DIPLOMA IN AGRICULTURE

SYLLABUS

(with effect from June 2015)

FACULTY OF AGRICULTURE AND ANIMAL HUSBANDRY

The Gandhigram Rural Institute – Deemed University

Gandhigram – 624 302 Tamil Nadu

FACULTY OF AGRICULTURE AND ANIMAL HUSBANDRY

Diploma in Agriculture Programme Revised syllabus with effect from July 2011

Scheme of Examinations

Code No	Subject	Credit			Total Marks	Scheme			
						Theory		Practical	
		T	P	Total		CFA	ESE	CFA	ESE
	I Semester								
11AGRD0101	Soil and Nutrient Management	3		3	100	40	60		
11AGRD0102	Soil and Nutrient Management - practical	-	1	1	50			25	25
11AGRD0103	Principles of Agronomy	3		3	100	40	60		
11AGRD0104	Principles of Agronomy - practical		1		50			25	25
11AGRD0105	Agricultural Meteorology and Land Use Systems	3		3	100	40	60		
11AGRD0106	Agricultural Meteorology and Land Use Systems-practical		1	1	50			25	25
11AGRD0107	Irrigation and Drainage	3		3	100	40	60		
11AGRD0108	Irrigation and Drainage – practical		1	4	50			25	25
11AGRD0109	Dairy Cattle Production	3		3	100	40	60		
11AGRD0110	Dairy Cattle Production – practical		1	1	50			25	25
11AGRD0111	Rural Development	3		3	100	40	60		
11AGRD0112	Rural Development – practical		1	1	50			25	25
	Total	**18**	**6**	**24**	**900**				
11AGRD0113	Village Placement Programme*	0	4	4	100				
	II Semester								
11AGRD0214	Agronomy of Field Crops – I	3		3	100	40	60		
11AGRD0215	Agronomy of Field Crops – I : pracical		1	1	50			25	25
11AGRD0216	Fundamentals of Plant Protection	3		3	100	40	60		
11AGRD0217	Fundamentals of Plant Protection – practical		1	1	50			25	25
15HORD0201	Introduction to Horticulture and Fruit Production	3		3	100	40	60		
15HORD0202	Introduction to Horticulture and Fruit Production - practical		1	1	50			25	25
11AGRD0218	Environmental Science and Organic Farming	3		3	100	40	60		
11AGRD0219	Environmental Science and Organic Farming – practical		1	1	50			25	25
11AGRD0220	Dairy Technology	3		3	100	40	60		
11AGRD0221	Dairy Technology – practical		1	1	50			25	25
11AGRD0222	Principles of Plant Breeding and Seed Science Technology	3		3	100	40	60		
11AGRD0223	Principles of Plant Breeding and Seed Science Technology –practical		1	1	50			25	25
	Total	**18**	**6**	**24**	**900**				
	III Semester								
11AGRD0324	Agronomy of Field Crops – II	3		3	100	40	60		
11AGRD0325	Agronomy of Field Crops – II : practical		1	1	50			25	25
11AGRD0326	Crop Insect Pest Management	3		3	100	40	60		
11AGRD0327	Crop Insect Pest Management – practical		1	1	50			25	25
15HORD0303	Vegetable Production	3		3	100	40	60		
15HORD0304	Vegetable Production – practical		1	1	50			25	25
11AGRD0328	Farm Power and Machinery	3		3	100	40	60		

11AGRD0329	Farm Power and Machinery – practical		1	1	50			25	25
11AGRD0330	Introduction to Agricultural Extension	3		3	100	40	60		
11AGRD0331	Introduction to Agricultural Extension - practical		1	1	50			25	25
11AGRD0332	Agricultural Economics	3		3	100	40	60		
11AGRD0333	Agricultural Economics – practical		1	1	50			25	25
	Total	**18**	**6**	**24**	**900**				
11AGRD0334	Village Placement Programme*	0	4	4	100				
	IV Semester								
11AGRD0435	Farm Management	3		3	100	40	60		
11AGRD0436	Farm Management –practical		1	1	50			25	25
11AGRD0437	Crop Disease Management	3		3	100	40	60		
11AGRD0438	Crop Disease Management – practical		1	1	50			25	25
15HORD0405	Floriculture and Plantation Crops	3		3	100	40	60		
15HORD0406	Floriculture and Plantation Crops - practical		1	1	50			25	25
11AGRD0439	Soil and Water Conservation	3		3	100	40	60		
11AGRD0440	Soil and Water Conservation – practical		1	1	50			25	25
11AGRD0441	Livestock and Chicken Production	3		3	100	40	60		
11AGRD0442	Livestock and Chicken Production – practical		1	1	50			25	25
11AGRD0443	Extension Methods and Audio - Visual Aids	3	1	4	150	40	60	25	25
	Total	**18**	**6**	**24**	**900**				

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

I Semester

11 AGD 0101 SOIL AND NUTRIENT MANAGEMENT (3+1)

Objective :

- 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

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.

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.

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).

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.

V. **Fertilizers:** Fertilizers–classification–sources of fertilizers–Straight, mixed and complex fertilizers – Nutrient content in fertilizers nitrogenous fertilizers, phosphatic fertilizers and Potassic fertilizers–slow release N fertilizers – Nitrification inhibitors – types of mixed fertilizers-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, colour
4. Particle density, Bulk density, Pore space, Consistency
5. Soil air and Soil water Soil temperature –Significance of physical properties in plant growth
6. Chemical properties of soil
7. Soil colloids Ph, EC
8. Definition and importance of Soil fertility
9. Soil fertility and productivity – Organic matter–Influence on fertility
10. Soil reaction- Problem soils
11. Acid, Saline, Sodic and Saline sodic soils
12. Reclamation, Management and suitable crops for problematic soils
13. Essential plant nutrients and their sources
14. Foliar diagnosis deficiencies and toxicity symptoms
15. Corrective measures of nutrient deficiencies
16. Time and methods of fertilizer application
17. Precautions in applying fertilizers
18. Methods to improve fertilizer use efficiency
19. Integrated nutrient management (INM) – Soil test crop recommendations (STCR)
20. Manures: Definition – Classification

21. Bulky Organic Manures (BOM)
22. Concentrated Organic Manures (COM)
23. Preparation of different types of compost including industrial waste
24. Composting of coir waste and press mud
25. Vermicomposting
26. Enriched FYM
27. Green manures
28. Green Leaf Manures
29. Benefits and significance of organic manures
30. Bio - fertilizers and their types
31. Application of Biofertilizers
32. Fertilizers
33. Classification of fertilizers
34. Sources of fertilizers
35. Straight, complex and mixed fertilizers
36. Nutrient content in fertilizers
37. Nitrogenous fertilizers
38. Phosphatic and Potassic fertilizers
39. Slow release fertilizers and micronutrient mixtures

Practicals:

1. Methods of collection and processing of soil samples, pH, EC
2. Analysis of available N, Organic carbon
3. Analysis of available P and available K
4. Determination of soil moisture by over dry method.
5. Analysis of soil test results, Interpretation and Fertilizers recommendation.
6. Foliar diagnosis and its corrective measures
7. Identification of manures, fertilizers and bio-fertilizer
8. Preparation of different types of compost and method of application (Composted Coir pith, Vermicompost and FYM etc)
9. Preparation of slow release fertilizers (Neem coated, Tar and Lac coated urea)
10. Calculation of fertilizers through straight, complex and mixed fertilizers for some field crops
11. Study of soil amendments, fertigation and foliar fertilizers application.

References:

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.

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

I Semester

11 AGD 0102 PRINCIPLES OF AGRONOMY (3+1)

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.

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.

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.

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.

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).

Practical

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

References

1. Gupta, O.P. 1998. Weed management principles and practices, Agro botanical Publishers. Biloaneers.
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, Ludhianan.

I Semester

11 AGD 0103 AGRICULTURAL METEOROLOGY AND LAND USE SYSTEMS (3+1)

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.

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.

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

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.

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.

Practical

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

References

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

11 AGD 0104 IRRIGATION AND DRAINAGE (3+1)

I. **Sources of Irrigation:** Irrigation Definition – necessity, merits and demerits of irrigation; Source - natural streams and rivers, surface resources, underground resources – Ground Water – aquifer - unconfined and confined; well irrigation – classification – open well, tube well – merits and demerits of the tube well; Measurements of irrigation water – methods – velocity area method, direct discharge method –weir – rectangular, Chippoletti, 90^{o} v- notch and orifice

II. **Methods of Irrigation:** Modes or methods of applying water to crops- uncontrolled or wild flooding, free flooding, border irrigation, check basin irrigation, furrow irrigation, sprinkler irrigation, drip irrigation and surge irrigation – Suitability of crop soil design factors merits and demerits of each irrigation system ; Irrigation Efficiencies .

III. **Water requirement of Crops:** Consumptive use of water – Factors affecting consumptive use of water – Direct measurement of consumptive use methods – tank and lysimeter, field experimental plots, soil moisture depletion studies, inflow and out flow method; open pan evaporation method, Blaney – Cridle method.

IV. **Drainage:** Definition, benefits of drainage, methods of drainage – surface, subsurface and special methods of drainage; surface drainage – drainage systems for flat lands – random, parallel field, parallel open ditch and bedding system; drainage system for sloping areas – drainage co efficient.

V. **Subsurface Drainage:** Benefits of drainage; methods of drainage; tile drain including perforated pipes, mole drains, drainage wells, deep open drains and combination of tile and open drains; Land reclamation-definition, purpose and methods of land reclamation

Practical

1. Measurement of water flow in field channels
2. Measurement of water flow in weirs
3. Acquiring knowledge in drip irrigation methods
4. Acquiring knowledge in sprinkler irrigation methods
5. Study of surge irrigation
6. Study of the water requirement of different crops
7. Calculation of duty of water
8. Studying the importance of drainage in Agriculture
9. Field visits to Water Technology Centre, TNAU, Coimbatore
10. Determination of the size of tile drainage
11. Determination of the size of open channel for surface drainage

References

1. Basak, N.N. 1999. Irrigation Engineering. TATA McGraw Hill, New Delhi.
2. Michael, A.M. and T.P.Ojha. 1987. Principles of Agricultural Engineering. Vol.2. Jain Brothers, New Delhi.
3. Sharma, S.K. 1984. Principles and practices of irrigation Engg., S.Chand and Company Ltd., New Delhi.
4. Singhal.O.P. 1998. Agricultural Engineering, Aman Publishing House, Meerut.
5. Sivanappan, R.K. and Karaigowder. 1997. Irrigation and Drainage, Popular Book Depot, Chennai.

I Semester

15ANHD0123- 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.

1. 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.
2. To provide hands-on experiences with handling and restraining of cattle, milking and other dairy husbandry practices.

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.

Practical

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. Preparation of projects for obtaining bank loan

References

1. ICAR, 2013. Hand book of Animal Husbandry, 4th Ed.ICAR Publication, Pusa, New Delhi.
2. Banerjee, G.C., 2006. Text book of Animal Husbandry 8th Ed.Oxford and IBH Publishing Company Ltd., New Delhi.
3. Jagadish Prasad, 2002. Principles and practices of Dairy Farm Management, 3rd Ed. Kalyani Publishers, Ludhiana.
4. Sastry, N.S.R., C.K.Thomas and R.A.Singh, 2015. Livestock Production Management, 4th 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.

Learning Outcome

Unit I: Instruction in lessons in Unit I should result in students achieving the following objectives

1. Describe the size and contribution of dairying to Indian economy and rural livelihood
2. Describe the various breeds of dairy cattle, giving their origin and breed characteristics and milk production capacity.
3. Identify the anatomical parts of the dairy animal
4. Identify various breeds of cattle and buffalo by viewing photographs or live animals.
5. Name the parts of dairy cattle and describe economically important traits.
6. Describe the characteristics of a good dairy cow
7. Select desirable breeding and production animals.
8. Differentiate desirable from undesirable traits

Unit II: Instruction in lessons in Unit II should result in students achieving the following objectives

1. Describe the male and female reproductive organs.
2. Identify the signs of heat and right time for insemination.
3. Able to identify suitable method of breeding for improving the productivity of herd
4. Able to determine the breeding efficiency of cows and bulls
5. Acquire knowledge skills in semen collection, evaluation, dilution and insemination

Unit III: Instruction in lessons in Unit III should result in students achieving the following objectives

1. Ability to handle and restrain animals safely.
2. Acquired skill in putting nose ring, castration, dehorining tattooing, branding, tattooing and dentition and ageing of cattle.
3. Ability to prepare plans for housing of dairy cows.

Unit IV: Instruction in lessons in Unit IV should result in students achieving the following objectives

1. Able to classify feeds according to their nutritive values
2. Acquire knowledge in feeding value of locally available feed

3. Able to list key nutrients for animals
4. Able to outline how carbohydrates, lipids and proteins can be classified
5. Able to describe the functions of minerals and vitamins in the nutrition of animals, and list the sources as well as the clinical signs associated with deficiency symptoms of these nutrients.
6. Describe the functions of the parts of the digestive systems of cow
7. Acquire knowledge in the use of urea as protein supplement

Unit V: Instruction in lessons in Unit V should result in students achieving the following objectives

1. Able to take care of sick animals
2. Able to identify healthy and sick animals
3. Able describe the basic physical examination of animals for health assessment
4. Able to list and describe the common diseases of cattle
5. Able to diagnose and treat mastitis, FMD, Rinderpest, anthrax, black quarters and Hemorrhagic Septicemia
6. Able to diagnose Tuberculosis, Johne's disease, Brucellosis and Rabies
7. Able to diagnose and treat Bloat, Carbohydrate engorgement, Diarrhoea and Indigestion
8. Able to control common Endoparasites and Ectoparasites

I Semester

15 AGD 0106 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

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.

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. 73rd Constitutional amendment- New Panchayati Raj- Tamil Nadu Panchayati Raj Act- constitution, structure and functions of Panchayat bodies at three tiers in Tamil Nadu.

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, NWDPRA, 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.

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

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.

Practical:

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

REFERENCES:

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.

Learning out comes		
Unit	**Vague out come**	**Most precious out come**
I.	Studying the concepts of rural development	1. Understanding the meaning and importance of rural development. 2. Studying the pre-independent rural development attempts by national leaders
II.	Learning about the community development programme and the machinery of its implementation	1. Understanding the background and need for the introduction of community development programme 2. Studying the transformation of panchayati raj over decades and its role and importance in the sphere of rural development.
III.	Learning about the Origin, objectives and functions of various agricultural development programmes	1. Understanding the importance of various agricultural development programmes in increasing the agricultural production 2. Learning about the components of various agricultural development programmes
IV.	Studying about the Origin, objectives and functions of various rural development programmes	1. Understanding the importance of various rural development programmes in achieving the overall development of rural India. 2. Learning about the components of various rural development programmes
V.	Learning about the different rural development institutions and SHGs	1. Understanding the establishment, activities and role of different rural development institutions 2. Establishment and nurturing the SHGs and use of those groups for rural development

II Semester
11 AGD 0201 AGRONOMY OF FIELD CROPS-I (3+1)

Agronomy of 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 and harvest, by product utilization latest technologies.

I. **Cereals I**: Rice
II. **Cereals II**: Wheat and Maize
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).
IV. **Pulses**:
    A.Major: Pigeon pea (Red gram), Black gram, Green gram, Bengal gram (Chickpea), Cowpea,
    B.Minor: Soybean, Horse gram, Field bean.
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 (Punai cali)

Practical

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, maize and sorghum.
9. Yield attributes and yield estimation in millets and pulses..
10. Yield estimation in green manure crops.
11. Working out cost of cultivation for important field crops.

References

1. Balasubramanian, R and B.Gururajan. 2009. Crop Production, Kalyani Publsihers, 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
11 AGD 0202 FUNDAMENTALS OF PLANT PROTECTION (3+1)

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.

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.

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.

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.

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 .

Practical

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. Preparation of Bordo mixture.
6. Symptoms of plant diseases in crop plants.
7. Simple calculation on Pesticide requirements.
8. Observation of disease fields.
9. Collection of plants damaged by insect pests and diseases.

10-11. Field Visits to Agricultural Research Stations / Farmers Field.

References

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

15HORD0215 INTRODUCTION TO HORTICULTURE AND FRUIT PRODUCTION (3+1)

Objectives:

1.To learn about importance , climatic zones, establishment of orchard , Systems of cropping, and Propagation techniques of horticultural crops.

2. To learn about production technology of tropical, subtropical, arid, humid and temperate fruit crops.

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.

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

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

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

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

VI.

Practical:

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

References:

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.

Learning out come		
Unit	**Vague out come**	**Most precious out come**
I	Studying the importance of horticulture and layout of orchard.	1.Understanding the importance of horticulture. 2. Understanding the layout of orchard.
II	Studying the Systems of cropping, training and pruning, harvest, Post harvest management	1. Understanding the Systems of cropping. 2. Understanding the training and pruning techniques of horticulture crops
III	Studying the vegetative Propagation techniques and tissue culture	1.Understanding the different types of stem cuttings, layering, grafting and budding. 2.Understanding the procedure for tissue culture.
IV	Studying the Production Technology of tropical fruit crops.	1.Understanding the . Production Technology of tropical fruit crops. 2. .Understanding the after cultivation practices followed for banana.
V	Studying the Production Technology of subtropical, arid, humid and temperate fruit crops.	1.Understanding the Production Technology of subtropical, arid, humid and temperate fruit crops. 2.Understanding the papain extraction method.

II Semester

11 AGD 0204 ENVIRONMENTAL SCIENCE AND ORGANIC FARMING (3+1)

Objective:

- 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
-

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

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.

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.

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.

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.

Practicals:

1. Observe and document the do nothing farming practices in the farmers field
2. Preparation of Biodynamic farming i.e. cow horn manures.
3. Preparation of Organic nutrient solution.
4. Preparation of Bio pesticides formulations.
5. Zero Budget Farming components and preparation of organic nutrients.
6. Visit to Organic farm and observe LEISA techniques.
7. Study on crop rotation and mixed cropping techniques.
8. Identification of sources for collection of IKs
9. Practicing different methods of collecting IKs
10. Documentation of IKs on Field crops.
11. Field Visits to Organic farmer's field.

References:

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.

Outcome:

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

II Semester

15ANHD0224- 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.

Theory

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.

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.

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

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.

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

Practical:

1. Sampling of milk.
2. Platform test
3. Determination of specific gravity of milk.
4. Analysis of fat in milk
5. Estimation of TS and SNF content in milk.
6. Detection of adulterants in milk.
7. Detection of preservatives in milk.
8. Preparation and analysis of dahi.
9. Preparation and analysis of khoa
10. Preparation and analysis of ice cream
11. Preparation and analysis of paneer and channa
12. Preparation and analysis of flavoured milk
13. Visit to milk processing unit

Reference 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).
4. Technology of Indian Milk Products, Dairy India year book 2007
5. Eeckless C.H, W.B Combs and H.Mecy (1955), Milk and Milk Products, Tata Mc Graw
Hill Publishing Co.Pvt.Ltd., New Delhi.
6. Sukumar De (1980) Outlines of Dairy Technology, Oxford University Press, New Delhi.

Learning Outcome:

Vague outcome	Precious outcome
Unit-I. Students will learn about the properties of milk	1.From this content of the study, students will able to know the milk definition ,composition secretion of milk in the udder, Nutritive value of milk, properties of milk 2. Learn about the details of Colostrums definition, composition and importance of factors affecting the milk yield.
Unit-II. Students will learn about the clean milk production	1.From this content of the study students will able to know the source of microbes in milk ,clean milk production, Bacteriological standard for raw milk 2. Also learns about the details of MBRT Test, detergents and sanitizers, common adulterants and preservatives in milk.
Unit-III. Students will learn about the Milk processing and market	1. From this content of the study will explain about the Collection, transportation of milk, milk reception, clarification. 2.Also learns about the details of Market milk – standardization, toned, double toned, flavoured milk
Unit-VI. Students will learn about the production techniques of fermented milk products.	1.From the content of this course, student learns about the handling and manufacturing procedure of fermentation-definition, starter culture, method of preparation of yoghurt, dahi, butter milk 2. And also learn about the preparation of Acidophilus milk and cheese, therapeutic benefits of fermented milk products.
Unit-V. Students will learn about the production techniques of fat rich and dried milk products.	1.This content of the study will learn about the Method of preparation and uses of ice-cream and butter 2.Ghee,concentrated milk, dried milk, paneer and channa

SEMESTER II
AGD 0206 PRINCIPLES OF PLANT BREEDING AND SEED SCIENCE TECHNOLOGY (3+1)

Objective

This course is 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.

Unit I. **Selection:** History of plant breeding, floral structure and pollination mechanisms - Methods of plant breeding – Introduction – Selection – Mass selection, purel ine 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 – Breeding for Biotic and Abiotic stress – 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.

Practical:

1. Pollination and reproduction in plants – alternation of generation and life cycle.
2. Selfing and crossing techniques in different crops.
3. Emasculation and kinds of emasculation and pollination techniques.
4. Study of floral biology – Monocots
5. Study of floral biology – Di cots
6. Identification of seed and its structure
7. Assessing the physiological and harvestable maturity in different crops.
8. Sampling – mixing and dividing – equipments – methods
9. Seed moisture estimation – principles – methods – reporting results.
10. Purity analysis – reporting results.
11. Seed germination tests and dormancy breaking treatments
12. Seedling evaluation – tetrazolium test and evaluation.
13. Visit to Seed farm and Seed Certification agency.

References:

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 Recknoner, Agrobios Publishers, Jodhpur, Rajasthan
4. Singh B.D. 1986. Plant breeding – Principles and Methods, Kalyani Publishers, New Delhi.
5. Sivasubramaniam.K. and S.K Yadav. 2007. A Dictionary of Seed Technological Teems, Kalyani Publishers, Ludhiana

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

III Semester

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

Agronomy 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.

I. **Oil seeds I**: Groundnut, Gingelly, Sunflower and Coconut.

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

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

IV. **Fibre crops and narcotics**: a) Major Fibre crops : Cotton, Jute
b) Minor Fibre crops : Silk cotton, Agave,
c) Narcotics : Tobacco.

V. **Forage crops**

a) Forage cereals - Sorghum, Maize.

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)

Practical

1. Study of field management in groundnut and other oil seeds
2. Cultivation techniques of sugarcane and sweet sorghum
3. Study of sowing and manuring of oilseeds , sugarcane and cotton
4. Tobacco nursery management
5. Growth and Yield estimation in oil seeds
6. Growth and Yield estimation in sugarcane.
7. Cost of cultivation in oil seeds.
8. Cost of cultivation in sugarcane.
9. Cost of cultivation in cotton.
10. Cost of cultivation in forage crops.
11. Visit to CTRI, Vedasandur

References

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.SWaminatioan, 2008 . recent stratigies on crop production.

III Semester

11 AGD 0302 CROP INSECT PEST MANAGEMENT (3+1)

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:

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

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

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

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

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

Practical

1. Identification and damage of insects, their damages on crop plants.
2. Study of Rice insect pests
3. Study of cereals and millets insect pests
4. Study of Pulses insect pests.
5. Study of Coconut insect pests.
6. Study of Groundnut and other oil seeds insect pests.
7. Study of Sugarcane insect pests.
8. Study of Cotton insect pests.
9. Study of Vegetables insect pests.
10. Study of Fruits insect pests.
11. Field visits and visit to warehouse to study the methods of grain storage and pest control.

References:

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

15 AGD 0303 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 , malaveous and leguminous vegetables

I. **Introduction**: Importance – Classification and types of vegetable gardens – Handling and maturity index.

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

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

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

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

Practical:

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

Learning out come		
Unit	**Vague out come**	**Most precious out come**
I	Studying the importance, classification, types and maturity index of vegetables.	1.Understanding the importance of vegetables. 2.Understanding the maturity index of vegetables.
II	Studying the Production technology of Drumstick, Curry leaf, Amaranthus and Coccinea	1.Understanding the the Production technology of Drumstick, Curry leaf, Amaranthus and Coccinea 2.Understanding the different species of Amaranthus.
III	Studying the Production technology of . Cabbage, Cauliflower, Chow-chow, Pumpkin, Water melon, Snake gourd, Bitter gourd and Ribbed gourd.	1.Understanding the Production technology of Cabbage, Cauliflower, Chow-chow, Pumpkin, Water melon, Snake gourd, Bitter gourd and Ribbed gourd. 2.Understanding the physiological disorders of cauliflower.
IV	Studying the Production technology of Onion,	1.Understanding the Production technology of Onion, Garlic, Carrot, Radish, Beetroot,

	Garlic, Carrot, Radish, Beetroot, Potato, Tapioca and Sweet Potato.	Potato, Tapioca and Sweet Potato. 2.Understanding the tapioca sett preparation and planting. after cultivation practices for root crops
V	Studying the Production technology of Brinjal, Tomato, Chillies, Lady's finger, Garden bean, Cluster bean, Peas and French beans.	1.Understanding the Production technology of Brinjal, Tomato, Chillies, Lady's finger, Garden bean, Cluster bean, Peas and French beans. 2.Understanding the virus diseases and control measures for tomato and bhendi.

References:

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

11 AGD 0304 FARM POWER AND MACHINERY (3+1)

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.

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.

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.

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 – studey of parts and its working principles; Repairs and maintenance of sprayers and dusters.

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.

Practical

1. Study and identification of different parts of solar drier, solar cooker, solar water heater, windmill and bio gas plant
1. Identification of different parts of tractor, power tiller
2. Study the operation of different primary tillage implements
3. Study the operation of different secondary tillage implements
4. Study the operation of bullock drawn planters and seed drills
5. Assessment of machinery power and cost of operation
6. Study the operation of different parts of hand operated sprayers and duster & power operated sprayers and dusters
7. Study the operation of different parts and types of electric motors and pumps
8. Study of post harvesting machineries - Paddy thresher cum winnower, paddy drier and seed cleaner cum grader
9. Study of post harvesting machineries – Groundnut decorticator, maize Sheller and Dhall mill

10. Field visit to College of Agriculture Engineering, TNAU, Coimbatore
11. Field visit to SRFMTTI, Govt of India, Ananthapur.

References:

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

15 AGD 0305 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

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.

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.

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.

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.

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.

Practical:

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

References 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.
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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.

Learning out comes		
Unit	**Vague out come**	**Most precious out come**
I.	Studying the basics of extension education	1. Understanding the concepts and differences between formal education and extension education 2. Understanding the philosophy and principles of extension education particularly the self help approach 3. Learning about the importance of extension education in agricultural development
II.	Learning about the communication and its process and models	1. Studying the importance of communication in extension work. 2. Understanding the concept of communication and its various models and their application for various communication situations 3. Learning about the problems and barriers in communication process
III.	Studying the rural sociology and its application to extension education	1. Understanding the importance of rural sociology, rural social structure in extension education. 2. Learning about the use of local leaders for extension education
IV.	Learning about the diffusion and adoption of innovations	1. Understanding the meaning of an innovation and its various attributes 2. Understanding the categorization of adopters and their application to current situations 3. Application of diffusion and adoption process to Agri-clinics, FFS etc.
V.	Studying the programme planning and evaluation in extension education	1. Learning about the programme development process and its application. 2. Acquiring skill in the handling of various PRA methods for the analysis of needs and problems of rural areas.

III Semester

11 AGD 0306 AGRICULTURAL ECONOMICS (3+1)

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.

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.

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.

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-Institutionalize and Non Institutionalized source of and Micro Credit .

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.

Practicals:

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 Gandhi Museum.
11. Visit to Village Industries

References

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
11 AGD 0401 FARM MANAGEMENT (3+1)

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.

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.

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.

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.

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.

Practical

1. Preparing cropping scheme for wet land areas
2. Preparing cropping scheme for garden and dry lands
3. Preparation of crop calendar and calendar of operations
4. Working out input requirement and cost for unit area of important wet and dry and garden land crops
5. Integrated farming systems model for wet land areas
6. Integrated farming systems model for garden land areas
7. Integrated farming systems model for dry land areas
8. Visit to farm section of our faculty and a Government farm
9. Study on important records in farm and their maintenance
10. Working out a balance sheet for a farm
11. Visit to warehouse and observing the storage pattern

References

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
11 AGD 0402 CROP DISEASE MANAGEMENT (3+1)

Objective :

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

Theory

Unit I.

Disease of Cereals and Pulses: Rice, Wheat, Cholam, 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, Chillies 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

Practical

1. Identification of of cereal crops diseases symptoms
2. Identification of pulses crops diseases symptoms
3. Identification of Cash crops diseases symptoms
4. Identification of Vegetable crops diseases symptoms
5. Identification of Fruit crops diseases symptoms
6. Collection and Preservation of diseased specimens.
7. Identification of Micro nutrient deficiencies and their rectifications.
8. Procedure and exprienceing of seed treatment.

9-13. Field Visits and field works.

Learning out come		
Unit	**Vague out come**	**Most precious out come**
I.	Studying the Diseases of Cereals and Pulses	1.Understanding the basic symptoms of diseases of Cereals and Pulses 2.Understanding the important disease management methods in Cereals and Pulses
II.	Studying the Disease of Oilseeds and Cash Crops	1.Understanding the basic symptoms of diseases of Oilseeds and Cash Crops 2.Understanding the important disease management methods in Oil seeds and Cash crops
III.	Studying the Diseases of Vegetable Crops	1.Understanding the basic symptoms of diseases Vegetable Crops 2.Understanding the important disease management methods in Vegetable crops

IV.	Studying the Diseases of Fruit Crops	1.Understanding the basic symptoms of diseases of Fruit Crops 2.Understanding the important disease management methods in Fruit crops
V.	Studying the Diseases of Plantation and Flower Crops	1.Understanding the basic symptoms of Plantation and Flower Crops diseases 2.Understanding the important disease management methods in Plantation and Fruit crops

References

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

15 AGD 0403 FLORICULTURE AND PLANTATION CROPS

(3+1)

Objectives:

1.To learn about importance, history,styles and types of garden and garden components including plant and non plant components.

2. To learn about production technology of commercial flower crops, spices and plantation crops

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

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

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

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

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

Practical:

1. Practising of planning and layout for home and public gardens
2. Identifiying of ornamental trees and shrubs
3. Practising cultivation of chrysanthemum
4. Practising cultivation of marigold
5. Visit to flower fields
6. Visit to flower shows
7. Preparing cost of cultivation for major flower crops
8. Practising display of ornamental plants
9. Identifying of spices and plantation crops
10. Processing of turmeric
11. Visit to plantation – Research station
12. Visit to plantation – Private farms
13. Visit to curing factories

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Learning out come		
Unit	**Vague out come**	**Most precious out come**
I	Studying importance,History and development of gardening Hindu style ,Moghul garden , Japanese garden , British garden.	1.Understanding the importance gardening 2.Understanding the different features of various types of garden.
II	Studying the . Arboretum , Lawn , Shrubs ,Climbers and Creepers,Flowering annuals,Hedges,Edges ,Rock garden and water garden.	1. Understanding the flowering, foliage, trees and shrubs. 2. Understanding the lawn making methods and different grass species.
III	Studying the Production technology of Jasmine, Rose, Tuberose, Chrysanthemum, Marigold	1.Understanding the Production technology of Jasmine, Rose, Tuberose, Chrysanthemum, Marigold and Crossandra.

	and Crossandra.	2.Understanding the after cultivation practices for flower crops.
IV	Studying the Production technology of Cardamom, Pepper, Turmeric, Ginger, Nutmeg and Clove	1 Understanding the Production technology of Cardamom, Pepper, Turmeric, Ginger, Nutmeg and Clove. 2. Understanding the economic parts of specie crops.
V	Studying the Production technology of Coffee, Tea, Rubber, Cashewnut and Arecanut.	1.Understanding the Production technology of Coffee, Tea, Rubber, Cashewnut and Arecanut. 2.Understanding the shade management in plantaiton crops

References

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
11 AGD 0404 SOIL AND WATER CONSERVATION (3+1)

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.

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.

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.

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; Insitu soil conservation methods in watershed area; Integrated watershed management – activities involved.

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 PondSand Storage dam – its merits and demerits.

Practical

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. Field study of different kinds of erosion
9. Scale drawing of terraces
10. Scale drawing of contour bund and graded bunds
11. Watershed management practices adopted in black soil and red soil areas

References

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
11 AGD 0405 LIVESTOCK AND CHICKEN PRODUCTION (3+1)

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 and 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.

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.

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 fed – Housing of pigs - Common diseases – Swine fever – Swine pox – Foot and mouth disease – Swine erysipelas – Brucellosis.

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 – Corprophagy – Time of feeding – Housing – Objectives – Rabbit hutches – Common diseases – Coccidiosis – Hemorrhagica septicemia – Ecto and endo parasites – Pneumonia.

V. **Chicken**: Advantages of chicken farming – Role of egg and chicken meat in human nutrition – Parts of a fowl – Classification of chicken – 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.

Practicals

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. Preparation of plans for housing of pigs
7. Preparation of project for a piggery unit
8. Visit to commercial sheep, goat, piggery, rabbitry and poultry farm
9. Debeaking and vaccination of chicken
10. Dressing of birds for table purpose
11. Preparation of project for a poultry unit (layers and broilers)

References

1. ICAR. 2002. Hand book of Animal Husbandry, Third edition, ICAR Publication, Pusa, New Delhi
3. Banerjee, G.C. 2006. Text book of Animal Husbandry, 8th edition, Oxford and IBH Publishing Company Ltd., New Delhi.

4. Sastry, N.S.R., C.K.Thomas and R.A.Singh. 2005. Livestock production management, Fourth edition, Kalyani Publishers, New Delhi.

5. Panda, B. and S.C.Mohapatra. 2007. Poultry Production. ICAR Publications, New Delhi.

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IV SEMESTER
15 AGD 0406 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.

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.

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.

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.

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.

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.

Practical:

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, flash cards and still pictures.
5. Preparation of charts and graphs.
6. Writing for leaflet, folder and news articles.
7. Planning and preparation of news stories and success stories
8. Practicing with the use of different projectors.
9. Operation and handling of video camera.
10. Participating in farmers' day celebrations.
11. Preparation of OHP Transparencies.

12. Preparation of power point presentations.
13. Internet browsing and E-mail communication- practice

References:

1. Adivi Reddy, A. 1980. Extension Education, Sree Lakshmi Press, Bapatla.
2. Chaubey, B.K. *et.al.*1999. Extension Education. Aman Publishing House.
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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.

Learning out comes		
Unit	**Vague out come**	**Most precious out come**
I.	Studying the classification extension teaching methods and audio-visual aids	1. Understanding the various types of classification extension teaching methods and audio-visual aids and their application to specific situations.
II.	Learning about the different extension methods belonging to individual and group contact	1. Understanding how each of the individual and group contact methods apply to the dissemination of various agricultural technologies. 2. Understanding the purpose, special features, advantages and disadvantages of individual and group contact methods.
III.	Learning about the different mass contact methods	1. Understanding how each of the mass contact methods apply to the dissemination of various agricultural technologies. 2. Understanding the purpose, special features, advantages and disadvantages of mass contact methods.
IV.	Learning about various audio and visual aids	1. Understanding the various types of audio and visual aids and their application for various extension communication situations 2. Learning about the combined use of audio and visual aids along with extension methods 3. Acquiring the skill in the handling of various types of audio and visual aids
V.	Learning about various audio-visual aids	1. Understanding the various types of audio -visual aids and their application for various extension communication situations 2. Learning about the combined use of audio -visual aids along with extension methods 3. Acquiring the skill in the handling of various types of audio -visual aids 4. Understanding the various modern information technologies