corrections – Soil fertility management in dry farming – Alternative land use system in dry farming areas – Watershed Management – water shed – definition and importance

**Unit V Forestry and Wasteland Development :** Forests and forestry – Forest in India and Tamil Nadu – Distribution – Status – Importance – their uses and conservation – classification – Wastelands – Definition- extent – ecological status – causes – types – classification – tree species suitable for waste lands, saline and water logged areas.

### **LECTURE SCHEDULE**

- 1 – 2 Introduction to agricultural meteorology, importance, its branches and definitions of different terms
- 3 Atmosphere – Definition, composition and different layers of atmosphere
- 4 Climate and weather – definition and significance of troposphere in agriculture
- 5-6 Different weather elements and their importance in crop production
- 7 Monsoons – trade winds – importance of monsoon systems in Indian agriculture
- 8-9 South west and north east monsoon systems - rainfall pattern and their importance
- 10 Agro climatic zones – definition, classification – different zones in India
- 11 Agro climatic zones of Tamil Nadu
- 12 Agro ecological zone - definition, classification – different zones in India
- 13-14 Weather forecasting – introduction - definition – significance of weather forecasting
- 15-16 Types of weather forecasting, forecasted weather elements and their utility in crop production
- 17 Synoptic chart – introduction, definition, description about chart preparation
- 18 Weather calendar – Importance – preparation of weather calendar – model for crops – practical utility in decision making at times of contingencies
- 19-20 Weather modification – definition – types – artificial rain making, changing effects of winds, light and other weather parameters
- 21 Automatic weather station and its role in recording and forecasting weather factors
- 22 Remote sensing – definition – methodology – practical utility in agriculture and allied sectors
- 23 Definitions – difference between dry farming and dry land agriculture significance of dry land agriculture in India
- 24 Indices of aridity – arid and semi arid climate – Koeppen, Thoorthwaite and Martonne’s classifications
- 25 Distribution of dry regions in India – locations with soil, rainfall and cropping pattern
- 26 Major crops and cropping systems in dry land areas of India and Tamil Nadu
- 27 Drought – definition, history and its impact on Indian Agriculture
- 28 Classification of drought – meteorological, hydrological and agricultural droughts and effect of drought in crop production
- 29 Integrated dry land development technology – outline and components
- 25 Soil and moisture conservation methods – control of soil erosion by different

- mechanical structures
- 26 In situ soil moisture conservation measures
- 27 Seed hardening and mulching
- 28 Contingent crop production techniques and midseason correction measures in dry land crop production
- 29-30 Integrated nutrient management measures in dry lands
- 31 Alternate land use systems – agro forestry –integrated farming systems and alley cropping in dry lands
- 32-33 Watershed management in dry lands – definitions – objectives and components of watershed management in dry lands
- 34-35 Forests and forestry – introduction – importance – extent of forest area in India and Tamil Nadu distribution of forest areas
- 36 Status of forestry and their uses and conservation efforts
- 37-39 Wastelands – introduction – extent of spread – classification – ecological status – causes of wasteland formation
- 39-40 Tree species suited to different types of wastelands such as mine spoil, saline, alkaline, waterlogged, desert etc. environments
- 40 -41 Alternate land use systems – agro forestry –integrated farming systems and alley cropping in dry lands
- 42 Watershed management in dry lands – definitions – objectives and components of watershed management in dry lands
- 43 Forests and forestry – introduction – importance – extent of forest area in India and Tamil Nadu – distribution of forest areas
- 44 Status of forestry and their uses and conservation efforts
- 45– 46 Wastelands – introduction – extent of spread – classification – ecological status – causes of wasteland formation
- 47 - 48. Tree species suited to different types of wastelands such as mine spoil, saline, alkaline, waterlogged, desert etc. environments

## **PRACTICAL SCHEDULE**

1. Visit and study of Agro meteorological observatory
- 2-3. Site selection for Agro met observatory-Drawing layout sketch of the observatory
- 4-5. Measurement of weather parameters – Acquiring skill and use of Meteorological Instruments- Thermometers
- 6-7. Acquiring skill and use of Meteorological Instruments- Anemometer, rain gauge and open pan evaporimeter
8. Pre-monsoon dry seeding for dry land crops.
9. Preparation of contingency crop planning for various aberrant weather situations
10. Study of dry farming tools and implements
11. Study of agro forestry options in Tamil Nadu

12. Study of tree species suitable for Agro Forestry and Wastelands.
- 13-14. Seed collection and seed treatment for tree species.
15. Nursery Management of tree species and planting.
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Gopalsamy, N. 1994. Agricultural Meteorology, Rawat Publications, Jaipur.
2. Griffiths, J.F. 1994. Hand Book of Agricultural Meteorology, Oxford University Press.
3. Nair, P.K.R. 2008. An Introduction to Agro forestry. Springer (India) Private Ltd., New Delhi.
4. Singh, R.P. 1996. Sustainable Development Dry land Agriculture in India, Scientific Publishers, Jodhpur.
5. Dhopte, A.M. 2009. Agro technology for Dry land farming.

## I SEMESTER

### 18AGD 0107 IRRIGATION AGRONOMY (3+1)

#### OBJECTIVES

- The students will be familiarized with the irrigation and crop water requirement concepts
- The students will be taught with the drainage and problems in the usage of water sources

#### LEARNING OUTCOME

- The students are well known with the handling of crops with better water requirement and irrigation resources

#### THEORY

**UNIT I Importance of Irrigation:** Definition- - Water resources of India and Tamil Nadu- Need for irrigation- Sources of Irrigation- Natural streams and rivers, surface resources, underground resources- History and development of Irrigation in India and Tamil Nadu- Irrigation systems of India and Tamil Nadu- Ground water- Aquifer- Well irrigation- Classification –open and bore well - Merits and demerits of tube wells-Role of water in plant growth.

**UNIT II Soil, Water and Plant relationship:** Soil- Plant-Water relationship-Soil plant Atmospheric continuum- Hydrological cycle- Soil water movement- Soil moisture constants- Saturation capacity, Field capacity, Permanent Wilting Point (PWP), Hygroscopic co-efficient, Moisture equivalent- Available Soil Moisture (ASM)- Importance of soil moisture constants in Irrigation management- Moisture extraction pattern- Absorption of water- Evapotranspiration- Plant water stress and its effects and methods to overcome stress- - Physical classification of water- Gravitational water, capillary water and Hygroscopic water- Biological classification of water- Superfluous water, Available water and Unavailable water.

**UNIT III Irrigation and Crop Water requirement:** Irrigation Requirement - Net Irrigation requirement (NIR) and Gross Irrigation requirement (GIR) – Evapotranspiration- Evaporation, Transpiration, Potential Evapo Transpiration (PET)- Crop Co-efficient – Effective rainfall- Factors affecting crop water requirement- Consumptive Use(Cu)-Methods of estimation of Crop water Requirement- Critical stages for irrigation- Water requirement of crops.

**UNIT IV Scheduling and methods of Irrigation:** When, how and how much to irrigate- different approaches- Methods of irrigation- Surface, sub-surface , sprinkler and drip irrigation- surge irrigation-Micro irrigation – layout, suitability, , merits and scope-Fertigation-Water use efficiency(WUE)-Methods to improve WUE- Conjunctive use of surface and ground water- Water management for major field crops of Tamil Nadu

**UNIT V Drainage and problems in water use:** Drainage-Definition- Effects of water logging, Benefits of Drainage- Classification of Drainage- surface Drainage- Merits and Demerits- Subsurface drainage- Quality of irrigation water- Agronomic practices for use of poor Quality water ( Saline, effluent and sewage water

### LECTURE SCHEDULE

- 1-2. Irrigation – Definition- Water Resources of India and Tamil Nadu- Need for irrigation- Source of irrigation- Natural streams and rivers – Surface resources and underground resources
- 3-4. History and Development of irrigation in India and Tamil Nadu- Irrigation systems of India and Tamil Nadu
- 5-6. Ground water, Aquifer- Well irrigation- Classification –open and bore wells- Merits and demerits of tube wells
- 7-8. Role of Water in plant growth- Functions of water in soils- Functions of soil – Role of organic matter in soil- Significance of Soil texture and Soil structure
- 9-10. Soil-Plant- water relationship- Soil factors- Infiltration and factors affecting Infiltration rate, permeability – Plant factors- Rooting characteristics, moisture extraction pattern and critical period of water requirement- Water factors- when to irrigate, how much water to apply and water application methods
- 11-12. Soil- plant Atmospheric continuum(SPAC)- Hydrologic cycle- Absorption of water by plants- Active absorption and passive absorption-Soil water movement- Saturated flow, unsaturated flow and vapour movement-
- 13-14. Soil moisture constants- Saturation capacity, Field capacity (FC), Permanent Wilting point (PWP)- Hygroscopic co-efficient, moisture equivalent and Available Soil moisture (ASM) – definition - Importance of soil moisture constants in Irrigation management
- 15-16. Soil physical characteristics – Soil texture, soil structure, porosity ,Bulk density and particle density in influencing irrigation- soil moisture estimation methods
- 17-18. Water stress and Plant growth- Causes of plant water stress- Effects of water stress on plant growth and methods to overcome.

- 19-20. Physical classification of Water- Gravitational water, capillary water and hygroscopic water- Biological classification of water- Superfluous water , available water and unavailable water
- 21-22. Irrigation requirement- Net irrigation requirement- Gross irrigation requirement- Evapo transpiration – Evaporation, Transpiration, Potential Evapo Transpiration (PET)- Reference crop Evapo transpiration- Crop co-efficient- Effective rainfall.
- 23-24. Crop Water requirement- Factors affecting Crop water requirement- Consumptive use- Seasonal consumptive use- Peak period consumptive use- Critical stages of irrigation
- 25-26. Methods of estimation of crop water requirement- Direct methods- Lysimeter, field experimental plots, Soil moisture depletion studies and water balance methods- Indirect methods- Modified blaney-criddle method, Thorthwaite formula, radiation method, Pan evaporation method.
- 27-28. Scheduling of irrigation- Criteria based on plant, soil moisture- Different approaches-Climatological approach, Empirical methods and crop co-efficient
- 29-30. Methods of irrigation- Surface irrigation- Flooding, beds and channels, border strip, ridges and furrows, broad bed and furrows (BBF)and surge irrigation- sub surface irrigation methods
- 31-32. Micro irrigation system- Drip and sprinkler irrigation- Lay out, suitability, components,operation, advantages and disadvantages- Fertigation
- 33-34. Water use efficiency (WUE)- Definition and concept- methods to improve WUE- Conjunctive use of water- Water budgeting
- 35-36. Water management for Cereals and Millets
- 37-38. Water management for Pulses and Oil seeds
- 39-40. Water management for commercial crops (Cotton, Sugarcane and Tobacco)
- 41-42. Drainage – Definition- Effects of water logging, Benefits of drainage
- 43-44. Classification of drainage- surface drainage- merits and demerits- Sub surface drainage
- 45-46. Quality of irrigation water- Irrigation management under limited water supply
- 47-48. Agronomic practices for the use of poor quality water (Saline, Effluent and sewage water)

## **PRACTICAL SCHEDULE**

1. Estimation of soil moisture by gravimetric method and Tensiometer
2. Estimation of Soil moisture by Resistance blocks and Neutron probe and other improved devices
3. Measurement of irrigation water with flumes and weirs
4. Calculation of irrigation water based on source, waterflow, soil moisture status and depth of irrigation
5. Land leveling and land shaping- beds and channels- Ridges and furrows
6. Land leveling and land shaping for border strips – Broad Bed and furrow method of irrigation
7. Operation and maintenance of drip and sprinkler irrigation systems
8. Estimation of crop water requirement by direct and indirect methods



9. Scheduling of irrigation based on indicator plants , soil-sand mini plot technique
10. Scheduling of irrigation based on depletion of available soil moisture and IW/CPE ratio
11. Calculations on Irrigation efficiency parameters
12. Assessment of irrigation water quality parameters
13. Observation of irrigation structures in wetlands and irrigated drylands
14. Visit to Water management and training Institutes
15. Final practical Examination

## **REFERENCES**

### **Text books**

1. Michael ,A.M. 1997. Irrigation- Theory and Practice.Vikas Publishers
2. Sankarareddy, G.H. and T.Yellamananda Reddy, 1997. Efficient use of Irrigation Water. Kalyani Publishers.

### e - references

[www.irri.org](http://www.irri.org)

[www.wcc.nrcsusda.gov/nrcsirrig](http://www.wcc.nrcsusda.gov/nrcsirrig)

[www.wcc.nrcs.sda.gov/irrig.info.html](http://www.wcc.nrcs.sda.gov/irrig.info.html)

[www.crinfo.net/irrigschedule.htm](http://www.crinfo.net/irrigschedule.htm)

## I SEMESTER

### 18AGD0109 DAIRY CATTLE PRODUCTION (3+1)

#### OBJECTIVES

1. The General objective of this course is to establish basic knowledge of how to manage and operate dairy farm.
2. This course is designed to impart basic technical knowledge and skills required for entry level positions or to successfully run a dairy farm enterprise by developing competencies concerning the selection and breeding of dairy cattle, management of animals of different physiological status, feeding, housing and health care.
3. To provide hands-on experiences with handling and restraining of cattle, milking and other dairy husbandry practices.

#### LEARNING OUTCOME

- The student will understand the various breeds of dairy cattle, giving their origin and breed characteristics and milk production capacity.
- Able to identify suitable method of breeding for improving the productivity of herd
- Ability to handle and restrain animals safely.
- Ability to classify feeds according to their nutritive values
- Able to identify healthy and sick animals

#### THEORY

**UNIT I Cattle breeds and selection:** Introduction - Meaning of commonly used terms - Origin and domestication of livestock - Dairy cattle census – Milk production and availability – Description of parts of dairy cow, cattle breeds – Indigenous breeds – Red Sindhi, Sahiwal, Gir, Kangayam – Exotic breeds – Holstein Friesian, Jersey, Brown Swiss. Breeds of buffalo – Murrah – Surti – Nili - Ravi – Selection of dairy cattle – objectives – dairy characters – selection of individual cows - Choice of breeds.

**UNIT II Cattle breeding:** Male and Female reproductive system – Oestrous cycle - Signs of heat – Concept of breeding – Inbreeding – Out breeding - breeding efficiency – Artificial insemination – Semen collection – Evaluation – Freezing technique – Insemination – Advantage and disadvantages of frozen semen.

**UNIT III Zootechny and Housing:** Handling and restraining of dairy cow – Casting – Putting nose ring and string – Dehorning – Castration – Dentition and ageing – Identification of dairy cow – Tattooing – Branding – Selection of site for the farm buildings — Planning and designing - construction details – Foundation – Wall, floor, roof, manager, drain etc. – Types of animal housing – Conventional barn – Loose housing. Training of work bullocks for ploughing and carting – age at work – draught capacity.

**UNIT IV Feeds and Feeding:** Classification of feeds – Roughage – Concentrate – Grains – Mill by products – Molasses – Oil cakes – Role of water, protein, carbohydrates, fats, vitamins and minerals in animal nutrition – Digestive system of ruminants – Digestion of carbohydrates, protein and fats – Nutrient requirements for maintenance and milk production – Urea feeding – Urea treatment of paddy straw.

**UNIT V ABC of Veterinary medicine:** Elementary principles of treatment and care of sick animals – Signs of health and ill health – Temperature – Respiration – Pulse – Mastitis - Common ailments – Bloat – Carbohydrate engorgement – Diarrhoea – Indigestion – Wounds. Common contagious diseases – Foot and Mouth disease – Rinderpest – Anthrax – Black quarter – Tuberculosis – Johne’s disease – Brucellosis – Rabies, Hemorrhagic Septicemia – Endoparasites – Ectoparasites

## **LECTURE SCHEDULE**

1. Introduction to dairying, advantages of dairying and role of dairying in Indian Economy.
2. Exploring origin and domestication of livestock, Livestock census, milk production and availability.
3. Meaning of commonly used terms, Zoological classification of bovine and name the parts of dairy cow.
4. Classification of breeds of cattle and distinguishing characteristics and production performance of indigenous breeds of cattle- Red Sindhi, Sahiwal, Gir and Kangayam.
5. Distinguishing characteristics and production performance of exotic breeds of cattle – Jersey, Holstein Friesian and Brown Swiss.
6. Distinguishing characteristics and production performance of buffalo breeds – Murrah, Surti and Nili-Ravi.
7. Objectives and dairy characteristics

8. Selection of individual cows and choice of breed.
9. Basic anatomy and physiology of reproductive system of bull
10. Basic anatomy and physiology of reproductive system of cow
11. Changes in female reproductive system during different phase of oestrous cycle
12. Signs of heat in cows and buffaloes
13. Concept and classification of cattle breeding systems, uses and consequences of inbreeding.
14. Various methods of out breeding and its uses.
15. Various methods used to measure the breeding efficiency of cows and bulls
16. Various steps involved in artificial insemination – semen collection, evaluation, dilution and insemination.
17. Frozen semen production and its advantages and disadvantages.
18. Handling and restraining of dairy cow.
19. Casting, putting nose ring and string.
20. Dehorning – various methods its advantages and disadvantages
21. Castration and its advantages
22. Dentition and ageing – classification of teeth, parts of tooth, dental formula and determining the age of the cow.
23. Identification of dairy cow – tattooing, tagging and branding.
24. Selection of site for the farm buildings, planning and designing.
25. Construction details – Foundation – wall, floor, roof, manger, drain etc.
26. Types of animal housing – conventional barn and loose housing.
27. Classification of feeds roughage and concentrates, hay and straw, legume and non-legume, pasture and cultivated fodder, tree leaves, root crops and tubers.
28. Feeding value of grains, mill byproducts tapioca, molasses and oil cakes.
29. Nutrients in the feeding stuff, Water content of animal body and factors influencing it, functions of water and factors affecting water intake.
30. Definition, classification and functions of carbohydrates, protein and fat in the animal body in animal body
31. Functions, deficiency symptoms and sources of fat soluble vitamins.

32. Functions, deficiency symptoms and sources of water soluble vitamins and minerals
33. Organs of digestive system – Alimentary canal - mouth - esophagus – stomach – intestine and accessory digestive organs – salivary gland, liver and pancreas.
34. Digestion and absorption of carbohydrates, protein and fat.
35. Principles of urea feeding, NPN compounds and their protein values and various methods of feeding urea
36. Factors affecting urea utilization and urea toxicity and its treatment.
37. Calculating the DM, TDN and DCP requirements of dairy cattle for maintenance and milk production.
38. Improving the digestibility of roughage by urea treatment
39. Elementary principles of treatment and care of sick animals
40. Signs of health and ill health
41. Recording of temperature, Respiratory and Pulse rate in cattle
42. Etiology, clinical signs, treatment and control of Mastitis
43. Etiology, clinical signs and treatment of Bloat and Carbohydrate engorgement
44. Etiology, clinical signs and treatment of Diarrhoea, Indigestion and Wounds.
45. Etiology, clinical signs, treatment and control of viral diseases viz. Foot and Mouth disease, Rinderpest and Rabies,
46. Etiology, clinical signs, treatment and control of acute bacterial diseases viz. Anthrax, Black quarter and Hemorrhagic Septicemia
47. Etiology, clinical signs, treatment and control of chronic bacterial diseases viz. Tuberculosis, Johne's disease and Brucellosis
48. Control of Endoparasites and Ectoparasites.

## **PRACTICAL SCHEDULE**

1. Familiarizing with of body parts of dairy cow
2. Identification of breeds of cattle and buffaloes
3. Estimation of body weight by body measurements
4. Demonstration of semen collection, evaluation and insemination
5. Restraining of dairy cattle
6. Disbudding of calves
7. Castration of male calves

8. Dentition and ageing
9. Recording of temperature, pulse and respiration
10. Identification of feeds and fodder
11. Preparation of plans for animal housing
12. Calculations of nutrient requirements for maintenance and milk production
13. Urea treatment of paddy straw
14. Preparation of projects for obtaining bank loan
15. Visit to a Dairy farm
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. ICAR, 2013. Hand book of Animal Husbandry, 4<sup>th</sup>Ed.ICAR Publication, Pusa, New Delhi.
2. Banerjee, G.C., 2006. Text book of Animal Husbandry 8<sup>th</sup>Ed.Oxford and IBH Publishing Company Ltd., New Delhi.
3. Jagadish Prasad, 2002. Principles and practices of Dairy Farm Management, 3<sup>rd</sup> Ed. Kalyani Publishers, Ludhiana.
4. Sastry, N.S.R., C.K.Thomas and R.A.Singh, 2015. Livestock Production Management, 4<sup>th</sup>Ed.Kalyani Publishers, New Delhi.
5. Ranjhan, S.K., and N.N.Pathak, 2003. Text book on buffalo production, 4 Ed. Vikas Publishing House Pvt. Ltd., New Delhi

## I SEMESTER

### 18 AGD 0111 RURAL DEVELOPMENT (3+1)

#### OBJECTIVES

- To teach the students about the basics and importance of rural development.
- To understand the rural development attempts over various decades
- To expose the students to various agricultural and rural development programmes of centre and state
- To impart knowledge about rural development institutions and their role and importance

#### LEARNING OUTCOME

- Studying the concepts of rural development
- Learning about the community development programme and the machinery of its implementation
- Learning about the Origin, objectives and functions of various agricultural development programmes
- Studying about the Origin, objectives and functions of various rural development programmes
- Learning about the different rural development institutions and SHGs

#### THEORY

**UNIT I Introduction:** Rural Development- meaning, objectives, characteristics and its importance in the development of Indian economy - Socio-economic conditions of rural population, causes for poverty conditions in villages, differences and relationships between rural and urban societies. Rural Development Attempts in the Pre-independent Era: Shantiniketan, Gurgaon Experiment, Etawah Pilot Project, Marthandam Project, Gandhian Constructive Programme, Firka Development Scheme of Madras State, Nilokheri Experiment.

**UNIT II CDP and Panchayati Raj:** Community Development Programme- meaning, principles, objectives and administration. Community Development and National Extension Service. Panchayati Raj- evolution, earlier efforts and setup in 1957-59. 73<sup>rd</sup> Constitutional amendment- New Panchayati Raj- Tamil Nadu Panchayati Raj Act- constitution, structure and functions of Panchayat bodies at three tiers in Tamil Nadu.

**UNIT III Agricultural Development Programmes:** Origin, objectives and functions of IADP, IAAP, HYVP, NPDP, ICDP, NATP, Technology mission on Oilseeds, Pulses and Maize. National Horticulture Board and its schemes, NWDPR, IAMWARM and NHM and NFSM. Origin, objectives and functions of Training

and Visit System and TNADP. TOT by ICAR- KVK, FLDs, OFTs, ATIC, ATMA, Agri Clinics and Agri Business Centres. Kisan Credit Card Scheme, National Agricultural Insurance Scheme, Precision Farming Project.

**UNIT IV Rural Development Programmes:** Origin, objectives and functions of IRDP, SGSY, IAY, National Social Assistance Programme- NOAPS, NMBS, NFBS, Annapurna Scheme, Bharat Nirman, PMGSY, PMGRY, PURA, RSVY, NREGA, MNREGS, DPAP, DDP, IWMP, Hariyali.

**UNIT V Rural Social Organizations:** Origin, objectives and functions of DRDA, NABARD, CAPART. TAWDEVA - Self Help Groups- formation, functioning and their role in rural development - TNCDW and its role in SHGs - Role of NGOs in the development of SHGs- provision of inputs- role in linking SHGs to formal credit system.

## LECTURE SCHEDULE

- 1-2 Rural Development- meaning, objectives, characteristics and its importance in the development of Indian economy
- 3 Socio-economic conditions of rural population
- 4 -5 Causes for poverty conditions in villages, differences and relationships between rural and urban societies
- 6 -9 Rural Development Attempts in the Pre-independent Era: Shantiniketan, Gurgaon Experiment, Etawah Pilot Project, Marthandam Project, Gandhian Constructive Programme, Firka Development Scheme of Madras State, Nilokheri Experiment.
- 10-11 Community Development Programme- meaning, principles, objectives and administration.
- 12. Community Development and National Extension Service
- 13 -14 Panchayati Raj- evolution, earlier efforts and setup in 1957-59.
- 15-16 73<sup>rd</sup> Constitutional amendment- New Panchayati Raj- Tamil Nadu Panchayati Raj Act
- 17-18 Constitution, structure and functions of Panchayat bodies at three tiers in Tamil Nadu
- 19 – 21 Origin, objectives and functions of IADP, IAAP, HYVP, NPDP, ICDP, NATP, Technology mission on Oilseeds, Pulses and Maize.
- 22 – 23 National Horticulture Board and its schemes, NWDPR, IAMWARM and NHM and NFSM
- 24 Origin, objectives and functions of Training and Visit System and TNADP.
- 25 – 27 TOT by ICAR- KVK, FLDs, OFTs, ATIC, ATMA, Agri Clinics and Agri Business Centres.
- 28-29 Kisan Credit Card Scheme, National Agricultural Insurance Scheme, Precision Farming Project



- 30-31 Origin, objectives and functions of IRDP, SGSY, IAY
- 32 – 34 National Social Assistance Programme- NOAPS, NMBS, NFBS, Annaporna Scheme,
- 35 – 38 Bharat Nirman, PMGSY, PMGRY, PURA, RSVY, NREGA, MNREGS,
- 39 DPAP, DDP, IWMP ,Hariyali.
- 40 – 42 Origin, objectives and functions of DRDA, NABARD, CAPART. TAWDEVA.
- 43 – 45 Self Help Groups- formation, functioning and their role in rural development - TNCDW and its role in SHGs –
- 46 – 48 Role of NGOs in the development of SHGs- provision of inputs- role in linking SHGs to formal credit system

## **PRACTICAL SCHEDULE**

1. Study of tools of data collection.
2. Preparation of schedules to collect the village basic data.
3. Preparation of schedules to collect the socio-economic status.
4. Visit to nearby villages to collect village basic data.
5. Micro level survey to assess the Socio-economic status of people in nearby villages.
6. Study of attitude of villagers towards Agricultural Development programmes
7. Visit to a nearby Village Panchayat office and attending Gram Sabha Meeting.
8. Visit to nearby Village to attend the Gram Sabha Meeting
9. Visit to Panchayat Union to learn its administrative setup, functions and programmes.
10. Visit and study of organizational structure, functions and programmes of DRDA.
11. Visit to KVK at GRI to learn its activities and programmes.
12. Interaction with SHG' members about their activities and experience.
13. Visit to an NGO and learning its activities and role in rural development.
14. Visit to Farmers training centre.
15. Visit to JDA office – Dindigul
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Dahama, O.P. and O.P.Bhatnagar. (1996). Education and Communication for Development, Oxford & IBH Publishing Co., Ltd., New Delhi.
2. Ray, G.L.(1991). Extension Communication and Management. Naya Prakash, Calcutta.
3. Reddy, A.A. (1980) Extension Education. Shree Laxmi Press, Bapatla
4. Tripathi, N.K. (2000). Rural Sociology and Psychology in Extension Education.
5. Sundaramari, M. (2006). Agriculture and Dairying- A Rural Development Perspective, NCBH, Chennai.

## II SEMESTER

### 18 AGD 0201 AGRONOMY OF FIELD CROPS-I (3+1)

#### OBJECTIVES

1. To know the concept and classification of field crops and cropping systems
2. To know the production technology of Cereal crops (Rice, Wheat, Maize, Sorghum and other Millets), Pulses (Red gram, Black gram, Green gram and others) and Green / Green leaf manure and Cover crops (Daincha, Manila Agathi, Sun hemp and others)

#### LEARNING OUTCOME

- Knowing the concept and classification of field crops their importance and their distribution / Improved production technology of Rice, wheat, maize, major and minor millets, Major and Minor pulses , Green and Green leaf manure and Cover Crops and their incorporation

#### THEORY

**UNIT I Cereals I: Rice**

**UNIT II Cereals II: Wheat and Maize**

**UNIT III Millets:**

**A. Major millets:** Sorghum, Pearl millet (Cumbu), Finger millet ( Ragi).

**B. Minor millets:** Foxtail millet (Tenai), Little millet (Samai), Kodo millet (Varagu), Common millet (Pani Varagu), Barnyard millet (Kudirai Vali).

**UNIT IV Pulses:**

**A. Major:** Pigeon pea (Red gram), Black gram, Green gram, Bengal gram (Chickpea), Cowpea,

**B. Minor:** Soybean, Horse gram, Field bean

**UNIT V Green manure, Green leaf manure and Cover crops:**

**A.** Green manures – Daincha, Manila Agathi, Sunhemp,

**B.** Green leaf manure - Gliricidia, Pungam and Neem.

**C.** Cover crops – Pillipesara, Kolingi, Kalapogonium ,Mucana (Punaicali)

#### LECTURE SCHEDULE

- 1 Importance of cereals, millets, pulses, green manures, green leaf manures and cover crops
- 2 Area, production and productivity of major cereals, millets and pulse crops of India and Tamil Nadu
- 3 Rice - importance - origin, distribution - soil and climatic requirement, season and varieties
- 4,5. Rice - growth stages - systems of rice cultivation - methods of sowing - nursery preparation and management - seed rate, seed treatment and sowing in nursery

- 6,7 Rice - main field preparation for wet and dry cultivation, Methods of crop establishment - Direct sowing under wet and dry condition – Transplanting, plant density and geometry, management of aged seedlings
- 8,9 Nutrient management in rice – manures and manuring - time and method of fertilizer application - application of bio fertilizers - Azolla, Bluegreen algae, Azospirillum and Phosphobacteria
- 10,11 . Rice - weed control – IWM - irrigation - after cultivation - cropping system - harvesting, threshing, drying and storage - by-products.
- 12,13 Rice - cultivation of hybrid rice - deep water rice – ratoon management
- 14 Wheat - origin and distribution - soil and climatic requirements - season, varieties
- 15 Wheat - field preparation - seeds and sowing, seed treatment - manures and manuring - weed control - irrigation - after cultivation - harvest, threshing, drying and storage - cropping system
- 16,17 Maize - origin and distribution - soil & climatic requirements - season, varieties – types of maize - field preparation - sowing – manures & manuring - weed control
- 18 Maize - irrigation - after cultivation - harvest, threshing, drying and storage - Agronomic practices for Baby corn - cropping system
- 19 Sorghum - importance - origin and distribution - soil and climatic requirements – season, varieties -seeds and sowing – nursery preparation
- 20,21 Sorghum - main field preparation - transplanting – manures and manuring - weed control - after cultivation – irrigation - harvest and storage
- 22 Sorghum - Agronomic practices for rain fed and ratoon sorghum - cropping system
- 23 Pearl millet - importance - origin and distribution - soil and climatic requirements - season, varieties - nursery - seeds and sowing – main field preparation and planting
- 24,25 Pearl millet - manures and manuring - weed control - after cultivation - irrigation - harvest and storage – Agronomic practices for rain fed pearl millet - cropping system
- 26 Finger millet - importance - origin and distribution - soil and climatic requirements - season, varieties - nursery - seeds and sowing - main field preparation and planting - manures and manuring - weed control - after cultivation - irrigation - harvest and storage – Agronomic practices for rain fed crop - cropping system
- 27 Barnyard millet - Foxtail millet - Kodo millet - importance - origin & distribution - soil and climatic requirement - season - varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation – harvest

- 28 Little millet and Common millet - importance - origin and distribution - soil and climatic requirements - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation - harvest and storage
- 29 Red gram – importance - origin and distribution - season, varieties - field preparation – seeds and sowing - manures and manuring - weed control - after cultivation – irrigation - harvest and storage - cropping system
- 30 Black gram - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation – irrigation - harvest and storage
- 31 Green gram - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation – irrigation - harvest and storage
- 32 Bengal gram - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation - irrigation - harvest and storage
- 33 Cowpea - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation - irrigation - harvest and storage
- 34 Soybean - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation - irrigation – harvest and storage
- 35 Horse gram and Field Bean - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation - irrigation – harvest and storage
- 36-38 Green manure crops – importance/benefits of growing green manures – ideal characteristics of green manure crops and nutrient content of various green, green leaf & cover crops
- 39-41 Importance - soil and climatic requirement for *Sesbania aculeata*, *Sesbania speciosa* and *Sesbania rostrata* - biomass production - time and method of incorporation
- 42-44 Importance - soil and climatic requirement for Sunnhemp and Kolinji time - biomass production and method of incorporation
- 45-46 Green leaf manure crops - importance - *Gliricidia*, Pungam, Neem, *Calotropis* - method of incorporation

47-48 Cover crops – importance – Phillipisara, Calapogonium and Mucana - method of incorporation

## **PRACTICAL SCHEDULE**

1. Practicing different types of rice nursery, SRI Technique in Rice.
2. Acquiring skill in nursery preparation for sorghum, cumbu and ragi
3. Practicing main field preparation, sowing and manuring of important cereals and millets.
4. Practicing main field preparation, sowing of pulses under pure and inter cropping system.
5. Seed treatment practices in cereals and pulses
6. Assessing and estimation of plant population for important field crops.
7. Foliar application of nutrients.
8. Yield attributes and yield estimation in rice and maize
9. Yield attributes and yield estimation in sorghum.
10. Yield attributes and yield estimation in Ragi and other millets
11. Yield attributes and yield estimation in pulses
12. Yield estimation in green manure crops.
13. Working out cost of cultivation for Rice and Maize
14. Working out cost of cultivation for Millets
15. Working out cost of cultivation for Pulses
16. Final Practical Examination

## **REFERENCES**

### **Text books**

1. Balasubramanian, R and B. Gururajan. 2009. Crop Production, Kalyani Publishers, Ludhiana
2. Chatterjee, B.N. and S. Maiti. 1993. Cropping system – Theory and Practice, Oxford and IBH Publishing Company Pvt. Ltd., New Delhi.
3. Chiddha Singh. 1997. Modern Techniques of raising field crops, Oxford and OBH Publishing Company Pvt. Ltd., New Delhi.
4. Singh, S.S. 1997. Crop Management under irrigation and rain fed conditions, Kalyani Publishers, New Delhi.
5. TNAU. 2006. Crop production Guide, TNAU and Directorate of Agriculture, Chennai.

## II SEMESTER

### 18AGD 0203 FUNDAMENTALS OF PLANT PROTECTION (3+1)

#### OBJECTIVES

1. To facilitate the students to learn and understand basic principles of Agricultural Entomology and Plant Pathology

#### LEARNING OUTCOME

- Studying the brief history of Indian Agricultural Entomology
- Studying the methods of pest control
- Studying the brief history of plant pathology
- Studying the plant diseases and symptoms
- Studying the plant protection chemicals

#### THEORY

**UNIT I Brief history of Indian Agricultural Entomology:** Systematic position of class insecta in animal classification –Reasons for the dominance of class Insecta – Types of damages caused by insects to plants – Causes for Insect Pest outbreak.

**UNIT II Methods of Pest Control:** Principles of Insect Pest control– Natural/Applied/Cultural/Physical/ Mechanical/Legal/ Biological and Chemical methods - Integrated Pest Management (IPM) and ETL level – Resurgence of insects with reference to insecticides application – pheromones, its uses in insect pest control.

**UNIT III Brief history of Plant Pathology:** Elementary classification of fungi – Basic knowledge on disease causing Fungal, Bacterial, Viral, MLO's, Nematode and Algal agents. Infectious and Non infectious agents of plant diseases – Flowering parasites like Cuscuta, Striga, Loranthus and Orbanchy.

**UNIT IV Study of plant diseases and symptoms** – Mode of spread of plant diseases – Brief study of sulphur, copper, systemic groups of fungicides - Importance of seed treatment with fungicides – Basic biological agents for disease control.

**UNIT V Study of Plant Protection Chemicals:** Different pesticide formulations and their nutrients – Preparation of spray fluid – Compatibility of pesticides, Physical/Chemical and Phytotoxic – Storage and handling of plant protection chemicals and appliances .

## LECTURE SCHEDULE

- 1-2 Systematic position of class insecta in animal classification
- 3-4 Reasons for the dominance of class Insecta
- 5-6. Types of damages caused by insects to plants
- 7 Causes for Insect Pest outbreak
- 8-9 Principles of Insect Pest control– Natural/Applied
- 10-11 Cultural
- 12-13 Physical
- 14 Mechanical
- 15 Legal
- 16-17 Biological and
- 18-19 Chemical methods
- 20-21 Integrated Pest Management (IPM) and ETL level
- 22 Resurgence of insects with reference to insecticides application
- 23-24 Pheromones, its uses in insect pest control
- 25 Elementary classification of fungi
- 26-27 Basic knowledge on disease causing Fungal, Bacterial, Viral, MLO's, Nematode and Algal agents
- 28-29 Infectious and Non infectious agents of plant diseases
- 30-31 Flowering parasites like Cuscuta, Striga, Loranthus and Orbanchy
- 32-33 Mode of spread of plant diseases
- 34-35 Brief study of sulphur
- 36-37 Copper fungicides
- 38-39 Systemic groups of fungicides
- 40-41 Importance of seed treatment with fungicides
- 42 Basic biological agents for disease control.
- 43-44 Different pesticide formulations and their nutrients
- 45 Preparation of spray fluid
- 46 Compatibility of pesticides, Physical/Chemical and Phytotoxic
- 47-48 Storage and handling of plant protection chemicals and appliances

## **PRACTICAL SCHEDULE**

1. Study of external structures of an insect.
2. Study of types of damage caused by insects on crops.
3. Study of Pesticide formulations.
4. Methods of pesticide application.
5. Study of Storage and handling of plant protection chemicals and appliances
6. Preparation of Bordo mixture.
7. Symptoms of plant diseases in crop plants.
8. Simple calculation on Pesticide requirements.
9. Study of seed treatment
10. Study of biological agents for disease control
11. Observation of disease fields.
12. Collection of plants damaged by insect pests
13. Collection of plants diseases
14. Visit to Agricultural Research Stations
15. Visit to Farmers Field
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. David, B.V. and T.Kumarasamy. 1995. Elements of Economic Entomology, Popular Book Depot, Chennai.
2. Govindasamy, C.V. and M.N.Alagianagalingam. 1990. Plant Pathology, Popular Book Depot, Chennai.
3. Panwar, V.P.S. 2000. Agricultural Insect Pests of Crops and their control. Kalyani Publishers, New Delhi.
4. Singh, R.S. 2000. Introduction to Principles of Plant Pathology, Oxford & IBH Publishing Company, New Delhi.
5. Srivastava, H.N. 1996. Plant Pathology, Pradeep Publications, Jalandhar.



## II SEMESTER

### 18 AGD 0205 INTRODUCTION TO HORTICULTURE AND FRUIT PRODUCTION (3+1)

#### OBJECTIVES

- To learn about importance , climatic zones, establishment of orchard , Systems of cropping, and propagation techniques of horticultural crops.
- To learn about production technology of tropical, subtropical, arid, humid and temperate fruit crops.

#### LEARNING OUT COME

- Studying the importance of horticulture and layout of orchard.
- Studying the Systems of cropping, training and pruning, harvest, Post harvest management
- Studying the vegetative Propagation techniques and tissue culture
- Studying the Production Technology of tropical fruit crops, subtropical, arid, humid and temperate fruit crops.

#### THEORY

**UNIT I Fundamentals of Horticulture:** Definition – Importance in Indian economy and nutrition – Climatic zones – Establishment of orchard – Selection of site, preliminary operations – Planning and layout – Planting systems and methods of planting.

**UNIT II Orchard Management:** Orchard soil management – Systems of cropping, training and pruning and Canopy management– Harvest, Post harvest management.

**UNIT III Propagation techniques:** Definition – Advantages and limitations - Stem cuttings – Simple layering and Air layering – Inarching and Epicotyl grafting – Shield and Patch budding-Tissue Culture.

**UNIT IV Cultivation of Major Tropical Fruits:** Cultivation of Mango, Banana, Citrus and Grape vine.

**UNIT V Cultivation of Other Fruits:** Cultivation of Guava, Sapota, Papaya, Ber, Pomegranate, Custard Apple, Indian goose berry- Temperate Fruits.

#### LECTURE SCHEDULE

1. Definition, Importance in Indian economy and nutrition
2. Branches of horticulture.
3. Agro- Climatic zones for horticultural crops.

- 4-5. Establishment of orchard – Selection of location and site
6. Planning and layout of orchard
7. Planting systems
8. Methods of planting
9. Orchard soil management
10. Systems of cropping – Intercropping and mixed cropping.
11. Multitier system of cropping.
12. Principles and methods of training in horticultural crops
13. Principles and methods of pruning in horticultural crops
14. Canopy management of horticultural crops
15. Harvest, Post harvest management of horticultural crops
16. Definition – Advantages and limitations of asexual propagation.
17. Cuttings- Root cuttings and stem cuttings.
18. Layering and its advantages.
19. Ground layering and its types.
20. Air layering.
21. Grafting- Methods of grafting.
22. Inarching and Epicotyl grafting
23. Budding- Shield and Patch budding
- 24-25. Tissue Culture and its applications.
26. Production Technology of Mango
27. Physiological disorders in Mango.
28. Production Technology of Banana
29. After cultivation practices in banana.
- 30-31. Production Technology of Citrus
- 32-33. Production Technology of Grapes
34. Production Technology of Guava
- 35-36. Production Technology of Sapota
37. Production Technology of Papaya
38. Papain extraction.
39. Production Technology of Ber
40. Production Technology of Pomegranate
41. Bahar treatment in pomegranate
- 42-43. Production Technology of Custard apple

44. Production Technology of Indian gooseberry
45. Production Technology of Apple.
46. Production Technology of Pear
47. Production Technology of Plum.
48. Production Technology of Peach

### **PRACTICAL SCHEDULE**

1. Acquiring knowledge about the college orchard and identifying of fruit plants
2. Acquiring knowledge about the tools and implements
3. Practicing nursery methods for horticultural crops
4. Pest and disease management in nursery.
5. Practicing Preparation of pits, planting and after care of horticultural crops
6. Practicing Manuring and fertilizer application methods
7. Practicing Irrigation and irrigation methods
8. Practicing training methods
9. Practicing Pruning methods
10. Special pruning techniques in horticultural crops.
11. Acquiring knowledge about the Simple layering and air layering
12. Acquiring knowledge about the Inarching and epicotyl grafting
13. Practicing Harvesting of fruits and preparing for the market
14. Visit to major orchard and fruit farms
15. Visit to micro propagation unit.
16. Final practical examination.

### **REFERENCES**

#### **Text books**

1. Kumar,N. 1997. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
2. Hartmann, H.T. and D.E.Kester. 1975. Plant propagation, Englewood cliffs, New Jersey, Printice Hall.
3. Bose, T.K. 1986. Fruits of India – Tropical and subtropical, Nayaprakash, Calcutta.
4. Shanmugavelu, K.S. 1989. Viticulture in India. Agro Botanical Publishers.
5. Singh, K.K.1987, Mango- A Hand Book, ICAR Publications, New Delhi

## II SEMESTER

### 18AGD 0207 ENVIRONMENTAL SCIENCE AND ORGANIC FARMING (3+1)

#### OBJECTIVES

- To teach the students about the ecology, ecosystem concepts, organic farming and IK
- To conceptualize Sustainable Agriculture and LEISA and their basic concepts to the students.

#### LEARNING OUTCOME

- The students can understand about ecology, environment, ecosystem concept and can practice and identify different methods of Indigenous Knowledge and collection of IK.

#### THEORY

**UNIT I Introduction:** Ecology –Ecosystems – forest, grassland and aquatic ecosystems - water cycle, carbon, oxygen, nitrogen, sulphur and phosphorous cycles - Environment - Components – Natural Resources - Soil, water, mineral, forest, wildlife resources – Components and Types of Ecosystems.

**UNIT II Agricultural Pollution and Management:** Adverse effect of Modern Agriculture on soil and water resources - Impact of high technology agriculture on crop production – Soil pollution – Agro chemical pollution – Acid Rain – Ozone layer depletion – Green House Effect – Global Warming and Climate Change.

**UNIT III Organic Farming:** Stages in Agricultural Development – History of Alternative Agricultural Development – Ill effects of Green Revolution Organic farming – Need, Concepts, Definition and Components – Essential characteristics – Key principles – Different concepts of organic farming – Natural farming, Biodynamic farming, Perma culture and Zero Budget Farming.

**UNIT IV Sustainable Agriculture:** Concept of Sustainable Agriculture – Economic and Ecological aspects of Agriculture – Focus of conventional agricultural research and extension – using external inputs in low input farming – Common traits of Indigenous farming—Basic ecological principles of LEISA.

**UNIT V Indigenous Knowledge:** Indigenous Knowledge –meaning and definition- Indigenous Vs Western (External) Knowledge – Forms and Types of IK- Nature, Scope and Characteristics of IK, Need, Importance, limitations of IK-Collection and Documentation IK-Sources and Methods- Participatory Technology Development

## **LECTURE SCHEDULE**

1. Introduction to Ecology and Ecosystems
2. Forest ecosystem
3. Grassland ecosystem
4. Aquatic ecosystem
5. Water cycle
6. Carbon cycle
7. Nitrogen cycle
8. Oxygen cycle
9. Sulphur cycle
10. Phosphorus cycle
11. Components of environment
12. Soil resources
13. Water resources
14. Mineral resources
15. Forest resources
16. Wildlife resources
17. Types of ecosystem
18. Adverse effect of modern Agriculture on soil and water resources
19. Impact of high technology agriculture on crop production
20. Soil pollution
21. Agrochemical pollution
22. Acid rain
23. Ozone layer depletion
24. Green house effect
25. Global warming and climate change
26. Impact of climate change in Agriculture
27. Stages in Agriculture development
28. History of Agriculture development
29. History of alternate agriculture development

30. Ill effects of Green Revolution
31. Organic farming
32. Components of Organic farming
33. Natural farming
34. Biodynamic farming
35. Permaculture
36. Zerobudget farming
37. Concepts of Sustainable Agriculture
38. Economic and Ecological aspects of Sustainable Agriculture
39. Conventional Agricultural research and Extension
40. LEISA
41. Basic ecological principles of LEISA
42. Indigenous Farming
43. Indigenous Knowledge vs Western Knowledge
44. Forms and types of IK
45. Need, importance and limitations of IK
46. Collection and documentation of IK
47. Sources and methods of collecting IK
48. Participatory Technology Development

### **PRACTICAL SCHEDULE**

1. Study of forest ecosystem
2. Study of pond ecosystem
3. Study of biodiversity in the farm
4. Visit to residue testing laboratory
5. Observe and document the do nothing farming practices in the farmers field
6. Preparation of cow horn manures.
7. Preparation of Organic nutrient solution.
8. Preparation of Bio pesticides formulations.
9. Zero Budget Farming components
10. Visit to Organic farm and observe LEISA techniques.
11. Study on crop rotation and mixed cropping techniques.
12. Identification of sources for collection of IKs
13. Practicing different methods of collecting IKs

14. Documentation of IKs on Field crops.
15. Field Visits to Organic farmer's field.
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Dhaliwal, G.S. and D.S. Kler. (2000). Agricultural Ecology, Himalaya Publishing Company, Mumbai.
2. IIRR (1996), Recording and using Indigenous Knowledge: A Manual International Institute of Rural Reconstruction, Silang, Cavite, Philippines.
3. Palaniappan.S.P. and K. Annadurai.(1999). Organic Farming Theory and Practice. Scientific Publishers (India), Jodhpur.
4. Sharma, Arun K. (2002). A Hand Book of Organic Farming Agrobios (India), Jodhpur.
5. Sundaramari, M. (2003). Indigenous Agricultural Practices for Sustainable Farming, Agrobios (India), Jodhpur.

## II SEMESTER

### 18AGD0209 DAIRY TECHNOLOGY (3+1)

#### OBJECTIVES

- To enlighten the students about the processing and marketing of milk.
- To gain an understanding of manufacturing methods and production of dairy products.

#### LEARNING OUTCOME

- Students will learn about the properties of milk
- Students will learn about the clean milk production
- Students will learn about the Milk processing and market
- Students will learn about the production techniques of fermented milk products.
- Students will learn about the production techniques of fat rich and dried milk products.

#### THEORY

**UNIT I Properties of Milk:** Milk - definition – Composition- Secretion of milk in the udder –Nutritive value of milk – Properties of milk – colostrums - Definition – composition-importance factors affecting the milk yield and composition.

**UNIT II Clean Milk Production:** Sources of microbes in milk – Clean milk Production – Bacteriological standard for raw milk – MBRT Test – Detergents and Sanitizers – common adulterants and preservatives in milk.

**UNIT III Milk Processing and Market:** Collection, Transportation of milk, milk reception, clarification, chilling, homogenization, pasteurization, sterilization, UHT processing, packaging; Market milk – standardized – Toned – Double toned – flavoured milk

**UNIT IV Milk Products – I :** Fermentation – Definition – Starter culture – Method of manufacture of yoghurt, dahi, buttermilk, acidophilus milk and cheese-therapeutic benefits of fermented milk products.

**UNIT V Milk Products - II:** Method of manufacture and uses of cream, ice cream, butter, ghee, khoa concentrated milk , dried milk, paneer and channa.

#### LECTURE SCHEDULE

1-2. Milk – definition composition of milk –major components-(water,fat,protein,lactose and ash) minor components- (salts,nonprotein substances phospholipids,vitamin, ,pigments and flavor)



- 3-4. Physical and chemical properties of milk – acid base equilibria oxidation-reduction potential. Specific gravity, viscosity, boiling point, freezing point
- 5-6. Factors affecting yield and composition of milk – introduction, average composition and normal range, breed, stage of lactation effect of age of cow, seasonal variation, effect of variation in milking, effect of feed nutritional level
7. Inter relation between the milk constituents
8. Nutritive value of milk – water, carbohydrate, fat, protein, minerals and vitamins
- 9-11. Clean milk production – Importance - Sources of micro organisms – milk born disease
- 12-13. MBRT – Bacteriological standard for raw milk
- 14-15. Detergents and sanitizers
- 16-18. Adulterants in milk, preservatives and neutralizers
- 19-20. Collection, transportation of milk, milk reception, clarification
- 21-22. Chilling – Types of chilling -Preservation and transportation of milk – Location of chilling centres.
- 23-25. Processing- standardization homogenization, pasteurization, Sterilization- UHT processing
26. Packaging and storing of milk
- 27-28. pasteurized milk – Standardized milk – Toned milk – Double toned milk
- 29-30. Milk products – fermentation – definition starter culture
- 31-32. Method of manufacture of yoghurt, dhahi, butter milk, acidophilus milk
- 33-34. Cheese – therapeutic benefits of fermented milk products
35. Milk products – Method of manufacture of cream, butter, uses of cream
- 36-37. Method of manufacture of ice cream
- 38-39. Method of manufacture of ghee
- 40-42. Method of manufacture of khoa
- 43-44. Method of concentrated milk, dried milk
- 45-46. Method of manufacture of paneer and channa

### **PRACTICAL SCHEDULE**

1. Sampling of milk
2. Determination of specific gravity of milk
3. Analysis of fat in milk
4. Analysis of lactose in milk
5. Analysis of protein milk
6. Estimation of TS and SNF content of milk
7. Determination of acidity in milk
8. Determination of MBRT in milk

9. Detection of adulterants in milk
10. Deduction of preservatives and neutralizers
11. Estimation of ash in milk
12. Preparation of khoa
13. Preparation of peda
14. Preparation of flavoured milk
15. Preparation of paneer
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Anantha Krishnan, C.P., (1991), Technology of milk processing, Sri Lakshmi Publications, Chennai -10.
2. Banerjee G.C (1993) Text Book of Animal Husbandry, Oxford and IBH Publishing Co.Pvt. Ltd., New Delhi.
3. Aneja.R.P, B.N Mathur, R.C Chandra and A.K. Banerjee (2002). Technology of Indian Milk Products, Dairy India year book 2007
4. Eeckless C.H, W.B Combs and H.Mecy (1955), Milk and Milk Products, Tata Mc Graw Hill Publishing Co.Pvt.Ltd., New Delhi.
5. Sukumar De (1980) Outlines of Dairy Technology, Oxford University Press, New Delhi.

## II SEMESTER

### 18AGD 0211 PRINCIPLES OF PLANT BREEDING AND SEED SCIENCE TECHNOLOGY (3+1)

#### OBJECTIVES

This course aimed at understanding to impart theoretical knowledge and practical skills about plant breeding objectives, modes of reproduction and genetic consequences, breeding methods for crop improvement and seed physiology , seed certification , seed testing and seed storage.

#### LEARNING OUTCOME

The students will understand about breeding objectives, breeding methods for crop improvement, seed physiology, seed testing and seed storage.

#### THEORY

**UNIT I Selection:** History of plant breeding, floral structure and pollination mechanisms - Methods of plant breeding – Introduction – Selection – Mass selection, pureline selection – Hybridization and selection Mechanisms promoting self pollination and Cross pollination in crops.

**UNIT II Heterosis breeding:** Male sterile systems – Development of hybrids single cross, double cross and polycross – Synthetic sand composites.

**UNIT III Other breeding methods:** Mutation breeding, Tissue culture –Meristem ,Anther ,ovary, Embryo culture – variety release committee and steps involved in release of crop varieties and hybrids – difference between seed and grain-selection, rogueing, harvest and processing

**UNIT IV Seed-** Fertilization – embryo genesis and seed formation – development and maturation – seed structure and composition – seed quality characteristics- Seed Farm Management – Seed Certification – General certification standards –classes of seed.

**UNIT V Seed germination and seed testing:** Types – Requirements – Factors affecting germination – Seed dormancy – Seed and seedling vigour – Seed storage –Seed storability – Seed sampling – Seed purity analysis – seed viability and seed health.

#### LECTURE SCHEDULE

1. History of plant breeding, Objectives and scope of plant breeding
2. Modes of reproduction
3. Mechanisms promoting self pollination
4. Mechanisms promoting cross pollination
5. Mechanisms of pollination control: self incompatibility systems

6. Mechanisms of pollination control: sterility systems.
7. Apomixis and their classification.
8. Importance of plant genetic resources
9. Centre of origin: mega gene centres and micro gene centres
10. Breeding of self pollinated crops, genetic makeup of self pollinated crops - introduction, selection and hybridization.
11. Methods of breeding –pure line concept in autogamous crops
12. Methods of breeding-mass selection in autogamous crops
13. Methods of breeding–population improvement, mass selection in allogamous crops.
14. Heterosis and inbreeding depression – exploitation of heterosis, types of heterotic hybrids and their uses
15. Development of hybrids single cross, double cross and polycross.
16. Development of synthetics, composites and multilines.
17. Mutation breeding: Techniques, physical and chemical mutagens.
18. Handling mutant populations and Application of mutation.
19. History of plant tissue culture and Plant tissue culture: general techniques.
20. Concepts and scope of biotechnology
21. Totipotency-sterilization techniques- explant.
22. Tissue culture media and culture establishment
23. Meristem culture
24. Anther culture
25. Microspore culture methods, production of virus free plants and their applications
26. Ovary, ovule culture,
27. Embryo and endosperm culture
28. Variety release committee and steps involved in release of crop varieties and hybrids.
29. Seed-definition - characteristics of quality seed - significance - difference between seed and grain.
30. Seed formation, development and structure - importance.
31. Climatic, edaphic and biotic factors affecting quality seed production.
32. Quality seed production-land requirement-isolation distance - rouging - other seed management practices.
33. Seed farm management
34. Seed certification -importance-phases.

35. Different seed certification procedures.
36. General certification standard – classes of seed
37. Seed viability - vigour - germination - types and events.
38. Seed Dormancy - types - causes - methods of breaking dormancy.
39. Factors affecting seed germination.
40. Seed testing objectives – importance – seed sampling procedure.
41. Seed treatment – types - pre-sowing treatment -hardening - pelleting.
42. Seed testing – objectives – importance of seed testing.
43. Sampling - equipments - physical purity importance.
44. Seed viability Germination requirements - media and methods.
45. Quick viability test- seed health test- importance.
46. Seed processing – principle - importance - sequence of seed processing for different crops.
47. Seed storage – need- factors influencing seed storage.
48. Seed packing materials - types - moisture pervious and resistant - moisture vapour proof containers.

## **PRACTICAL SCHEDULE**

1. Breeders Kit & its components
2. Pollination and reproduction in plants – alternation of generation and life cycle
3. Selfing and crossing techniques in different crops
4. Emasculation and kinds of emasculation and pollination techniques
5. Study of floral biology – Monocots
6. Study of floral biology –Dicots
7. Fertility & Sterility in A,B,R & TGMS lines and their maintenance
8. Identification of seed and its structure
9. Assessing the physiological and harvestable maturity in different crops
10. Sampling – mixing and dividing – equipments – methods
11. Purity analysis – reporting results
12. Seed germination tests
13. Seed dormancy breaking treatments
14. Seedling evaluation – tetrazolium test and evaluation.
15. Seed farm visit and Seed Certification agency
16. Final practical Examination

## REFERENCES

### Text books

1. Agarwal.R.L. 2004. Seed Technology, IVth Edition, Oxford and IBH Publishers Company, New Delhi.
2. Chaudhary. R.C. 1990. Introduction to Plant Breeding, Oxford and IBH Publishers Company, New Delhi.
3. Ramamoorthy, K. and K. Sivasubramaniam. 2006. Seed Technology, Ready Reckoner, Agrobios Publishers, Jodhpur, Rajasthan
4. Singh B.D. 2005. Plant breeding – Principles and Methods, Kalyani Publishers, New Delhi.
5. Sivasubramaniam.K. and S.K Yadav. 2007. A Dictionary of Seed Technological Terms, Kalyani Publishers, Ludhiana

### III SEMESTER

#### 18AGD 0301 AGRONOMY OF FIELD CROPS-II (3+1)

#### OBJECTIVES

- To know the concept and classification of field crops and cropping systems
- To know the production technology of oilseeds, sugar crops, Fibre crops, Tobacco and fodder crops.

#### LEARNING OUTCOME

The student will gain knowledge on the cultivation of oilseeds sugar crops, Fibre crops, Tobacco and fodder crops.

#### THEORY

Agromony of the field crops with reference to economic importance, origin, soil and climatic requirement area, production and productivity in India and Tamil Nadu – systems of cultivation, crop management – season, varieties, seed rate, seed treatment, sowing, spacing, Integrated nutrient and weed management – irrigation – after cultivation – harvest- by product utilization. Latest developments in oilseeds sugar crops, Fibre crops, Tobacco and fodder crops.

**UNIT I Oil seeds I:** Groundnut, Gingelly and Sunflower

**UNIT II Oil seeds II:** Rapeseed and Mustard, Safflower and Castor.

**UNIT III Sugar crops:** Sugarcane, Sugar beet and Sweet sorghum

**UNIT IV Fibre crops and narcotics:**

- a) Major Fibre crops : Cotton, Jute
- b) Minor Fibre crops : Silk cotton, Agave,
- c) Narcotics : Tobacco.

**UNIT V Forage crops**

- a) Forage cereals - Sorghum, Maize and cumbu
- b) Forage grasses - Guinea grass, Bajra Napier, Kolukkattai grass and Deena nath grass.
- c) Forage legumes - Lucerne, Cow Pea, Stylo, Siratro and Desmanthus.
- d) Forage trees - Subabul (saundal), Sesbania (Agathi) and Gliricidia.
- e) Less Known - Erythrina (Mulmurugai), Thespesia (Poovarasu)

#### LECTURE SCHEDULE

- 1-2 Importance of oil seeds like Groundnut, Gingelly, Sunflower
- 3 Area, production and productivity of major oil seeds of India and Tamil Nadu

- 4 Groundnut - importance – origin - distribution - soil and climatic requirement, season and varieties
- 5 Groundnut - growth stages – manuring - weeding – irrigation- after cultivation - harvesting and Storage
- 6 Gingelly – Origin – distribution - soil and climatic requirement – season- varieties
- 7 Gingelly– manures and manuring - time and method of fertilizer application – Weeding and after cultivation.
- 8 Sunflower – Origin – distribution - soil and climatic requirement – season- varieties
- 9 Sunflower – manures and manuring - time and method of fertilizer application – Weeding and after cultivation.
- 10-11 Sunflower - weed control – IWM - irrigation - after cultivation - cropping system - harvesting, threshing, drying and storage - by-products.
- 12 Rapeseed- origin and distribution - soil and climatic requirements - season, varieties
- 13 Rapeseed - field preparation - seeds and sowing, seed treatment - manures and manuring - weed control - irrigation - after cultivation - harvest, threshing, drying and storage - cropping system
- 14 Mustard - origin and distribution - soil & climatic requirements - season, varieties – types of maize - field preparation - sowing – manures & manuring - weed control
- 15 Mustard- irrigation - after cultivation - harvest, threshing, drying and storage - Agronomic practices for Baby corn - cropping system
- 16 Safflower- origin and distribution - soil and climatic requirements - season, varieties
- 17 Safflower - field preparation - seeds and sowing, seed treatment - manures and manuring - weed control - irrigation - after cultivation - harvest, threshing, drying and storage - cropping system
- 18 Castor - origin and distribution - soil & climatic requirements - season, varieties – types of maize - field preparation - sowing – manures & manuring - weed control
- 19-20 Castor - irrigation - after cultivation - harvest, threshing, drying and storage - Agronomic practices for Baby corn - cropping system
- 21 Sugarcane - importance - origin and distribution - soil and climatic requirements – season, varieties -seeds and sowing – nursery preparation
- 22-23 Sugarcane - main field preparation – manures and manuring - weed control - after cultivation – irrigation - harvesting
- 24-25 Sugarcane - Agronomic practices for ratoon sugarcane - cropping system



- 26 Sugarbeet- importance - origin and distribution - soil and climatic requirements - season, varieties - seeds and sowing – main field preparation and planting
- 27-28 Sugarbeet - manures and manuring - weed control - after cultivation - irrigation - harvesting
- 29-30 Sweet sorghum - importance - origin and distribution - soil and climatic requirements - season, varieties - - seeds and sowing - main field preparation and planting - manures and manuring - weed control - after cultivation - irrigation - harvesting
- 31-32 Cotton– importance - origin and distribution - season, varieties - field preparation – seeds and sowing - manures and manuring - weed control - after cultivation – irrigation - harvest and storage - cropping system
- 33-34 Jute - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation – irrigation - harvest and storage
- 35-36 Agave - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation – irrigation - harvest and storage
- 37-38 Tobacco - importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation - irrigation - harvest and storage
- 39-40 Silk cotton- importance - origin and distribution - season, varieties - field preparation - seeds and sowing - manures and manuring - weed control - after cultivation - irrigation - harvest and storage
- 41-42 Forage crops – importance/benefits of growing forage crops.
- 43-44 Importance - soil and climatic requirement for forage cereals and Forage grasses.
- 45-46 Importance - soil and climatic requirement for Forage legumes.
- 47 Forage trees - importance
- 48 Importance – Erythrina and Thespesia

## **PRACTICAL SCHEDULE**

1. Study of field management in groundnut and other oil seeds
2. Cultivation techniques of sugarcane
3. Cultivation techniques of sweet sorghum
4. Study of sowing and manuring of oilseeds

5. Study of sowing and manuring of sugarcane
6. Study of sowing and manuring of cotton
7. Tobacco nursery management
8. Growth and Yield estimation in oil seeds
9. Growth and Yield estimation in sugarcane.
10. Growth and Yield estimation in fibre crops
11. Cost of cultivation in oil seeds.
12. Cost of cultivation in sugarcane.
13. Cost of cultivation in cotton.
14. Cost of cultivation in forage crops.
15. Visit to CTRI, Vedsandur
16. Final practical Examination.

## **REFERENCES**

### **Text books**

1. Chiddha Singh. 1997. Modern techniques of raising field crops. Oxford and IBH Publishing Company Pvt. Ltd., New Delhi.
2. Gopalachari, N.C. 1984. Tobacco, ICAR, New Delhi.
3. Thakur, C. 1981. Scientific crop production. Vol.II. Metropolitan Book Company Pvt. Ltd., New Delhi.
4. Yadava, R.L. 1993. Agronomy of sugarcane – Principles and Practices, International book distribution Company, Lucknow.
5. Gururajan, B.R. Balasubramanian and V.S. Waminatioan, 2008 . recent strategies on crop production.

### III SEMESTER

#### 18 AGD 0303 CROP INSECT PEST MANAGEMENT (3+1)

#### OBJECTIVES

- To facilitate the students to learn and understand symptoms and management practices of following crops.

#### LEARNING OUTCOME

- Studying the Insect Pests of Cereals, Pulses and Cash crops
- Studying the Insect Pests of Oilseeds and Plantation Crops
- Studying the Insect Pests of Fruit Crops
- Studying the Insect Pests of Vegetable and Flower Crops
- Studying the Insect Pests of Stored Products

#### THEORY

Study of major and common Insect pests with reference to the life, cycle, symptoms of damage and their management including bio control measures of the following:

**UNIT I Insect Pests of Cereals, Pulses and Cash crops:** Rice, Cholam, Cumbu, Red gram, Black gram, Green gram, Bengal gram, Cotton and Sugarcane.

**UNIT II Insect Pests of Oilseeds and Plantation Crops:** Castor, Groundnut, Coconut, Sesamum, Sunflower, Coffee, Tea, Cardamom.

**UNIT III Insect Pests of Fruit Crops:** Mango, Banana, Citrus, Pomegranate, Sapota, Guava, Grapes.

**UNIT IV Insect Pests of Vegetable and Flower Crops:** Tomato, Brinjal, Bhendi, Cabbage and Cauliflower, Potato, Rose and Jasmine.

**UNIT V Insect Pests of Stored Products:** Rice Weevil, Angoumois grain moth, Red flour beetle, Khapra beetle, Pulse beetle and their management- Cold storage.

#### LECTURE SCHEDULE

- 1-2. Insect Pests of Rice
- 3-4 Insect Pests of Cholam and Cumbu
- 5-7 Insect Pests of Pulses (Red gram, Black gram, Green gram, Bengal gram)
- 8-9. Insect Pests of Cotton

- 10-11 Insect Pests of Sugarcane
- 12-13 Insect Pests of Castor
- 14-15. Insect Pests of Groundnut
- 16-17 Insect Pests of Coconut
- 18-19. Insect Pests of Sesamum and Sunflower
- 20. Insect Pests of Coffee
- 21-22. Insect Pests of Tea
- 23-24. Insect Pests of Cardamom
- 25-26. Insect Pests of Mango
- 27. Insect Pests of Banana
- 28-29. Insect Pests of Citrus
- 30 Insect Pests of Pomegranate
- 31 Insect Pests of Sapota
- 32-33. Insect Pests of Guava
- 34-35. Insect Pests of Grapes
- 36-37 Insect Pests of Brinjal
- 38-39 Insect Pests of Bhendi
- 40 Insect Pests of Tomato
- 41-42 Insect Pests of Cabbage and Cauliflower
- 43-44. Insect Pests of Potato
- 45-46 Insect Pests of Rose and Jasmine
- 47. Rice Weevil, Angoumois grain moth, Red flour beetle, Khapra beetle and Pulse beetle
- 48. Management and Cold storage.

## **PRACTICAL SCHEDULE**

1. Identification and damage of insects, their damages on crop plants.
2. Study of Rice insect pests (sucking pests).
3. Study of Rice insect pests (borers and defoliators).
4. Study of cereals and millets insect pests
5. Study of Pulses insect pests.
6. Study of oil seeds insect pests (Coconut and Groundnut)
7. Study of oil seeds insect pests (Castor, Sesamum and Sunflower)
8. Study of Sugarcane insect pests.
9. Study of Cotton insect pests (sucking pests)

10. Study of Cotton insect pests (bollworms, borers and defoliators)
11. Study of Vegetables insect pests. (Brinjal, Bhendi and Tomato)
12. Study of Vegetables insect pests (Cabbage, Cauliflower and Potato)
13. Study of Fruits insect pests. (Mango, Banana and Citrus)
14. Study of Fruits insect pests (Pomegranate, Sapota, Guava and Grapes)
15. Field visits and visit to warehouse to study the methods of grain storage and pest Control
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Butani, D.K. and Jotwani, M.G. 1990. Insects in Vegetables - Periodical Expert Book Agency, New Delhi.
2. David, B.V. and T. Kumarasamy. 1995. Elements of Economic Entomology, Popular Book Depot, Chennai.
3. Kumar & Nigam. 1989. Economic and Applied Entomology, Emkay Publications.
4. Nair, M.R.G.K. 1990. Insects and Mites of Crops in India- ICAR Publications, New Delhi.
5. Panwar V.P.S. 2000. Agricultural Insect Pests of Crops and their control, Kalyani Publishers, New Delhi.

### III SEMESTER

#### 18 AGD 0305 VEGETABLE PRODUCTION (3+1)

#### OBJECTIVES

1. To learn about Importance, classification and types of vegetable gardens.
2. To learn about Production Technology of greens, salads , crucifers, cucurbitaceous, bulb, root, tuber, solanaceous , malvaceous and leguminous vegetables.

#### LEARNING OUT COME

- Studying the importance, classification, types and maturity index of vegetables.
- Studying the Production technology of Drumstick, Curry leaf, Amaranthus and Coccinea
- Studying the Production technology of Cabbage, Cauliflower, Chow-chow, Pumpkin, Water melon, Snake gourd, Bitter gourd and Ribbed gourd.
- Studying the Production technology of Onion, Garlic, Carrot, Radish, Beetroot, Potato, Tapioca and Sweet Potato.
- Studying the Production technology of Brinjal, Tomato, Chillies, Lady's finger, Garden bean, Cluster bean, Peas and French beans.

#### THEORY

**UNIT I Introduction:** Importance – Classification and types of vegetable gardens – Cultural aspects of vegetables- Handling and maturity index.

**UNIT II Perennial vegetables, greens and salad crops:** Cultivation of Drumstick, Curry leaf, Amaranthus and Coccinea

**UNIT III Cole crops and cucurbits:** Cultivation of Cabbage, Cauliflower, Chow-chow, Pumpkin, Water melon, Snake gourd, Bitter gourd and Ribbed gourd.

**UNIT IV Bulb, root and tuber vegetables:** Cultivation of Onion, Garlic, Carrot, Radish, Beetroot, Potato, Tapioca and Sweet Potato.

**UNIT V Solanaceous vegetables, peas and beans:** Cultivation of Brinjal, Tomato, Chillies, Lady's finger, Garden bean, Cluster bean, Peas and French beans.

#### LECTURE SCHEDULE

1. Definition and Importance of vegetables.
- 2-3. Classification of vegetable crops.
4. Types of vegetable gardens –Kitchen garden and its advantages.

- 5-6. Kitchen garden – selection of site, Model kitchen garden and cropping arrangements.
7. Market garden, truck garden, growing vegetables for processing,
8. Vegetable forcing and vegetable seed industry.
9. Cultural aspects of vegetables.
10. Post harvest handling of vegetables.
11. Maturity indices of vegetables.
- 12-13. Production technology of Drumstick
14. Production technology of Curry leaf
15. Production technology of Amaranthus
16. Production technology of Coccinea
17. Production technology of Cabbage
- 18-19. Production technology of Cauliflower
20. Production technology of Chow-chow
21. Production technology of Pumpkin
22. Production technology of Water melon.
23. Production technology of Snake gourd
24. Production technology of Bitter gourd
25. Production technology of Ribbed gourd.
- 26-27. Production technology of Onion.
28. Production technology of Garlic
29. Production technology of Carrot
30. Production technology of Radish
31. Production technology of Beetroot
32. Physiological disorders of Carrot
- 33-34. Production technology of Potato
- 35-36. Production technology of Tapioca
37. Production technology of Sweet Potato.
38. Production technology of Brinjal.
- 39-40. Production technology of Tomato.
41. Production technology of Chillies
42. Production technology of Lady's finger
43. Production technology of Garden bean
44. Production technology of Cluster bean
45. Production technology of Peas

46. Production technology of French beans.
47. Physiological disorders in vegetable crops.
48. Application of plant growth regulators in vegetable crops.

## **PRACTICAL SCHEDULE**

1. Identifying of different vegetable varieties
- 2-3. Practicing preparation of nursery beds, seeds and sowing
4. Acquiring knowledge about propagation through specialized vegetative structures.
- 5-6. Practicing Field preparation for vegetables
7. Practicing transplanting of vegetables
8. Practicing manuring and fertilizer application methods
9. Acquiring knowledge about plant protection measures
10. Practicing harvesting and grading of vegetables
11. Practicing in packing and marketing of vegetables
12. Conducting kitchen garden campaigns
13. Preparing cost of cultivation for important vegetables
14. Visit to vegetable gardens
15. Protected cultivation.
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Bose, T.K., M.G.Som and J. Kabir. 1993. Vegetable crops, Nayaprakash, Calcutta.
2. Choudhary, B. 1987, Vegetables, NBT, New Delhi.
3. Shanmugavelu, K.G. 1989. Production technology of vegetable crops, Oxford India Publications, New Delhi.
4. Singh, S.P. 1989. Production technology of vegetable crops, Universal Publication Centre, Karnal.
5. Veeraragavathatham, D, M. Jawaharlal and Seemandhini Ramadas. 1991. A guide on vegetable culture, AE Publication, Coimbatore.



### III Semester

#### 18 AGD 0307 FARM POWER AND MACHINERY (3+1)

#### OBJECTIVES

- To identify suitable implements for tillage, sowing, weeding and plant protection operations for different crop and soil conditions
- To understand the operation and maintenance of oil engine and electric motor pumpsets

#### LEARNING OUTCOME

- The students can learn in selection of suitable farm power source, farm implements based on field conditions and crop conditions
- The students can get practical knowledge in handling of farm machineries and maintenance of oil engine and electric motor pumpsets

#### THEORY

**UNIT I Farm power:** Farm power sources – Man, animal, mechanical and electrical - advantages and limitations of different source of farm power, Tractors and power tillers – its major functions; Renewable sources of energy – bio gas, wind and solar energy – Application and limitation, tapping and limitations in Agriculture.

**UNIT II Farm Machinery:** Tillage –Classification - Primary tillage implements – Country plough, mould board plough, disc plough, chisel plough, secondary tillage implements – Harrows, cultivators, weeders, basinlister, puddler, green manure trampler; Different sowing methods – its merits and demerits – sowing machinery – broadcasting device, seed planter, seed cum fertilizer drill, direct paddy seeder, paddy transplanter. Harvesting machinery – Sickles –Reapers - Calculation of draft, field capacity and power required for the farm implements.

**UNIT III Pumping Machinery:** Oil engine coupled with centrifugal pumpset – study of the parts, working principles and repair and maintenance of oil engine ; Electric motor – types of AC three phase induction motor – monoblock, motor coupled with centrifugal pumpset – study of parts, working principles, repair and maintenance of electric motor.

**UNIT IV Plant protection machinery:** Sprayers and dusters – Bucket type sprayer - Knapsack sprayer – Rocker arm sprayer – Engine powered sprayer – study of parts and its working principles; Power duster – Rotary hand duster – study of parts and its working principles; Repairs and maintenance of sprayers and dusters.

**UNIT V Post harvesting machinery:** Multi crop thresher, Seed cleaner cum grader, paddy drier, groundnut decorticator, sunflower thresher, maize sheller, minidhal mill, vegetable seed drier – study of parts, working principles and capacity of the machinery.

### **LECTURE SCHEDULE**

1. Sources of farm power
- 2-5. Merits and demerits of human power, animal power, electrical power and mechanical power.
- 6-9. Renewable energy sources – application and limitations.
10. Tillage – definition, objectives.
- 11-13. Primary tillage implements – suitability, area coverage and its components.
- 14-17. Secondary tillage implements – suitability, area coverage & its components.
- 18-20. Sowing machinery – suitability area coverage & its components.
- 21-23. Centrifugal pump – working principle, components and merits.
24. Benefits of electricity and definition of electrical terms working.
- 25-27. Principles of single phase and three phase electric motor
- 28-29. Working principles of stationary diesel engine.
30. Sprayer – functions & classification
- 31-33. Hand operated sprayers – its functions, components & application rate, coverage.
- 34-35. Working principles of power operated sprayer
- 36-38. Hand operated duster and power operated duster.
39. Working principles of multi crop thrasher
40. Paddy winnower, seed cleaner cum grader
41. Paddy drier, vegetable seed drier
42. Groundnut decorticator
43. Sunflower thrasher
44. Maize Sheller
45. Mini dhal mill.

### **PRACTICAL SCHEDULE**

1. Study and identification of different parts of solar drier, solar cooker, solar water heater, windmill and bio gas plant
2. Identification of different parts of tractor, power tiller
3. Study the operation of different primary tillage implements

4. Study the operation of different secondary tillage implements
5. Study the operation of bullock drawn planters and seed drills
6. Assessment of machinery power and cost of operation
7. Study the operation of different parts of hand operated sprayers and duster & power operated sprayers and dusters
8. Study the operation of different parts and types of electric motors and pumps
9. Study of post harvesting machineries - Paddy thresher cum winnower, paddy drier and seed cleaner cum grader
- 10– 13. Study of post harvesting machineries – Groundnut decorticator, maize Sheller and Dhal mill
14. Field visit to College of Agriculture Engineering, TNAU, Coimbatore
15. Field visit to SRFMTTI, Govt of India, Ananthapur.
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Anonymous. 1997. Directory of Rural Technologies. Vol.I, Council for advancement of rural technology, New Delhi.
2. Ghose, R.K. and S.Swain. 1990 Practical Agrl. Engg., Nayaprakash Publishing Ltd., Calcutta
3. Michael, A.M. and T.P.Ojha. 1987. Principles of Agricultural Engineering. Vol. I, Jain Brothers, New Delhi
4. Nakra, C.P. 2006, Farm Machineries and Equipment.
5. Shippen, J.M. and J.G.Turner. 1996. Basic farm machinery, Pergamon Press, Oxford.

### III SEMESTER

#### 18 AGD 0309 INTRODUCTION TO AGRICULTURAL EXTENSION (3+1)

#### OBJECTIVES

- To teach the students about the basics of extension education
- To impart skill in the handling of various extension methods and audio-visual aids
- To expose the students to various dairy development programmes and institutions and their importance to rural development

#### LEARNING OUTCOME

- Studying the basics of extension education
- Learning about the communication and its process and models
- Studying the rural sociology and its application to extension education
- Learning about the diffusion and adoption of innovations
- Studying the programme planning and evaluation in extension education

#### THEORY

**UNIT I Introduction:** Education-meaning and types. Differences between formal and extension education. Extension Education–Meaning, Concepts, Characteristics, Terminology in extension. Extension Education–Scope, Importance, Principles, Philosophy and Objectives. Agricultural Extension Education - Meaning, nature - Process. Qualities of Extension workers. History and development of extension service and extension systems. Concept of extension Pluralism.

**UNIT II Rural Sociology:** Meaning and importance, socio-psychological characteristics of rural people. Social structure- meaning and importance. Rural social institutions. Social control- meaning, types and agents. Motivation- how to motivate rural people. Leaders- meaning, types and use of local leaders in rural areas. Social change- meaning, types and causes.

**UNIT III Communication and Training:** Communication – definition, types, forms, characteristics, scope, importance and models of communication process. Elements of communication and their description. Problems and barriers in communication. Teaching-learning situation and Steps in extension teaching. Training- meaning- types of training- FTC, KVK, ATMA – Objectives and salient features.

**UNIT IV Diffusion and adoption:** Diffusion and Adoption of innovations, Perceived Attributes of Innovation. Five stage model and ID Process of adoption. Adopter categories and their characteristics. Consequences of adoption of innovation. Adoption stages and information sources. Constraints to adoption of innovations. Agri-clinics and Agri business centres. Farmer Field Schools. Privatization of Extension, Market led Extension, Commodity Interest Groups.

**UNIT V Programme Planning and PRA:** Programme planning – meaning, nature, scope, principles, objectives, importance and steps in programme planning process. Monitoring – meaning and types. Evaluation – meaning, objectives, types, importance, degrees, uses, steps and methods. Role and scope of PRA and RRA in assessment of local needs and problems. PRA- meaning, principles, characteristics, menu of PRA methods, and steps to conduct. Participatory Technology Development - meaning, principles and approaches.

## **LECTURE SCHEDULE**

1. Education-meaning and types. Differences between formal and extension education.
2. Extension Education–Meaning, Concepts, Characteristics, Terminology in extension.
- 3 – 5. Extension Education–Scope, Importance, Principles, Philosophy and Objectives.
6. Agricultural Extension Education - Meaning, nature - Process.
7. Qualities of Extension workers.
8. History and development of extension service and extension systems.
9. Concept of extension Pluralism.
10. Meaning and importance, socio-psychological characteristics of rural people.
11. Social structure- meaning and importance.
- 12 -13. Rural social institutions.
- 14-15. Social control- meaning, types and agents.
16. Motivation- how to motivate rural people.
- 17-18. Leaders- meaning, types and use of local leaders in rural areas.
19. Social change- meaning, types and causes.
20. Communication – definition, types, forms, characteristics, scope and importance.
21. Models of communication process.

- 22-23. Elements of communication and their description.
- 24. Problems and barriers in communication.
- 25-26. Teaching-learning situation and Steps in extension teaching.
- 27-29. Training- meaning- types of training- FTC, KVK, ATMA.
- 30. Diffusion and Adoption of innovations, Perceived Attributes of Innovation.
- 31. Five stage model and ID Process of adoption.
- 32. Adopter categories and their characteristics.
- 33. Consequences of adoption of innovation. Adoption stages and information sources.
- 34. Constraints to adoption of innovations.
- 35-36. Agri-clinics and Agri business centres and Farmer Field Schools.
- 37-38. Privatization of Extension, Market led Extension, Commodity Interest Groups.
- 39-40. Programme planning – meaning, nature, scope, principles, objectives and importance -
- 41. Steps in programme planning process.
- 42-43. Monitoring – meaning and types. Evaluation – meaning, objectives, types, importance, degrees, uses, steps and methods.
- 44. Role and scope of PRA and RRA in assessment of local needs and problems.
- 45-47. PRA- meaning, principles, characteristics, menu of PRA methods, and steps to conduct.
- 48. Participatory Technology Development - meaning, principles and approaches.

## **PRACTICAL SCHEDULE**

- 1. Terminology in Extension methodologies
- 2. Study of socio-psychological background of rural people by interacting with them.
- 3. Simulated exercises on communication and distortion in communication
- 4. Study of diffusion and adoption pattern of a selected innovation in a village
- 5. Study of information sources of innovations to the farmers.
- 6. Identification of local and farm leaders and learning about their roles.
- 7. Visit to the Office of the Joint Director of Agriculture
- 8. Study of records to be maintained by base level extension workers
- 9. Visit to the Farmers Training Centre
- 10. Visit to ATMA and study its functions
- 11. Visit to an Agricultural Clinic
- 12. Visit to KVK at GRI and study its functions.

13. Practicing PRA and RRA methods to identify the rural problems
14. Interaction with self help groups about their activities and functions.
15. Visit to nearby village to understand the problems encountered by the farmers
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Annamalai, R. 1993. Extension Education and Programme Planning. Palaniappa Printers,
2. Chaubey, B.K. *et.al.* 1999. Extension Education. Aman Publishing House, Meerut.
3. Dahama, O.P and O.P. Bhatnagar. 1996. Education and Communication for Development, Oxford IBH Publishing Co., Ltd., New Delhi. Pvt. Ltd., New Delhi.
4. Ganesan, R., Mohammad Iqbal, I. and Anandaraja, N. (2003). Reaching the Unreached- Basics of Extension Education. Associated Publishing Company, New Delhi.
5. Ray, G.L. (2006). Extension Communication and Management Naya Prakashan, Kolkatta.
6. Reddy, A. A. (2005). Extension Education. Sri Lakshmi Press. Bapatla
7. Rogers, E.M. (2003). Diffusion of Innovations. Free Press, New Delhi.
8. Yella Reddy, N. (1998). Audio-Visual Aids for Teaching, Training and Extension. Haritha Publishing House, Hyderabad.

## III SEMESTER

### 18 AGD 0311 AGRICULTURAL ECONOMICS (3+1)

#### OBJECTIVES

- The students will be familiarized with the Gandhian Approach to Economics.
- The Students will be taught with marketing concepts and Role of Finance in Agriculture.

#### LEARNING OUTCOME

- The students have learnt with the Financial, Marketing concepts of Economics.

#### THEORY

- UNIT I**      **Introduction:** Meaning and concepts of Economics – Definition of economics – Division of economics – Consumption; Classification of goods, characteristics and classification of wants, law of diminishing marginal utility.
- UNIT II**      **Causes of low productivity and remedial measures:**– Land reforms, consolidation of holdings, organization of cooperative framings-Agricultural labour: causes of the poor economic condition of farm labour, suggestion for the improvements of the condition of agricultural labour and Government measures.
- UNIT III**      **Market:** Importance of marketing, significance of agriculture marketing – Classification of markets – Services of different market functionaries present systems of agricultural marketing in India and development measure Marketing institution: Regulated markets, cooperative marketing, Direct Retail Market, Corporate Retail Market.
- UNIT IV**      **Finance:** Rural indebtedness, causes of indebtedness and relief measures - Role of agricultural credit, classification of agricultural credit, factors responsible for successful agricultural credit. Agencies supplying agricultural credit- Institutionalized and Non Institutionalized source of and Micro Credit .
- UNIT V**      **Gandhian approach to economics:** Means of production, Swadeshi and Bread labour – Village economy – Village Industries and Appropriate Technology – J.C Kumarappa concept of economy, Economics of permanence. Constructive programmes of Gandhiji.



## **LECTURE SCHEDULE**

- 1 – 3 Meaning and concepts of Economics
- 4 – 6 Definition of economics – Division of economics -Consumption;
- 7 – 9 Classification of goods and Characteristics and classification of wants.
- 10- 12 Law of diminishing marginal utility, Land reforms,
- 13-15 Consolidation of holdings. Organization of cooperative framings.
- 16-18 Agricultural labour. Causes of the poor economic condition of farm labour.
- 19-21 Suggestion for the improvements of the condition of agricultural labour.
- 22-24 Government measures. Importance of marketing. Significance of agriculture marketing.
- 25-27 Classification of markets, Services of different market functionaries present systems of agricultural marketing in India.
- 28-30 Development measures, Marketing institution. Regulated markets, Cooperative Marketing. Direct Retail Market. Corporate Retail Market.
- 31-32 Rural indebtedness, causes of indebtedness. Relief measures. Role of Agricultural credit. Classification of Agricultural credit.
- 33-34 Factors responsible for successful Agricultural credit.
- 35-37 Agencies supplying agricultural credit. Institutional and non-institutional source of micro credit
- 38-40 Gandhian approach to Economics: Means of Production. Swadeshi. Bread Labour. Village Economy.
- 41-43 Village Industries and appropriate technology.
- 44-46 J.C Kumarappa-Economics of Performance.
- 47-48 Constructive programmes of Gandhiji.

## **PRACTICAL SCHEDULE**

1. Socio economic survey
2. Micro level study of Farm Labour house hold
3. Visit to Farmer's market
4. Visit to Regulated market
5. Visit to Corporate Retail Market
6. Visit to RUDSET
7. Study of Cooperative banks
8. Study of commercial banks and loaning pattern
9. Visit to Gandhigram KVIC Trust

10. Visit to Constructive Programme of GandhiMuseum.
11. Visit to Village Industries.
12. Preparation of Farm Layout.
13. Visit to NABARD
14. Interaction with Self Help groups and their Activities.
15. Visit to Lead Bank.
16. Final Practical Examination.

## **REFERENCES**

### **Text books**

1. S.S. Acharya and N.L Agarwal, 2004 Agricultural Marketing in India, Fourth Edition, Oxford & IBH Publishing Co. Pvt. Ltd.,
2. S. Subba Reddy and P. Raghuram, 1996, Agricultural Finance and Management, Oxford & IBH Publishing Co. Pvt. Ltd.
3. H. Evandrummond and John W. Goodwin, 2004 Agricultural Economics, IInd Edition, Pearson Education Publishers.
4. Ruddar Datt and K.P.M Sundharam, 2001 Indian Economy, Forty Third Revised Edition, S. Chand and Company Ltd.
5. M.K. Gandhi, 1990, Village Industries, Navajivan Publishing House, Ahemedabad

## IV SEMESTER

### 18 AGD 0401 FARM MANAGEMENT (3+1)

#### OBJECTIVES

- To improve knowledge and skills about the farm management and decision making and problems solving the successful farm to get maximum profits

#### LEARNING OUTCOME

- Basic Knowledge about farm management in maximizing the profits.
- Scope and practical utility in study of farm selection, farm layout and importance of fencing
- To study the labour problems, how to improve the labour efficiency, crop calendar and calendar of operation.
- Basic knowledge about preparation of farm planning and farm budgeting
- To Study about basic knowledge on storage, Marketable produce and concept of warehouse.

#### THEORY

**UNIT I Introduction:** Farm Management - Definition and importance – Farming System – Definition, classification - Cropping system – Definition – difference between farming system and cropping system – Systems of farming and types of farming – Advantages and disadvantages – mechanized farming and its possibilities in India – Integrated farming systems (IFS) – definition - types of IFS, Suitable for different situations.

**UNIT II Selection and layout of Farm:** Factors to be considered in selection and layout of a farm – Physical, climatic, economic and social factors –Ideal farm layout – Fencing – need and types, merits and demerits.

**UNIT III Farm labour and Management:** Definition of labour -Criteria for selection of labour –Types of labour –Factors affecting labour efficiency - methods for improving labour efficiency – Wages - Systems of payment of wages – Cropping scheme – Forecast and execution, Crop Calendar and Calendar of Operations

**UNIT IV Farm planning and budgeting:** Assessment of resources – Planning for land use – Livestock use and marketing – Factors affecting farm profits – Objects of farm budget –Balance sheet – Farm accounts and types records and registers, records Need, maintenance depreciation – types and methods of calculation – condemnation – disposal of unserviceable materials.

**UNIT V Storage and marketing of farm products:** Importance of storage – factors affecting storage of food grains – methods of storage - rat and moisture proof storage godowns – warehouse concepts – Marketing of farm products –Quality Management – Supply Chain Management -Consumer preference-Rural godowns – Concept and implementation strategies.

### **LECTURE SCHEDULE**

1. Introduction to Farm Management
2. Definitions of Farm Management
3. Importance of Farm Management
4. Farming System - Definitions
5. Farming System classification
6. Cropping system - Definitions
7. Cropping system - importance
8. Difference between farming system and cropping system
9. Systems of farming
10. Types of farming
11. Advantages and disadvantages – mechanized farming
12. Mechanized farming and its possibilities in India
13. Integrated farming systems (IFS) – definition - types of IFS
14. Factors to be considered in selection and layout of a farm
15. Physical factors – farm layout
16. Climatic factors – farm layout
17. Economic factors – farm layout
18. Social factors – farm layout
19. Ideal farm layout
20. Fencing – need and types
21. Fencing - merits and demerits
22. Labour - Definition - Introduction
23. Criteria for selection of labour
24. Types of labour
25. Factors affecting labour efficiency
26. Methods for improving labour efficiency
27. Wages – introduction

28. Systems of payment of wages
29. Cropping scheme – Introduction
30. Forecast and execution
31. Crop Calendar and Calendar of Operations.
32. Assessment of resources
33. Planning for land use
34. Factors affecting farm profits
35. Objects of farm budget
36. Balance sheet
37. Farm accounts and types records and registers
38. Records Need, maintenance
39. Depreciation – types and methods of calculation
40. Condemnation – disposal of unserviceable materials.
41. Importance of storage
42. Factors affecting storage of food grains
43. Methods of storage
44. Warehouse concepts – Marketing of farm products
45. Quality Management
46. Supply Chain Management
47. Consumer preference
48. Rural godowns – Concept and implementation strategies.

### **PRACTICAL SCHEDULE**

1. Preparing cropping scheme for wet land areas
2. Preparing cropping scheme for garden land areas
3. Preparing cropping scheme for dry land areas
4. Preparation of crop calendar
5. Preparation of calendar of operations
6. Working out input requirement and cost for unit area of important wet land crops
7. Working out input requirement and cost for unit area of important garden and dry land crops
8. Integrated farming systems model for wet land areas
9. Integrated farming systems model for garden land areas
10. Integrated farming systems model for dry land areas
11. Visit to farm section and dairy section of our faculty

12. Visit to a Government farm
13. Practicing on important records in farm and their maintenance
14. Working out a balance sheet for a farm
15. Visit to warehouse and observing the storage pattern
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Indian Social Institute. 1996. Agricultural labour, Indian Social Institute, Issue No.501, New Delhi.
2. Johl,S.S. and T.R.Kapur, 1992, Fundamentals of Farm Business management, Kalyani publishers, Lundhiana.
3. Kahlon, A.S. and Karam Singh. 1980. Economic of farm management in India – Theory and Practice. Allied Publishers Pvt. Ltd., Chennai.
4. Karuppusamy, S.S. and S.Kulandaisamy. 1986. Pannai Nirvagam, Gandhigram Rural Institute - Deemed University, Gandhigram
5. Morachan, Y.B. 1986. Crop production and management. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

## IV SEMESTER

### 18 AGD 0403 CROP DISEASE MANAGEMENT (3+1)

#### OBJECTIVE

- To facilitate the students to learn and understand about the micro organisms.

#### LEARNING OUTCOME

- Studying the Diseases of Cereals and Pulses
- Studying the Disease of Oilseeds and Cash Crops
- Studying the Diseases of Vegetable Crops
- Studying the Diseases of Fruit Crops
- Studying the Diseases of Plantation and Flower Crops

#### THEORY

Study of major and common diseases (including nutritional disorders), symptoms, mode of spread and management practices of following crops.

**UNIT I      Disease of Cereals and Pulses:** Rice, Wheat, Cholan, Maize, Cumbu, Green gram, Black gram, and Bengal gram.

**UNIT II     Disease of Oilseeds and Cash Crops:** Coconut, Groundnut, Castor, Gingelly, Sunflower, Cotton, Sugarcane.

**UNIT III    Disease of Vegetable Crops:** Brinjal, Bhendi, Chillies, Potato, Tomato, Cucurbits, Crucifers and Tapioca.

**UNIT IV    Disease of Fruit Crops:** Citrus, Mango, Banana, Grapes, Apple

**UNIT V     Disease of Plantation and Flower Crops:** Coffee, Tea, Cardamom, Pepper, Rose, Crossandra and Jasmine

#### LECTURE SCHEDULE

1.        Diseases of Rice
2.        Diseases of Wheat
3.        Diseases of Cholan, Maize and Cumbu
- 4-5.     Diseases of Green gram, Black gram, and Bengal gram
- 6-7.     Diseases of Coconut
- 8.-9     Diseases of Groundnut
- 10-11.   Diseases of Castor

- 12-13. Diseases of Gingelly
- 14-15. Diseases of Sunflower
- 16-17 Diseases of Cotton
- 18-19. Diseases of Sugarcane
- 20.-21 Diseases of Brinjal
- 22-23 Diseases of Bhendi
- 24-25 Diseases of Chillies
- 26. Diseases of Potato
- 27. Diseases of Tomato
- 28 Diseases of Cucurbits
- 29-30 Diseases of Crucifers
- 31 Diseases of Tapioca
- 32 Diseases of Citrus
- 33 Diseases of Mango
- 34 Diseases of Banana
- 35.-36 Diseases of Grapes
- 37-38 Diseases of Apple
- 39-40 Diseases of Coffee
- 41-42 Diseases of Tea
- 43-44 Diseases of Cardamom
- 45-46 Diseases of Pepper
- 47-48. Diseases of Rose, Crossandra and Jasmine

## **PRACTICAL SCHEDULE**

1. Study of cereal crops diseases symptoms
2. Study of pulses crops diseases symptoms
3. Study of Cottoncrop diseases symptoms
4. Study of Sugarcane crop diseases symptoms
5. Study of Vegetable crops diseases symptoms(Brinjal, Bhendi and Tomato)
6. Study of Vegetable crops diseases symptoms Chillies, Potato and Tapioca)
7. Study of Vegetable crops diseases symptoms(Cucurbits and Crucifers)
8. Study of Fruit crops diseases symptoms (Citrus, Mango and Banana)
9. Study of Fruit crops diseases symptoms (Grapes and Apple)
10. Collection and Preservation of diseased specimens.



11. Study of Micro nutrient deficiencies and their rectifications.
12. Study of seed treatment
- 13-15. Field Visits.
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Govindasamy, C.V. and M.N. Alagianagalingam. 1990. Plant Pathology, Popular Book Depot, Chennai.
2. Mehrotra, R.S. 1988. Plant Pathology, Tata McGraw Hill Publishing Company Ltd., New Delhi.
3. Prakasam, V., V.Valluva Paraidhasan and R.Jeyarajan. 1993. Hand book on Field Crop Diseases, AE Publication, Coimbatore.
4. Rangasamy, G. 1994. Diseases of Crop Plants in India, Prentice Hall of India Pvt. Ltd., New Delhi.
5. Singh, R.S. 1989. Diseases of Vegetable Crops, Oxford & IBH Publishing and Company, New Delhi.

## IV SEMESTER

### 18 AGD 0405 FLORICULTURE AND PLANTATION CROPS (3+1)

#### OBJECTIVES

- To learn about importance, history, styles and types of garden and garden components.
- To learn about production technology of commercial flower crops, spices and plantation crops

#### LEARNING OUT COME

- Studying importance, History and development of gardening Hindu style, Moghul garden, Japanese garden, British garden.
- Studying the Arboretum, Lawn, Shrubs, Climbers and Creepers, Flowering annuals, Hedges, Edges, Rock garden and water garden
- Studying the Production technology of Jasmine, Rose, Tuberose, Chrysanthemum, Marigold and Crossandra.
- Studying the Production technology of Cardamom, Pepper, Turmeric, Ginger, Nutmeg and Clove
- Studying the Production technology of Coffee, Tea, Rubber, Cashewnut and Arecanut.

#### THEORY

**UNIT I Ornamental gardening:** Introduction, importance – History and development of gardening – Hindu style – Moghul garden – Japanese garden – British garden.

**UNIT II Garden Components** Arboretum – Lawn – Shrubs – Climbers and Creepers – Flowering annuals – Hedges – Edges – Rock garden and water garden.

**UNIT III Commercial Floriculture:** Cultivation of Jasmine, Rose, Tuberose, Chrysanthemum, Marigold and Crossandra.

**UNIT IV Spices:** Cultivation of Cardamom, Pepper, Turmeric, Ginger, Nutmeg and Clove.

**UNIT V Plantation Crops:** Cultivation of Coffee, Tea, Rubber, Cashewnut and Arecanut

#### LECTURE SCHEDULE

1. Definition, Introduction of ornamental gardening.
2. Importance of ornamental gardening.
3. History and development of gardening.
4. Hindu style of garden
5. Moghul garden
6. Japanese garden
7. British garden.
8. Arboretum

9. Lawn – Methods of lawn making.
10. Maintenance of lawn.
11. Lawn grasses, Description of lawn grasses.
12. Shrubs
13. Climbers and Creepers
14. Flowering annuals and its classification
15. Hedges, Classification of hedges
16. Edges
17. Rock garden
18. Water garden.
19. Production technology of Mullai
20. Production technology of Malligai.
- 21-22. Production technology of Rose
23. Production technology of Tuberose
24. Production technology of Chrysanthemum
25. Special horticultural practices of Chrysanthemum.
26. Production technology of Marigold
27. Production technology of Crossandra.
- 28-29. Production technology of Cardamom
- 30-31. Production technology of Pepper
32. Production technology of Turmeric
33. Production technology of Ginger
34. Production technology of Nutmeg
36. Production technology of Clove.
37. Production technology of Coffee
- 38-39. Production technology of Tea
- 40-41. Processing of tea and coffee.
- 42-43. Production technology of Rubber
44. Processing of rubber.
45. Production technology of Cashew nut
46. Processing of cashewnut.
- 47-48. Production technology of Areca nut.

## **PRACTICAL SCHEDULE**

1. Practicing of planning and layout for home and public gardens
- 2-3. Identifying of ornamental trees and shrubs
4. Identification of climbers and creepers, edges & hedges and other ornamental species
5. Practicing cultivation of chrysanthemum
6. Practicing cultivation of marigold
7. Practicing cultivation of Jasmine flowers, Rose
8. Practicing cultivation of tuberose and crossandra
9. Special horticultural practices in flower crops.
10. Preparing cost of cultivation for major flower crops
11. Practicing display of ornamental plants
12. Identifying of spices and plantation crops
13. Processing of turmeric
14. Visit to plantation – Research station
15. Visit to Botanical garden & parks.
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. Bose, T.K. 1990. Fruits of India Tropical and Subtropical, Nayaprakash, Calcutta.
2. Crop Production Guide. 1999. TNAU & Department of Agriculture Publication.
3. Kumar, N. 1993. Spices, plantation crops, medicinal and aromatic plants, Rajalakshmi Publications, Nagercoil.
4. Pappaiyah, C.M. Commercial flowers. TNAU.
5. Randhava, G.S. 1973. Ornamental Horticulture in India, Today and Tomorrow's Printers and Publishers, New Delhi.

## IV SEMESTER

### 18 AGD 0407 SOIL AND WATER CONSERVATION (3+1)

#### OBJECTIVES

- To study different types of soil erosion due to water and wind and their control methods
- To study soil conservation structures and watershed management practices suitable for different field condition

#### LEARNING OUTCOME

The students can learn different types of erosion due to water and wind and able to identify suitable soil conservation methods to arrest erosion and they can also understand the different activities involved in promoting watershed development under different field conditions.

#### THEORY

**UNIT I Soil Erosion:-** Definition – Factors affecting soil erosion by water – climate, topography, vegetation and soil; Classification of erosion – geological and accelerated erosion; Types of erosion – rain drop erosion, rill erosion, sheet erosion, gully erosion, stream channel erosion; Results of erosion by water; Run off – Factors affecting run off – Estimation.

**UNIT II Wind Erosion:-** Soil movement by wind erosion – soil particle movement - saltation, Suspension and surface creep; Sand dune; Factors influencing erodibility, Measures of control wind erosion- Tillage practices and machinery to control soil blowing; Surface roughness; wind break and shelter belts, fixing of sand dunes.

**UNIT III Field structure and practices to control erosion by water:-** Land use capability classification; contour farming, strip cropping, conservation tillage, Terracing – types of terraces- broad base ridge type and bench terraces – specification, location, soil suitability; bunds – Graded bunds, contour bund-specifications; contour trenches.

**UNIT IV Water Shed Management:-** Definition, Principles, objectives and benefits; Water shed development methods – basic land treatment, crop and animal husbandry practices and alternate land use system; *In situ* soil conservation methods in watershed area; Integrated watershed management – activities involved.

**UNIT V Water harvesting structures;-** Temporary gully control structures – Brush dam,

Rock dam; Permanent gully control structures – Drop spillway, Chute spillway, Drop inlet spillway; Percolation pond, Farm pond and Sunken Pond Sand Storage dam – its merits and demerits.

## **LECTURE SCHEDULE**

1. Introduction, Evil effects of soil erosion.
2. Soil erosion definition & classification
- 3-6. Types of soil erosion.
- 7-8. Factors affecting soil erosion.
9. Run off – definition, factors affecting runoff and estimate peak runoff rate.
10. Wind erosion definition and damages caused by wind erosion.
- 11-13. Soil particle movement by wind
- 14-15. Factors affecting wind erosion
- 16-18. Control methods of wind erosion
19. Sand dunes and fixing of sand dunes.
- 20-21. Land use capability classification
- 22-25. Terraces, classification and functions
- 26-27. Bunds, classification and functions
28. Watershed management definition and importance
- 29-30. Principles, objectives and benefits of watershed management
- 31-34. Watershed development methods
- 35-36. Activities involved in integrated watershed management.
- 37-38. Gully erosion – classification, stages of gully development
- 39-41. Temporary gully control structure, functions, suitability and construction details.
- 42-44. Permanent gully control structures function, suitability and construction details.
45. Percolation pond, Farm pond, Sunken pond and sand storage dam.

## **PRACTICAL SCHEDULE**

1. Chain survey – Direct ranging, indirect ranging methods -
2. Obstacles found in chaining and methods to overcome
3. Cross staff survey measuring the irregular area
4. Measuring irregular area by ordinate methods
5. Finding out level difference between two stations by using dumpy level
6. Field problems in simple leveling and compound leveling.

7. Field problems in construction of contours
- 8-9. Field study of different kinds of erosion
10. Scale drawing of terraces
- 11- 12. Scale drawing of contour bund and graded bunds
- 13 - 14. Watershed management practices adopted in black soil and red soil areas
15. Final practical Examination

## **REFERENCES**

### **Text books**

1. Dr.Bimal Chandra Mil. 1995. Introduction to soil and water conservation engineering, Kalyani Publishers, Calcutta.
2. Rajesh Rajora. 1998, Integrated Watershed Management Rawat Publications, Jaipur and New Delhi.
3. Saini, G.S. 1996. A textbook of soil and water conservation, Amman Publishing house, Meerut.
4. Singhal, O.P. 1998. Agricultural Engineering, Aman Publishing house, Meerut.
5. Zamir Alvi. 1994. A text book of surveying, Vikas Publishing House Pvt. Ltd., New Delhi.

## IV SEMESTER

### 18 AGD 0409 LIVESTOCK AND CHICKEN PRODUCTION (3+1)

#### OBJECTIVES

1. The General objective of this course is to establish basic knowledge of how to manage and operate sheep, goat, pig, and rabbit farms.
2. This course is designed to impart basic technical knowledge and skills required to successfully run livestock and chicken farm enterprise by developing competencies concerning the selection and breeding of livestock, management of animals of different physiological status, feeding, housing and health care.
3. To impart scientific knowledge and skills required to run broiler and layer chicken farm successfully.

#### LEARNING OUTCOME

- Learn about sheep, goat, breeds, nutrition, reproduction, breeding and diseases.
- Learn about swine, rabbit and chicken breeds, nutrition, reproduction and diseases.

#### THEORY

**UNIT I Sheep:** Introduction – Zoological classification – Advantages of sheep farming – breeds classification – Indigenous breeds – Hissardale, chokla, Nali, Nellore, Mandya – Breeds of Tamil Nadu – Mecheri, Madras red, Ramnad White, Trichy black, Kilakarsal, Vembur – Exotic breeds – Merino, Rambouillet, Dorest- Suffolk – South Down – Breeding – Selection of breeding stocks - Reproduction in sheep – Breeding system – Breeding policy for improving mutton and wool production — Feeding – Nutrient requirements – Feed resources – Pasture management – Flushing – Feeding of pregnant and lactating ewes – Housing of sheep – Common diseases – Sheep pox – Blue tongue – PPR – Anthrax – Hemorrhagic septicemia – Foot root – Pregnancy toxemia.

**UNIT II Goat:** Introduction – Meaning of commonly used terms – Advantages of goat farming – Breeds – Indigenous breeds – Jamunapari – Tellicherry – Barbari – Exotic breeds – Saanen –Toggenberg – Nubian – Breeding – Selection of breeding animal – Reproduction - Mating systems – Feeding – Feeding habits of goat – Nutrient requirement – Stall fed system of goat rearing – Control of ecto and endo parasites – Common complaints – Carbohydrate engorgement – HCN poisoning – Tetanus.



**UNIT III Swine:** Advantages and disadvantages of pig farming – Utility – Breeds – Large White Yorkshire – Middle White Yorkshire – Landrace – Berkshire – Breeding – Selection of breeding stocks – Reproduction - symptoms of heat – Care of pregnant sows – Management at the time of farrowing – Weaning – Feeding – Creep feeding – Starter ration – Grower ration – Finisher ration – quantity to be feed – Housing of pigs - Common diseases – Swine fever – Swine pox – Foot and mouth disease – Swine erysipelas – Brucellosis.

**UNIT IV Rabbit:** Advantages and disadvantages of rabbit farming – Breeds – New Zealand White – Californian - Giant Blanc – Chinchilla Giganta – Dutch – Angora – Breeding – selection of breeding stocks – Reproduction – Mating – Pregnancy – Fostering – Care of young rabbits – Handling of rabbits – Feeding – Concentrate – Roughage – Coprophagy – Time of feeding – Housing – Objectives – Rabbit hutches – Common diseases – Coccidiosis – Hemorrhagica septicemia – Ecto and endo parasites – Pneumonia.

**UNIT V Poultry:** Advantages of poultry farming – Role of egg and chicken meat in human nutrition – Parts of a fowl – Classification of poultry – American – English – Asiatic – Mediterranean classes – Management – Chick – Grower – Layer – Broiler – Housing – Location – Housing requirements – Construction details – Deep litter system – Cage system – Feeding – Nutrient requirement for different classes of chicken – Feed formulation – Common diseases – Ranikhet disease – Infectious bursal disease – Coccidiosis – Vaccination – Dressing of bird for table purpose.

## **LECTURE SCHEDULE**

1. Introduction to sheep farming, meaning of commonly used terms, Zoological classification and advantages of sheep farming
2. Breeds of sheep, classification based on origin, utility and agro-climatic conditions.
3. Distribution, characteristics and production performance of indigenous breeds – Hissardale, chokla, Nali, Nellore and Mandya
4. Distribution, characteristics and production performance of breeds of Tamil Nadu – Mecheri, Madras red, Ramnad White, Trichy black, Kilakarsal, Vembur
5. Distribution, characteristics and production performance of exotic breeds – Merino, Rambouillet, Dorest, Suffolk and South Down

6. Sheep Breeding – Selection of breeding stocks, Reproduction in sheep, sheep breeding systems and breeding policy for improving mutton and wool production.
7. Feeding of sheep – Nutrient requirements for different class of sheep, Feed resources, Pasture management, Flushing, Feeding of pregnant and lactating ewes.
8. Housing of sheep – space requirement, construction details of shed and yard
9. Cause, mode of transmission, clinical signs, treatment, prevention and control of common viral diseases viz. sheep pox, blue tongue and PPR.
10. Cause, mode of transmission, clinical signs, treatment, prevention and control of common bacterial diseases viz. anthrax, hemorrhagic septicemia and foot root and metabolic disease pregnancy toxemia.
11. Introduction, meaning of commonly used terms and advantages of goat farming.
12. Distribution, characteristics and production performance of indigenous goat breeds – Jamunapari, Tellicherry and Barbari.
13. Distribution, characteristics and production performance of breeds of exotic breeds – Saanen, Toggenberg Anglo Nubian and Boer.
14. Goat Breeding – Selection of breeding stocks, reproduction in goat, goat breeding systems and breeding policy for improving meat and milk production.
15. Feeding of goat – feeding habits of goat, dry matter requirements for different class of goat, Feeding schedule, feeding of different classes of goat
16. Stall fed system of goat rearing
17. Cause, mode of transmission, clinical signs, treatment, prevention and control of Common complaints – Carbohydrate engorgement, HCN poisoning and tetanus.
18. Introduction to swine farming, meaning of commonly used terms, advantages and disadvantages of pig farming
19. Breeds pig – Large White Yorkshire, Middle White Yorkshire, Landrace, Berkshire and Duroc.
20. Breeding of pigs – Selection of breeding stocks, reproduction in pigs, symptoms of heat, care of pregnant sows and management at the time of farrowing.
21. Systems of swine rearing.
22. Management of piglets from birth to weaning.
23. Feeding of pigs– creep feed, starter ration, grower ration, finisher ration and quantity to be feed
24. Housing of pigs –space requirement, pen and yard accommodation construction details.
25. Cause, mode of transmission, clinical signs, treatment, prevention and control of common viral diseases viz. swine fever, swine pox, foot and mouth disease.

26. Cause, mode of transmission, clinical signs, treatment, prevention and control of common bacterial diseases viz. swine erysipelas and brucellosis.
27. Introduction to rabbit husbandry, meaning of commonly used terms, advantages and disadvantages of rabbit farming.
28. Common breeds of rabbit – New Zealand White, Californian, Giant Blanc, Chinchilla Giganta, Dutch and Angora
29. Breeding of rabbits – selection of breeding stocks, reproduction, mating, pregnancy, and fostering.
30. Care and management of kindling animals and Kindling
31. Care of young rabbits and handling and restraining of rabbits.
32. Identification of rabbits
33. Feeding of rabbits – nutrient requirement, feeding schedule, concentrates, roughages, corprophagy.
34. Housing – objectives, climatic requirement, deep litter system, rabbit hutches
35. Common diseases – Coccidiosis, hemorrhagic septicemia, Ecto and endo parasites and pneumonia.
36. Economics of rabbit production.
37. Introduction to poultry farming, meaning of commonly used terms, advantages of poultry farming, role of egg and chicken meat in human nutrition.
38. Parts of a fowl, classification of poultry breeds on the basis of origin and utility
39. Characteristics of American, English, Asiatic and Mediterranean classes of chicken.
40. Broiler production and management
41. Management of layer chicks.
42. Management of growers
43. Management of layer chicken
44. Housing – location, housing requirements and construction details deep litter house and cage system.
45. Feeding of chicken – nutrient requirement for different classes of chicken feed ingredients and feed formulation.
46. General measures to control outbreak of diseases in a poultry farm and vaccination schedule for broiler and layer chicken.
47. Cause, mode of transmission and clinical signs of common diseases – Ranikhet disease, infectious bursal disease and coccidiosis.
48. Slaughtering of chicken for table purpose.

### **PRACTICAL SCHEDULE**

1. Identification of breeds of sheep

2. Preparation of project for a sheep unit
3. Identification of breeds of goat
4. Preparation of project for a goat unit
5. Preparation of plans for housing of sheep and goats
6. Hands on training in deworming
7. Visit to commercial sheep and goat farm
8. Preparation of project for a piggery unit
9. Preparation of plans for housing of pigs
10. Visit to commercial piggery and rabbitry
11. Debeaking and vaccination of poultry
12. Dressing of birds for table purpose
13. Preparation of project for a broiler chicken unit
14. Preparation of project for a layer chicken unit
15. Visit to commercial broiler and layer chicken farms
16. Final practical Examination

## **REFERENCES**

### **Text books**

1. ICAR, 2013. Hand book of Animal Husbandry, 4<sup>th</sup>Ed.ICAR Publication, Pusa, New Delhi.
2. Banerjee, G.C. 1998. Poultry, 8<sup>th</sup> edition, Oxford and IBH Publishing Company Ltd., New Delhi.
3. Sastry, N.S.R., C.K.Thomas and R.A.Singh. 2003. Livestock production management, Third edition, Kalyani Publishers, New Delhi.
4. Panda, B. and S.C.Mohapatra. 1989. Poultry Production. ICAR Publications, New Delhi.
5. C. P. Peacock, 1996. Improving Goat Production in the Tropics: A Manual for Development Workers, Oxafam

## IV SEMESTER

### 18 AGD 0411 EXTENSION METHODS AND AUDIO-VISUAL AIDS (3+1)

#### OBJECTIVES

- To expose the students to various extension methods and audio-visual aids
- To impart skill in the application of extension methods and audio-visual aids to specific situations and subjects
- To impart skill in the planning, preparation and use of various visual aids and modern gadgets.

#### LEARNING OUT COME

- Studying the classification extension teaching methods and audio-visual aids
- Learning about the different extension methods belonging to individual and group contact
- Learning about the different mass contact methods
- Learning about various audio and visual aids

#### THEORY

**UNIT I**      **Introduction:** Extension methods- meaning, purpose and classification according to form and use, functions and stages of ID process. Audio-visual aids- meaning, importance, advantages and disadvantages. Classification of audio-visual materials according to evolution, senses involved and contribution to learning. Planning, preparation, presentation and evaluation of audio-visual aids.

**UNIT II**      **Individual and group contact methods:** Farm & Home visit, office call, telephone call, personal letter, e-mails, observation plots, result demonstration and agri-clinics. Method demonstration, General meetings- lecture, debate, symposium, forum, buzz session, group discussion, brainstorming, seminar, workshop and field trips.

**UNIT III**      **Mass contact methods:** Farm journalism- scope and functions. Publications- leaflet and folder, extension journals, newspaper, extension bulletins, newsletter and circular letter. Radio, television, exhibition, campaign, farmers' fairs, agrl. Film shows, extension talk, distance learning methods.

**UNIT IV**      **Audio and Visual aids:** Audio aids-Radio, types of audio-recording, tape

recorder, CDs, DVDs, and public address system. Visual aids-Literature, symbolized- charts and graphs. Three dimensional- models, specimens and objects. Two-dimensional-non-projected- photographs, still pictures, chalk board, bulletin board, flash cards and flannel graph. Projected- slides, power point, LCD and Over Head and Opaque projectors.

**UNIT V** **Audio-visual aids:** Audio-visual- television, film shows, video projections, LCD and DLP Projectors, drama and puppet show, folk dance, folk songs and storytelling. Computer and multimedia. Modern information technology- E-mail - Internet browsing - Search engines- Directories, online journals, websites and computer networks. MS Power Point - Creating Presentations and Slides - Working with Power Point Objects. Factors to be considered in the selection and combination of extension methods and audio-visual aids. Influence of extension teaching methods.

## **LECTURE SCHEDULE**

- 1-2. Extension methods- meaning, purpose and classification according to form and use, functions and stages of ID process.
3. Audio-visual aids- meaning, importance, advantages and disadvantages.
- 4-5. Classification of audio-visual materials according to evolution, senses involved and contribution to learning.
- 6-8. Planning, preparation, presentation and evaluation of audio-visual aids.
- 9-12. Individual contact methods- Farm & Home visit, office call, telephone call, personal letter, e-mails, observation plots, result demonstration and agri-clinics.
- 13-18. Group contact methods- Method demonstration, General meetings- lecture, debate, symposium, forum, buzz session, group discussion, brainstorming, seminar, workshop and field trips.
19. Farm journalism- scope and functions.
- 20-23. Publications- leaflet and folder, extension journals, newspaper, extension bulletins, newsletter and circular letter.
- 24-26. Radio, television, exhibition, campaign,
- 27-29. Farmers' fairs, agrl. Film shows, extension talk, distance learning methods.
- 30-31. Audio aids-Radio, types of audio-recording, tape recorder, CDs, DVDs, and public address system.

- 32-33. Visual aids-Literature, symbolized- charts and graphs. Three dimensional- models, specimens and objects.
- 34- 36. Two-dimensional-non-projected- photographs, still pictures, chalk board, bulletin board, flash cards and flannel graph.
- 36-38. Projected- slides, power point, LCD and Over Head and Opaque projectors.
- 39-42. Audio-visual- television, film shows, video projections, LCD and DLP Projectors, drama and puppet show, folk dance, folk songs and storytelling.
- 43-44. Modern information technology- E-mail - Internet browsing - Search engines- Directories, online journals, websites and computer networks.
- 45-46. MS Power Point - Creating Presentations and Slides - Working with Power Point Objects.
- 47-48. Factors to be considered in the selection and combination of extension methods and audio-visual aids, Influence of extension teaching methods.

## **PRACTICAL SCHEDULE**

1. Practicing with lecture, debate and symposium methods.
2. Steps to be followed in the conduct of result and method demonstrations.
3. Organizing and conducting group discussions
4. Preparation of Poster.
5. Preparation of flash cards.
6. Preparation of still pictures.
7. Preparation of charts and graphs.
8. Writing for leaflet, folder and news articles.
9. Planning and preparation of news stories and success stories
10. Practicing with the use of different projectors.
11. Operation and handling of video camera.
12. Participating in farmers' day celebrations.
13. Information kiosk and Kissan call centres
14. Preparation of power point presentations.
15. Internet browsing and E-mail communication- practice
16. Final practical Examination

## REFERENCES

### Text books

1. Adivi Reddy, A. 1980. Extension Education, Sree Lakshmi Press, Bapatla.
2. Chaubey, B.K. *et.al.* 1999. Extension Education. Aman Publishing House.
3. Dahama, O.P. and O.P.Bhatnagar. 1996. Education and Communication for Development.
4. Ray, G.L. (2006). Extension Communication and Management Naya Prakashan, Kolkatta.
5. Saxena, S. 2003. MS.OFFICE 2000 for every one. Vikas Publishing House, New Delhi.
6. Seetharaman, Netaji. R., *et.al.* 1990. A Manual on Audio-visual Aids.
7. Yella Reddy, N. (1998). Audio-Visual Aids for Teaching, Training and Extension. Haritha Publishing House, Hyderabad.
8. Leon, A and M. Leon. (2004). Introduction to Information System. Vijay Nicol (P) Ltd., Chennai.