Swami Vivekanand University, Sagar(M.P.)

SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)

SYLLABUS

For
Diploma in Agriculture

Department of Agriculture Science
Faculty of Agriculture Science
Course Code: DAG

Duration of Course : 2 Year

Examination Mode : Yearly

Swami Vivekanand University, Sironja Sagar (M.P.

Swami Vivekanand University, Sagar(M.P.)

"Course Distribution''

Diploma in Agriculture After 10th Two Year			
Sr. No.	**Paper Code**	**Paper Name**	**Sub Code**
1	**DAG 101**	Principles of Agronomy & AgroMeteorology	PAG
2	**DAG 102**	Fundamental of Soil and Soil Fertility Management	SSM
3	**DAG 103**	Principles of Entomology and Economic Entomology	ENT
4	**DAG 104**	Farm power, Machinery and Post Harvest Technology	FMT
5	**DAG 105**	Vegetable production and Nursery Management	VPM
6	**DAG 106**	Water Harvesting, Irrigation Technology & Weed Management	WIM
7	**DAG 107**	Breeding of Field crops, seed production, Testing and Certification	BFC
8	**DAG 108**	Agronomy of Field Crops-I	AFC

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"Course Distribution''

Diploma in Agriculture After 10th Two Year			
Sr. No.	**Paper Code**	**Paper Name**	**Sub Code**
1	**DAG 201**	Crop pests and their Management	CPM
2	**DAG 202**	Plant pathology, crop diseases and their Management	PPM
3	**DAG 203**	Commercial floriculture and Ornamental Gardening	CFO
4	**DAG 204**	Manures and fertilizers	MNF
5	**DAG 205**	Land Surveying, Watershed Management and Green House Technology	LWT
6	**DAG 206**	Fundamentals of Livestock, Poultry and Fish Production	LPF
7	**DAG 207**	Agricultural Extension , Communication and Rural Sociology	ACR
8	**DAG 208**	Agricultural Economics, Finance & Marketing	AFM
9	**DAG 209**	Agronomy of Field Crops-II	AFC

First Year

Course Title : Principles of Agronomy & AgroMeteorology

Theory:

UNIT I

Meaning and scope of Agronomy: National and International Agricultural Research Institutes located in India, Agro-climatic zones of India and Orissa.

UNIT II

Classification of crops. Crop rotation principles and advantages, cropping pattern, cropping schemes, multiple cropping and mixed cropping principles and advantages, intercropping types and advantages and assessment.

UNIT III

Relay cropping, paira cropping and crop interactions. Selection of seed, sowing methods, tillage and its objectives, types and effect of tillage on soil, tillage implements and harvesting.

UNIT IV

Agricultural meteorology: Weather and climate, micro-climate, weather elements, Earths' atmosphere, Composition and structure, climate change : causes, effect on ecosystem, crop production

UNIT V

Global warming, Wind: factors affecting, cyclones and anticyclones and Formation and classification of clouds, Introduction to monsoon.

Practical:

1. Identification of field crops and under utilized crops and their growth stages;
2. Study of tillage implements; Practice of ploughing; Practice of puddling;
3. Study of seeding equipments; Different methods of sowing;
4. Study of inter-cultivation implements and practice; Site selection for Agromet observatory; Measurement of temperature; Measurement of rainfall; Measurement of evaporation (atmospheric/soil); Measurement of atmospheric pressure; Measurement of sunshine duration and solar radiation; Measurement of wind direction and speed and relative humidity.

Reference Book:

1. Principles of Agronomy - T.Y. Reddy and G. H. Sankar Reddi
2. Principles of Agronomy - S. R. Reddy
3. The Nature and Properties of Soil - N.C.Brady and Ray R. Weil
4. Manures and Fertilizers - K. S. Yawalkar, J.P. Agrawal and S. Bokde
5. Soil Conditions and Plant Growth – E.W.Russel and E.J. Russell
6. Agrometeorology and remote sensing - D.D. Sahu
7. Text book of Agricultural Meteorology - Edited by M.C. Varshney
8. Introduction to Agrometeorology - H.S.Mavi
9. Crops and Weather – S. Venkataraman and A. Krishnan (ICAR)
10. Climate, Weather and Crops in India – D. Lenka

Course Title : Fundamental of Soil and Soil Fertility Management

Theory:

UNIT I

Soil: Pedological and edaphological concepts, Definition of Rocks and minerals, Weathering, soil formation factors and processes, components of soils, Soil profile, soil physical properties,

UNIT II

soil texture, Soil fertility and productivity-factors affecting, features of good soil management, problems of supply and availability of nutrients, relation between nutrient supply and crop growth,

UNIT III

Criteria of essentiality of nutrients, Essential plant nutrients-their functions, nutrient deficiency symptoms, transformation and dynamics of major plant nutrients.

UNIT IV

Commercial fertilizers, composition, relative fertilizer value and cost; crop response to different nutrients, residual effects and fertilizer use efficiency, fertilizer mixtures and grades, agronomic, chemical and physiological methods of increasing fertilizer use efficiency nutrient interactions, organic fertilizers and its advantages, Time and methods of manures and fertilizers application,

UNIT V

Foliar application and its concept, relative performance of organic and inorganic manures, economics of fertilizer use, integrated nutrient management, use of vermin compost and residual waste in crops.

Practical:

1. Determination of pH, EC, organic C, total N, available N, P, K and S in soils,
2. Determination of total N, P, K and S in plants,
3. Interpretation of interaction effects and computation of economic and yield optima.

Reference Book:

1. Chemistry of the soils – F. Bear
2. Soils and soil fertility – C.M. Thomson and F.R. Troeh
3. Soil fertility and fertilizers – S.L.Tisdale, W.L.Nelson, J.D. Beaton and J.L. Havlin

Course Title : Principles of Entomology and Economic Entomology

Theory:

UNIT I

. Brief Introduction, Classification of Phylum Arthropoda upto classes , *viz.*,Symphyla, Crustacea, Arachnida, Chilopoda, Diplopoda, and Insecta. Characters of class Insecta. Division of class Insecta into subclasses- Apterygora and Pterygota- orders under Apterygota. Division of Pterygota into exopterygota and endopterygota and orders under each with important examples.

. Order Orthoptera –Characters , Prognathus or Hypognathus head, filiform antenna, biting and chewing mouth parts, large prothorax, pterothorax, wing characters, Alary and Femero alary type of stridulation, tympanal organs, saltatorial hind legs, 3 or 4 segmented tarsi, boat shape male genetalia, ovipositor with 3 pairs of valves. Un segmented anal cerci, simple or incomplete metamorphosis. Lay eggs in soil. Examples of agricultural importance.

UNIT II

Order Thysanoptera (Thrips) 6-10 segmented antenna, compound eyes, asymmetrical mouth parts, wing characters, leg characters, parthenogenetic type of reproduction. Examples of agricultural importance.

Order Hemiptera Sub order Heteroptera (Plant bug) 4 to 5 segmented antenna, well developed compound eyes, 2 ocelli if present and sucking type of mouth parts, large pronotum, five fold division of mesonotum, wing characters, odoriferous glands, small ovipositor, simple metamorphosis. Examples of agricultural importance.

Sub order Homoptera – Deflexed type of head, compound eyes well developed, 3 to10 segmented antenna. piercing and sucking type of mouth parts. Thoracic characters, wing characters, wax glands. Sexual, parthenogenetic and simple metamorphosis. Examples of agricultural importance.Order Lepidoptera (Moth and Butterflies) overlapping scales on the body and appendages. Mouth parts siphoning type, head small with neck, compound eyes large, 2 ocelli, characters

UNIT III

of wings and venation, presence of discal cell presence of androconia, differences between moths and butterflies. Examples of agricultural importance. Order Coleoptera (Beetles and weevils) wings elytra, head with often 11 segmented antenna, biting type of mouth parts, thoracic characters, wing characters, tarsal segments variable with in the same insect and are represented by tarsal formula, abdominal characters, larvae oligopod or apodous and pupa exarate. Examples of agricultural importance.

Order Hymenoptera (Bees, wasps, ants and sawflies etc.,) prominent head with free neck, well developed compound eyes, ocelli or absent, antenna variable, biting, lapping and sucking mouth parts, wing characters, trochanter 1 or 2 segmented, abdominal characters, modification of ovipositor an larval and pupal characters. Examples of agricultural importance.

UNIT IV

Order Diptera (two winged or true flies) Head prominent and small neck, eyes large, ptilinium, antenna 3 segment and aristate. Mouth parts sponging and sucking type, thoracic characters, hind pair of wings modified to halters tarsus 5 segmented with pulvilli and empodium, larval and pupal characters, Examples of agricultural importance.

External characters of cockroach- External characters, segmentation, body regions - head, thorax, abdomen; appendages of head, mouth parts, thorax- prothorax, mesothorax and metathorax, legs and wings, Abdomen-anal cerci and styles.

Types of mouth parts- Biting and chewing type, Piercing and sucking type Rasping and sucking type Sponging and sucking type, Sucking type.

UNIT V

Types of injury and symptoms of damage caused by pests.

Integrated Pest Management- Introduction, importance concepts and principles of IPM; Tools of IPM - host plant resistance, cultural methods, mechanical and physical methods, legislative or quarantine measures.

Bio agents – parasitoids and predators. Characters of parasitoids and predators.

Chemical control - Importance of pesticides - classification of insecticides.

Different formulations of insecticides.

Study of important group of insecticides with examples – botanicals (neem), cyclodienes, organo phosphates, carbamates, synthetic pyrethroids, novel insecticides, nematicides, rodenticides, acaricides, antifeedants, attractants, sex pheromones.

Compatibility of insecticides - insecticides mixtures, phytotoxicity.

Practicals:

1. Methods of collection and preservation of insects including immature stages.
2. External features of a grass hopper.
3. Types of insect antenna.
4. Types of insect legs.
5. Types of insect mouth parts and study of biting and chewing (orthopteran) and sucking (Hemipteran) mouth parts. Study of mouth parts of Diptera. Hymenoptera and Lepidoptera.
6. Wing venation, types of wings and wing symptoms.
7. Types of insect larvae and pupae.
8. Dissection of digestive system in insects.
9. Dissection of male female reproductive system.
10. Study of characters of orders Orthoptera and Dictyoptera and their families.
11. Study of characters of orders Isoptera and Thysanoptera and their families.

12. Study of characters of order Hemiptera and its families.
13. Study of characters of order Lepidoptera and its families.
14. Study of characters of order Coleoptera and its families.
15. Study of characters of order Hymenoptera and its families.
16. Study of characters of order Diptera and its families.

References:

1. Elements of Economic Entomology Vasantharaj David B 2001.
2. General and Applied Entomology Nayar K K Ananthakrishnan T N andDavid B V
3. Imms General Text Book of Richards O W and Davies R G 1977, Entomology Vol I & II Chapman and Hall, London.
4. Insect Structure and Function Chapman R F 1988. Cambridge Univ. Press U K
5. Insect Physiology and Anatomy Pant N C and Ghai S 1981. ICAR.

Swami Vivekanand University, Sagar(M.P.

Course Title : Farm power, Machinery and Post Harvest Technology

UNIT I

Primary (Mould board plough, Disc plough) and secondary tillage (Cultivator and harrows) implements,

UNIT II

Field operation of line sowing equipment (Seed drill, transplanter), SRI method of planting with marker, Repair and maintenance of tractor,

UNIT III

power tiller and matching implements, Operation, use and maintenance of sprayers and dusters,

UNIT IV

Operation and maintenance of harvesting tools (improved sickle, power reaper),

UNIT V

Operation and maintenance of pedal operated thresher, power thresher-cum-winnower, and Axial flow thresher.

Practical :

1. Adjustment and Operation of primary tillage implements (MB plough, Disc plough etc.),

2. Adjustment and Operation of secondary tillage implements (Cultivator and Harrow),
3. Field operation of seed drill, field operation of paddy transplanter), Paddy transplanting in SRI method using marker, Operation of manual and power weeder (Cono, Mandua and low land power weeder),

4. Adjustment and operation of tractor, power tiller with matching implements, Precautionary measures in operation of sprayers and dusters, Operation of axial flow thresher, Operation of pedal operated, power operated and axial flow thresher.

5. Moisture content determination of food grains. Study of cleaners and graders. Study of different types of dryers. Study of different storage structures. Visit to Rice mill, Dall mill and oil mill.

Reference Books

1. Principles of Agricultural Engineering, Vol: I by A.M.Michael and T.P.Ojha
2. Post harvest technology of cereal, pulses and oil seeds, A Chakraverty

Course Title : Vegetable production and Nursery Management
Theory:

UNIT I

Importance and scope of the vegetable cultivation, classification of vegetables, Study of climate and environment effect on plant growth,

UNIT II

study of climatic and soil requirement, varieties, sowing/planting times and methods, seed rate, seed treatment, nutritional and irrigation requirement, intercultural operations, physiological disorders, harvesting, cool season vegetables (Potato, Cole crops-Cabbage, Cauliflower , Knol-Khol, Root crops-Carrot, radish, Beetroot, Bulb crops- Onion, Garlic, Peas, Leafy vegetables).

UNIT III

study of climatic and soil requirement, varieties, sowing/planting times and methods, seed rate, seed treatment, nutritional and irrigation requirement, intercultural operations, physiological disorders, harvesting, Warm season vegetables (Tomato, Brinjal, Chilli , Capsicum, Okra, Cluster bean, Cucurbits(Pumpkin, Cucumber, Pointed gourd, Bitter gourd , Bottle gourd), Cassava, Sweet potato,

UNITI V

study of climatic and soil requirement, varieties, sowing/planting times and methods, seed rate, seed treatment, nutritional and irrigation requirement, intercultural operations, physiological disorders, harvesting, Leafy vegetables- Basella, Fenugreek),

UNIT V

study of climatic and soil requirement, varieties, sowing/planting times and methods, seed rate, seed treatment, nutritional and irrigation requirement, intercultural operations, physiological disorders, harvesting, Perennial vegetables (Drumstick , Curry leaf)

Practical:

1. Raising of nursery of vegetable crops, raising of some warm season and cool season vegetables, identification of seeds and plants, extraction of seeds from important crops, intercultural operations of vegetable, stages of maturity of vegetables and harvestings, visit to mandi, nearby farms & farmers cold storage.

Reference Book:

1. Vegetable Science and Technology in India–Vishnu Swarup
2. Vegetable for the tropical region- PremNath, S.Velayadhan and D.P.Singh

Course Title : Water Harvest, Irrigation Technology & Weed Management

Theory:

UNIT I

Definition and objectives, water resources; Soil plant water relationships; soil water movement, evapotranspiration and crop water requirement

UNIT II

Effective rainfall, scheduling of irrigation; Methods of irrigation: surface and subsurface, Micro irrigation, sprinkler and drip irrigation;

UNIT III

Irrigation efficiency and water use efficiency, conjunctive use of water, irrigation water quality and its management.

UNIT IV

Weeds: Introduction, harmful and beneficial effects, classification, crop weed competition and allelopathy . Methods of weed control: physical, cultural, chemical and biological methods. Integrated weed management;

UNIT V

Herbicides: advantages and limitation of herbicide usage in India, formulations, methods of application; Introduction to adjuvants and their use in herbicides; compatibility of herbicides with other agro chemicals.

Practical:

2. Determination of field capacity by field method; Calculation of irrigation water requirement (Problems); Demonstration of furrow method of irrigation; Demonstration of check basin and basin method of irrigation; Erection and operation of sprinkler irrigation system; Identification of weeds; Survey of weeds in crop fields and other habitats; Computation of herbicide doses; Study of herbicide application equipment and calibration; Demonstration of methods of herbicide application; Tours and visits to experimental field and problem areas.

Reference Book:

1. Irrigation Principles and Practices - O.W. Israelsen and V.E. Hansen
2. Irrigation and Drainage - D. Lenka
3. Irrigation, Theory and Practices - A. M. Michael
4. Agricultural Drainage : Principles and Practices – U.S. Kadam
5. Modern weed management - O.P.Gupta
6. Principles of Weed science - V.S. Rao
7. Weed management - V.N. Saraswat, V. M. Bhan and N.T. Yaduraju (ICAR)
8. All about weed control - S. Subramaniam, A.Mohamed Ali and R. Jaykumar

Course Title : Breeding of Field crops, Seed production, Testing and Certification

Theory:

UNIT I

Plant Breeding- Introduction, History, Landmark achievements.Objectives of Plant Breeding. Flower biology, Mode of reproduction in crop plants, Procedure of sexual fertilization, self-pollination mechanism, Cross pollination mechanism,

UNIT II

Male sterility and its types, Self incompatibility and its classification, vegetative reproduction.Crop improvement, Open pollinated variety, Composite and synthetic variety, Multiline variety, Hybrids, Heterosis, hybridization, Steps involved in Testing and release of variety/Hybrids.Seed & its Importance,

UNIT III

Difference between seed and grain, Characteristics of quality seed; Process of seed, Types of seed-Nucleus, Breeder , Foundation, Certified,Truthful and Labelled seed. Principle of seed production, Isolation distance, Rouging, Synchronization, Supplementary pollination techniques, Maintenance of Physical and Genetic purity in released varieties.

UNIT IV

Seed production technique of varieties/Hybrids in Rice, Maize, Jower, Bajra, Sunflower, Castor, Cotton, Groundnut, Sesamum, Green gram, Black gram, Bengal gram, Red gram. Seed certification, Seed processing, Seed drying, Seed threshing, Seed cleaning, Seed treatment, Seed storage, Seed testing, Seed moisture, Physical purity and Genetic purity.

UNIT V

Seed viability, Vigour, Germination, Factor influencing seed germination. Seed dormancy, Factors and method of breaking seed dormancy, seed health, Seed packing, Seed act, Introduction to seed pelleting. Biotechnology and Intellectual Property Rights (I.P.R).

Practical:

1. Emasculaltion and crossing techniques in rice
2. ,emasucation and crossing techniques in cotton,
3. vegetative propagation in Napier grass,
4. seed sampling methods, seed moisture test and seed germination test, unfilled grains and pods
5. identification and separation in Rice and Groundnut,
6. seed viability test, methods to overcome seed dormancy, seed physical purity determination test, seed genetic purity determination test,

Reference Book:

1. Principles of Plant Breeding - R.W. Allard
2. Plant Breeding Principles and Methods - B. D. Singh
3. Plant Breeding - (Ed.) V. L. Chopra
4. Plant Breeding. Analysis and Exploitation of Variation - D. Roy

Course Title : Agronomy of Field Crops-I

Theory:

UNIT I

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of kharif crops, Cereals – rice, maize, sorghum, pearl millet and minor millets;

UNIT II

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of Pulses : pigeonpea, mungbean, urdbean and horsegram;

UNIT III

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of Oilseeds: groundnut, sesame, niger and soybean;

UNIT IV

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of Fibrecrops: cotton, jute, mesta and sun hemp;

UNIT V

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of Forage crops: sorghum, maize, bajra, guinea grass, deenananath grass, hybridnapier, para grass, cowpea, rice bean and stylosanthes.

Practical:

1. Rice nursery preparation and transplanting/seed bed preparation and sowing of Kharif crops;
2. Calculations on seed rate; Sowing of soybean, pigeonpea, mungbean, maize, groundnut, and cotton;
3. Effect of seed size on germination and seedling vigour of soybean/groundnut;
4. Effect of sowing depth on germination of groundnut
5. Identification of weeds in rice, maize and soybean fields
6. study of weed control experiments in these crops;
7. Top dressing of nitrogen in maize and rice and
8. study of fertilizer experiments on rice, maize, sorghum and millets;
9. Study of yield contributing characters, yield calculations, harvesting and yield estimation of above crops;
10. Study of forage experiments. Judging the maturity stage of kharif crops viz: rice maize pulses and oilseed crops.

Reference Book:

1. Modern Techniques of raising field crops - Chida Singh
2. Crop management under rainfed and irrigated condition - S.S.Singh
3. Agronomy of field crops - S.R.Reddy
4. Text book of field crop production - Edited by R. Prasad (ICAR)

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"Course Distribution''

Diploma in Agriculture After 10th Two Year			
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9	**DAG 209**	Agronomy of Field Crops-II	AFC

Course Title : Crop pests and their Management

Theory:

UNIT I

Biology nature of damage and management of insect pests of major field crops like rice, wheat, maize,

UNIT II

Biology nature of damage and management of insect pests of major field crops like sorghum, ragi,

UNIT III

Biology nature of damage and management of insect pests of major field crops like sugar cane, cotton, jute,

UNIT IV

Biology nature of damage and management of insect pests of major field crops like pulses, groundnut, mustard, sunflower, sesamum, castor,

UNIT V

commonly grown vegetable crops of M.P. belonging to cucurbits, colecrops and solonaceous crops, sweet potato etc. Pest of coconut, cashewnut, coffee and their management.

Practical:

1. Identification of crop pests with symptoms of damage in major crops belonging to cereals,
2. Identification of crop pests with symptoms of damage in major crops belonging to pulses,
3. Identification of crop pests with symptoms of damage in major crops belonging to oil seeds,
4. Identification of crop pests with symptoms of damage in major crops belonging to fiber crops,
5. Identification of crop pests with symptoms of damage in major crops belonging to sugar cane

Reference Book:

1. Insect pest of India and S.E Asia – A.S.Atwal
2. Elements of Economic Entomology – B.V.David

3. nsect and mites of crops in India – MRGK Nair
4. Agricultural insect pests and their control V.B.Awasthi

Course Title : Plant pathology, Crop diseases and their Management

Theory:

UNIT I

Introduction and important of plant pathogenic organisms, different groups, fungi, bacteria, fastidious vesicular bacteria, phytoplasmas,

UNIT II

Introduction and important of plant pathogenic organisms, different groups, viruses, viriods, algae, protozoa and phanerogamic parasites with examples of disease caused by them.

UNIT III

Economic importance, symptoms, cause, epidemiology, disease cycle and integrated management of disease of rice, sorghum, bajra, maize, wheat, sugarcane,

UNIT IV

Economic importance, symptoms, cause, epidemiology, disease cycle and integrated management of disease of turmeric, ginzer, tobacco, groundnut, sesamum, sunflower,

UNIT V

Economic importance, symptoms, cause, epidemiology, disease cycle and integrated management of disease of cotton, redgram, blackgram, greengram, tea, soyabean.

Practical:

1. Plant disease symptom identification and preservation of disease samples.

2. Study of symptoms, etiology, host-parasite relationship and specific control measures of the following crop diseases.
3. Presentation of disease samples survey and collection of diseases of rice, sorghum; diseases of wheat,
4. bajra and maize; diseases of sugarcane, turmeric and tobacco;
5. diseases of groundnut, castor and sunflower; diseases of sesamum and cotton;
6. diseases of redgram, greengram, blackgram, bengalgram and beans; Field visits at appropriate time during the semester.

Reference Book:

1. Plant Pathogens : The Fungi - R. S. Singh
2. An Introduction to Fungi- H. C. Dubey
3. Principles of Plant Pathology - R. S. Singh
4. Plant Pathology - R. S. Mehrotra

Course Title : Commercial floriculture and Ornamental Gardening

Theory:

UNIT I

Scope and importance of ornamental horticulture, Garden types and its parts. planning of ornamental garden,

UNIT II

Scope and importance of house plants and seasonal flowers in garden cultivation,

UNIT III

Propagation of flowering and ornamental plants,

UNIT IV

Production technology of important commercial flowers like rose, tuberose marigold,

UNIT V

Production technology of important commercial flowers like gladiolus and chrysanthemum and some house plants.

Practical:

1. Identification of seeds and plants(Flowers, trees, climbers, house plants, seasonal plants etc.)
2. Layout of lawn and its maintenance.
3. Care and maintenance of house plants.
4. Training and pruning of Rose.
5. Pinching, disbudding and dishooting of chrysanthemum

Reference Book:

1. Floriculture in India - G.S.Randhawa and A. Mukopadhyay
2. Complete gardening in India - K.S.G.Gopalswami

Course Title : Manures and fertilizers

Theory:

UNIT I

Introduction-Raw materials-Manures-Bulky and concentrated-FYM, Composts-Different methods, Mechanical compost plants, Vermicomposting, Green manures, oil cakes,sewage and sludge-Biogas plant slurry, plant and animal refuges

UNIT II

Fertilizers-classification, Manufacturing processes and properties of major nitrogenous(ammonium sulphate, urea, calcium ammonium nitrate, ammonium nitrate, ammonium sulphate nitrate)

UNIT III

Fertilizers-classification, Manufacturing processes and properties of major Phosphatic(single super phosphate, enriched super phosphate, diammonium phosphate, ammonium poly phosphate)

UNIT IV

Fertilizers-classification, Manufacturing processes and properties of major Potassic and complex fertilizers, their fate and reactions in the soil, Secondary and micronutrients fertilizers, cz Amendments,

Fertilizer control order, fertilizer storage

UNIT V

Biofertilizers and their advantage

Practical:

1. Total nitrogen and phosphorus in manures/composts
2. Ammonical and nitrate nitrogen-water soluble P_2O_5, potassium, calcium, sulphur and zinc contents of fertilizers.
3. COD in organic wastes-Adulteration in fertilizer,
4. Compatibility of fertilizers with pesticides.

Reference Book:

1. Soil fertility and fertilizers-S.L.Tisdale, W.L.Nelson, J.D. Benton and J.L. Havlin
2. 2.. Manures and Fertilizers – K.S. Yawalker,J.B. Agarwal and S. Bokde
3. Soil Fertility, Theory and Practice –J.S. Kanwar
4. A text Book of fertilizers – R.K.Basak
5. Toxicology of insecticides-F. Matsumura
6. 6.Insecticides,action & metabolism-R.D.O'Brien
7. Chemistry of insecticides & fungicides- V.S.Sreeramulu

Course Title : Land Surveying , Watershed Management and Green House Technology

Theory:

UNIT I

Surveying: survey equipment, chain survey, cross staff survey, plotting procedure, calculations of area of regular and irregular fields.

UNIT II

Levelling - levelling equipment, terminology, methods of calculation of reduced levels, types of levelling, contouring.

UNIT III

Water source, Water lifting devices - pumps (shallow and deep well), capacity, power calculations. Water conveyance systems, open channel and underground pipeline. Irrigation methods - drip and sprinkle irrigation systems.

UNIT IV

Soil and water conservation - soil erosion, types and engineering control measures.

UNIT V

Green house technology, Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of greenhouse for cooling and heating purposes. Green house equipment, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses

Practical:

1. Acquaintance with chain survey equipment; Levelling equipment - dumpy level, levelling staff, temporary adjustments and staff reading; Differential leveling
2. Study of centrifugal pumping system and irrigation water measuring devices
3. Study of different components of sprinkler irrigation systems
4. Study of different components of drip and sprinkler irrigation systems; Uniformity of water application in drip and sprinkler systems
5. Study of soil and water conservation measures
6. Study of different types of green houses based on shape, construction and cladding materials

Reference Book:

1. A Text Book of Surveying and Levelling – P.C. Purnima
2. Land & Water Management Engineering – V.V.N. Murty
3. Soil Erosion and Conservation – R.P. Tripathy and H.P. Singh

Course Title : Fundamentals of Livestock, Poultry and Fish Production

Theory:

UNIT I

Place of livestock in the national economy, different livestock development programmes of Govt. of India. Important exotic and Indian breeds of cattle, buffalo, sheep, goat and swine.

UNIT II

Measures and factors affecting fertility in livestock, reproductive behaviour like oestrus, parturition, farrowing etc.Milk secretion, milking of animals and factors affecting milk yield and composition. Selection and breeding of livestock for higher milk and meat production.

UNIT III

Feeding and management of calves, growing heifers and milch animals and other classes and types of
animals, housing principles, space requirements for different species of livestock.

UNIT IV

Disease control measures, sanitation and care, breeding, feeding and production records. Breed characteristics of poultry, their methods of rearing, breeding, feeding and management, incubation, hatching and brooding, vaccination and prevention of diseases, preservation and marketing of eggs, its economics and keeping quality.

UNIT V

Cost of production of milk, economical units of cattle, buffalo, sheep, goat and swine, fresh water fish production technology.

Practical:

1. Identification, handling and restraining of animals
2. Judging and culling of different livestock
3. Feeding and ration formulation
4. Hatching, housing and management of poultry
5. Visit to livestock farms and Economics of livestock production

Reference Book:

1. A Textbook of Animal Husbandry – G.C. Benerjee
2. Livestock Production and Management – N.S.R. Sastri, C.K. Thomas, R.A. Singh
3. Essentials of Animal Production and Management – R. Singh
4. A Handbook of Animal Husbandry – ICAR publication.
5. A Textbook of Livestock Production Management in Tropics – D.N. Verma
6. Books on fish production - ICAR publication.

Course Title : Agricultural Extension, Communication and Rural Sociology

Theory:

UNIT I

Meaning of Education, Extension and agricultural extension. Principles of Agricultural Extension, Communication, Meaning and definition of communication Elements of Communication and their characteristics, Types and barriers of Communication

UNIT II

Extension teaching methods, Individual contact methods, group contact method, mass contact method.

UNIT III

Diffusion and Adoption of Innovations Meaning, definition. Adopt categories and their characteristics, Factors influencing adoption process.

UNIT IV

Sociology and Rural Sociology: Meaning, Definition, Scope, Importance of Rural Sociology in Agriculture Extension. Indian Rural Society Important characteristics, Social groups-

UNIT V

Meaning Definition, Classification, Cultural concepts-Culture, Customs, Folkways, Mores, Taboos, Rituals and Traditions. Social Control- Meaning, Definition Social change-Meaning, Definition, Nature of Social change.

Practical:

1. Preparation of Interview Schedule to collect information from villager,
2. Identification of village tour to identify the innovation and adaption pattern,
3. Identifications of various social and cultural patterns of rural society through field visit,
4. Visit to various rural institutions to study their structure and function.

Reference Book:

1. Introductory Rural Sociology- J.B. Chitamber
2. An Introduction to Sociology- Vidya Bhusan & D. R. Sachdev
3. Extension Education- A. Adivi Reddy
4. Education & Communication for Development – O.P.Dahama & O.P.Bhatnagar
5. Extension Communication & Management – G.L.Ray

Course Title : Agricultural Economics, Finance & Marketing

Theory:

UNIT I

Definition of Economics, Scope and importance of economics, Difference between Micro and Macro Economics, Basic terms and concepts used in economics, Consumer behaviour and demand, law of diminishing marginal utility, law of equi-marginal utility, Indifference Curve, Elasticity of demand, Methods of measuring price elasticity of demand, Income elasticity of demand and cross elasticity of demand, consumer's surplus and application, Production and supply: Nature and factors of production, Short-run and long –run production function, Theory of cost ,Short-run and Long-run cost curves. Characteristics of perfect and various imperfect market and their equilibrium conditions.

UNIT II

Macro-Economic Concepts, importance and measurement of national income, Theory of Employment , Theory of Consumption function ,Aggregate demand and Aggregate supply, Money, Demand and supply of money, Inflation, monetary and fiscal policy, Importance and function of public finance, public revenue and expenditure, canons of taxation.

UNIT III

Definition, Importance, Need of Agricultural Finance, Problems of agricultural credit in India, Requisites of good credit system, classification of credit and loan, Institutional agencies in agricultural credit, test of farm credit proposal, tools of farm financial analysis, agricultural projects.

UNIT IV

Definitions, Meaning and Role of agricultural marketing, scope of agricultural marketing, characteristics of agricultural commodities, classification of markets, producer's surplus, process of agricultural marketing , marketing risk management strategy, speculation, hedging, problems in agricultural marketing, marketing channels, agricultural prices,

UNIT V

Role of government in agricultural marketing, Marketing efficiency-meaning, definition, marketing margin, price spread cooperative marketing, food corporation of India, quality control of agricultural products, AGMARK, contract farming.

Reference Book:

1. Elementary economic theory - K.K. Dewett and J.D. Verma
2. International Economics - B. Mishra
3. Fundamentals of Agricultural Economics - A.N. Sadhu and A. Singh
4. Economics - Paul A. Samelson and W.D. Nordhans
5. Agriculture Finance Management- S.Reddy and R.Ram
6. Managing Agricultural Finance-A.S.Kahlon and Karam Singh
7. Agricultural Finance : Theory and Practice – J.P.Singh
8. Agricultural Marketing in India-S.S Acharya and N.C.Aggarwal

Course Title : Agronomy of Field Crops-II

Theory:

UNIT I

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops; Cereals: wheat, barley;

UNIT II

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops; Pulses: chickpea, lentil, peas, french bean;

UNIT III

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops; Oilseeds: rapeseed and mustard, sunflower, safflower and linseed;

UNIT IV

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops; Sugar crops: sugarcane and sugar beet,

UNIT V

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops; Commercial crops: potato and tobacco, Forage crops: berseem, Lucerne,Japanese mustard and oat.

Practical:

1. Seed bed preparation and sowing of wheat, sugarcane and sunflower
2. Calculations of seed rate
3. Top dressing of nitrogen in wheat and study of fertilizer experiments on wheat and mustard
4. Identification of weeds in wheat and grain legumes
5. Application of herbicide and study of weed control experiments
6. Morphological characteristics of wheat, sugarcane, chickpea and mustard
7. Yield contributing characters of wheat
8. Yield and quality analysis of sugarcane
9. Judging the maturity stage of rabi crops.
10. Important agronomic experiments of rabi crops and visit to research stations related to rabi crops.

Reference Book:

1. Modern Techniques of raising field crops - Chida Singh
2. Crop management under rainfed and irrigated condition - S.S.Singh
3. Agronomy of field crops - S.R.Reddy
4. Text book of field crop production - Edited by R. Prasad (ICAR)