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 : 1 Year

Examination Mode : Yearly

Swami Vivekanand University, Sironja Sagar (M.P.)

Swami Vivekanand University, Sagar(M.P.)

"Course Distribution''

Diploma in Agriculture After 12th One Year			
Sr. No.	**Paper Code**	**Paper Name**	**Sub Code**
1	DAG 101	Agronomy, Agro-meteorology & Organic Farming	DAG
2	DAG 102	Fundamentals of Genetics & Plant Breeding	DGB
3	DAG 103	Fundamentals of Soil Science and Soil Fertility Management	DSS
4	DAG 104	Entomology, Economic Entomology and Pest Management	DEN
5	DAG 105	Horticulture and Production Technology of Horticultural crops	DHT
6	DAG 106	Farm Machinery, Soil and Water conservation Engineering	DFM
7	DAG 107	Plant Pathology, Microbiology and Integrated disease Management	DPP
8	DAG 108	Fundamentals of Livestock and Poultry Management	DLM
9	DAG 109	Agricultural Economics, Finance & Marketing	DAE
10	DAG 110	Agricultural Extension and Rural Sociology	DET

Swami Vivekanand University, Sagar(M.P.)

Course Title : Agronomy, Agro-meteorology and Organic farming

Theory

UNIT -I

- .Meaning and Scope of Agronomy
- National and International Research Institutions in India
- Agro Climatic Zones of India and Madhya Pradesh

UNIT -II

- Definition, objectives and classification of tillage and tillage implements
- Crops stand establishment
- Planting geometry and its effect on growth and yield
- Cropping systems
- Harvesting

UNIT -III

- Agriculture Meteorology : weather and climate, micro-climate, weather elements
- Earth's atmosphere, composition and structure
- Solar radiation, nature, properties, depletion, solar constant and energy balance

UNIT -IV

- Introduction of Organic Farming (OF)
    - Importance of requirement of foods and fodder in the nation.
    - OF in relevance to quality foods and fodder
    - Meaning of OF and its basic tools
- Concept of OF and objectives of OF
    - OF in relevance to Indian and global agriculture in present context
    - OF in relevance to sustainable agriculture and farming systems
- Organic production requirements
    - What to do and what not to do in OF and conversion of land for organic agriculture
    - Organic soil with organic nutrition - organic matter and its role in plant- nutrition
    - Organic sources of plant nutrition

UNIT -V

- Biological intensive nutrient management
    - Organic manures-Farmyard manure (preparation, composition and availability)
    - Composts and composting-aerobic and anaerobic composting, microbial cultures for hastening composting, preparation of composts from rural and urban wastes, phospho-composts, NADEP-composts
    - Vermicompost-role of earthworms in composting, method of vermicomposting, vermicuture, vermi-wash, qualities of vermicompost
    - Green manuring and its advantages, green manure crop (leguminous and non-leguminous), ideal green manuring crops and type of green manuring

Practical

1. Study of tillage implements
2. Practice of ploughing and puddling
3. Study of seeding equipments
4. Site selection for Agro met Observatory
5. Measurement of temperature, rainfall and evaporation (atmospheric/soil)
6. Raising of vegetable crops through organic nutrients, diseases and pest management

References:-

1. Hand Book of Organic Farming — Sharma, A.K. 2001, Agribios (India), Jodhpur
2. Principles of Agronomy Kalyani — S.R. Reddy (1999), Kalyani S.R. Reddy (1999),
3. सस्य विज्ञान के सिद्धांत तथा फसलोत्पादन — अहलावत, आई.पी.एस. एवं ओमप्रकाश
4. A Practical Guide on Agro meteorology — K.K. Agrawal and A.P. Upadhyay

Swami Vivekanand University, Sagar(M.P.)

Course Title : Fundamentals of Genetics & Plant Breeding

Theory

UNIT - I

- Mendel's laws of inheritance and exceptions to the laws
- Types of gene action
- Multiple alleles, Pleiotropism, Penetrance and expressivity
- Quantitative traits, qualitative traits and differences between them.

UNIT - II

- Multiple factor hypothesis
- Cytoplasmic inheritance, it's characteristics features and difference between chromosomal and cytoplasmic inheritance
- Mutation and it's characteristics features
- Methods of inducing mutations and CIB technique, gene expression and differential gene activation

UNIT - III

- Lac operon and fine structure of gene
- Ultra structure of cell and cell organelles and their functions
- Study of chromosome structure, morphology, number and types, Karyotype and Ideogram
- Mitosis and meiosis, their significance and differences between them

UNIT -IV

- Classification of plants, botanical description, floral biology, emasculation and pollination techniques in cereals, millets, pulses, oil seeds, fibres, plantation crops etc.
- Aims and objectives of plant breeding
- Modes of reproduction, sexual, asexual, apomixis and their classification; significance in plant breeding

UNIT -V

- Modes of pollination, genetic consequences, differences between self and cross pollinated crops
- Methods of breeding-introduction and acclimatization, selection, mass selection Johannson's pure line theory, genetic basis of pure line selection

Practical

1. Microscopy (light microscopes and electron microscopes) : Preparation and use of fixatives and stains for light microscopy
2. Preparation of micro slides and identification of various stages of mitosis
3. Preparation of micro slides and identification of various stages of meiosis
4. Botanical description and floral biology
5. Study of megasporogenesis and microsporogenesis

1. Fundamentals of Genetics – B.D. Singh, Kalyani Publisher
2. Elements of Genetics – Phundan Singh, Kalyani Publisher
3. Plant Breeding – B.D. Singh
4. Principles and Practices of Plant Breeding – J.R. Sharma

Swami Vivekanand University, Sagar(M.P.)

Course Title : Fundamentals of Soil Science and Soil Fertility Management

Theory

UNIT -I

- Soil Pedagogical and Edapthological concepts, Origin of the earth, Earth's crust.
- Composition: rocks and minerals weathering.
- Soil formation factors and processes, Components of soils.
- Soil profile description. Diagnostic horizons.
- Soil physical properties, Soil texture, Textural classes, Particle size analysis.

UNIT -II

- Soil structure classification, soil aggregates, their significance in crop production.
- Soil consistency, soil crusting, soil compaction, soil colors.
- Bulk density and particle density of soils and porosity, their significance and manipulation.
- Elementary knowledge of soil, classification and soils of India.

UNIT -III

- Soil water, Retention and potentials, soil moisture constants.
- Movement of soil water, infiltration, percolation, permeability, drainage.
- Methods of determination of soil moisture
- Thermal properties of soils, Soil temperature

UNIT -IV

- Problem soils – acid, salt affected and calcareous soils, characteristics, nutrient availabilities
- Reclamation – mechanical, chemical and biological methods
- Fertilizer and insecticides and their effect on soil water and air
- Irrigation water – Quality of irrigation water and its appraisal
- Indian standards for water quality. Use of saline water for agriculture
- Soil fertility – Different approaches for soil fertility evaluation

UNIT -V

- Methods of soil testing – chemical methods. Critical levels of different nutrients in soil
- Plant analysis – DRIS methods, critical levels in plants
- Rapid tissue tests, Indicator plants
- Biological method of soil fertility evaluation
- Soil test based fertilizer recommendations to crops
- Source, method and scheduling of nutrients for different soils and crops grown under rainfed and irrigated conditions

Practical

1. Collection and processing of soil for analysis – Organic carbon, pH, EC, soluble cations and anions
2. Study of a soil profile – Identification of rocks and minerals
3. Soil texture and identification of rocks and minerals
4. Estimation of N in plants
5. Estimation of P and K in plants

References

1. The Nature and Properties of Soil — Brady, N.C. & Weil, R.R., Macmillan
2. Fundamentals of Soil Science — ICAR Publication, New Delhi
3. Soil Fertility and Fertilizer — Samuel Tisdale & Werner nelson

Swami Vivekanand University, Sagar(M.P.)

Course Title : Entomology, Economic Entomology and Pest Management

Theory

UNIT-I

History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen.

UNIT - II

- Categories of pests. IPM, Introduction, importance, concepts principles/and tools of IPM-Host plant resistance, Cultural method
- Mechanical and physical control methods
- Legislative control
- Biological (parasites, predators and transgenic plant pathogens such as bacteria, fungi and viruses) methods of control
- Chemical control – importance, hazards and limitation
- Classification of insecticides

UNIT - III

- Toxicity of insecticides and formulations of insecticides
- Study of important insecticides
- Botanical insecticides – neem based products
- Cyclodine organophosphates
- Carbamates, synthetic pyrethroids
- Novel insecticides, Pheromones, Nicotinyl insecticides
- Chitin synthesis inhibitors, Phenyl pyrazoles, Avermectins
- Macrocyclic lactones, Oxadiazimes, Thiourea derivatives.

UNIT - IV

- Pyridine azomethines, pyrroles, etc. Nematicides
- Rodenticides, acaricides
- Fumigants
- Recent methods of pest control, repellents, antifeedants, hormones
- Attractants, gamma radiation and genetic control
- Practices, scope and limitations of IPM
- Insecticides Act 1968 – Important provisions
- Application techniques of spray fluids

UNIT - V

- Phytotoxicity of insecticides. Symptoms of poisoning, first aid and antidotes
- Beneficial insects: parasites and predators used in pest control
- Mass multiplication techniques
- Important groups of micro-organisms, bacteria, viruses and fungi used in pest control and their mass multiplication techniques
- Important species of pollinators, weed killers and scavengers, their importance
- Non insect pests – mites, Nematology
- Rodents and birds, Vermiculture

Practical

1. Methods of collection and preservation of insects including immature stages
2. Study of distribution patterns of insects
3. Sampling techniques for the estimation of insect population and damage
4. Pest surveillance through light traps, pheromone traps and field incidence
5. Practicable IPM practices, mechanical and physical methods
6. Practicable IPM practices, cultural methods

References

1. Text Book of Agricultural Entomology — H.S. Pruthi

2. Text Book of Agricultural Entomology — H.S. Pruthi

3. Insect Pests of Field Crops — S. Pradhan

4. Integrated Pest Management concept and approach — Dhaliwal and Arora

Swami Vivekanand University, Sagar(M.P.)

Course Title : -Horticulture and Production Technology of Horticultural crops

Theory

UNIT -I

Horticulture-Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops;

UNIT - II

- Importance and scope of olericulture
- Types of vegetable gardens
- Classifications of vegetable

UNIT - III

- Origin, area, production, varieties, package of practices for fruit vegetables
- Tomato, brinjal, chilli, okra
- Cucurbitaceous vegetables – cucumber, ridge gourd, ash gourd, snake gourd, bottle
- gourd, bitter gourd, watermelon, musk melon
- Cole crops – cauliflower, cabbage, knol-khol
- Bulb crops – onion and garlic
- Beans – French bean, cluster bean, dolichos bean and cowpea
- Peas

UNIT – IV

- Origin, area, production, varieties, package of practices for fruit vegetables
- Tuber crops – potato, sweet potato, colocasia, tapioca, yams
- Root crops – carrot, radish, turnip, beet root
- Leafy vegetable – palak, amaranthus
- Perennial vegetables – drumstick, curry leaf

UNIT -V

- Establishment of orchard (selection of site, fencing, planning and layout, wind breaks, planting systems) high density planting
- Propagation methods and use of root stocks
- Package of practices for cultivation of major fruit crops (Mango, Guava, Citrus, Banana, Grapes, Papaya, Sapota)

Practical

1. Methods of pruning and training
2. Identification of important vegetable seeds and plants
3. Raising of vegetable nurseries
4. Identification of ornamental plants – Trees, shrubs, climbers, seasonal, palm etc.
5. Development of garden features
6. Transplanting of seedlings

References

1. Basic Horticulture — Jitendra singh 2011 Kalyani Publications New Delhi
2. Udhyan Vigyan — S.S. Shrivastava

Swami Vivekanand University, Sagar(M.P.)

Course Title : Farm Machinery, Soil and Water conservation Engineering

Theory

UNIT -I

- Sources of Farm Power in India.
- Engine brief, classification of IC, Engines, Difference between 2 stroke and 4 stroke cycle engines, Difference between diesel and petrol engines.
- I.C. engine components and system's components of an IC. Engine.
- Working of two stroke petrol engines.
- Working of four stroke cycle petrol engines and diesel engines.

UNIT -II

- I.C. engine terminologies.
- Numerical on engine terminologies.
- Fuel supply system of petrol engine.
- Fuel supply system of diesel engine.
- Cooling systems of diesel engine.
- Lubrication system of diesel engine.
- Air intake and exhaust system, Valve operating system.

UNIT -III

- Tractors Definition, Classification and systems.
- Selection of a tractor.
- Operating cost of a tractor.
- Tillage, objectives of tillage.
- Tillage implements – Primary and secondary tillage tools and implements
- (Bullock Drawn and Tractor Drawn)
- Description of Indigenous plough, MB plough, Types of shares and M.B.
- Description of Disc Plough and other ploughs.
- Description of harrows (BD & TD).
- Description of Disc harrow.

Unit IV

- Importance of irrigation –Methods of irrigation –surface, subsurface and overhead irrigation-Micro Irrigation methods – Sprinkler and drip irrigation-localized irrigation
- Irrigation management in Different soil types. Water conveyance structures-Irrigation of principal crops –
- Water harvesting and recycling-Ground water recharge-Roof water harvesting

Unit V:

- Soil loss-soil and water conservation – methods of soil conservation – Agronomic and Engineering.
- Soils of the MP state- problems and management Laterites and associated soils- problems and management.

Practical

1. Study of different components of an I.C. engine.
2. Study of working of 2 stroke petrol engine.
3. Study of working of 4 stroke diesel engine.
4. Study of working of 4 stroke petrol engine.
5. Study of working of a farm tractor.
6. Field visit to selected locations – identification of different types soil and water loss
7. Soil conservation – erection of vegetative barriers types – scope and limitations

References

कृषि अभियंत्रण	प्रो. रन्धावा चौहान
Elements of Agricultural Engineering	Dr. O.P. Singhal

Swami Vivekanand University, Sagar(M.P.)

Course Title : Plant Pathology, Microbiology and Integrated disease Management

Theory

UNIT -I

- Introduction, Importance of Plant Pathology in Agriculture.
- Different groups of microorganisms: Fungi, Bacteria, Fastidious Vesicular bacteria, phytoplasmas, Spiro plasmas Viruses, Viriods, Algae, Protozoa and Phanerogamic Parasites with examples of diseases caused by them.
- Prokaryotes : Classification of Prokaryotes according to Bergey's Manual of Systematic Bacteriology.

UNIT -II

- Survival of Plant Pathogens.
- Dispersal of Plant Pathogens
- Phenomenon of infection – Pre penetration and post – penetration.
- Pathogenesis – Role of enzymes, toxins, growth regulators and polysaccharide.
- Defense mechanism in plants : Structural and Biochemical (Pre and Post infection).

UNIT -I

- **History of Microbiology**
  - Spontaneous generation theory and germ theory
  - Protection against infection
  - Applied areas of microbiology and fermentation

UNIT -III

- **Soil microbiology**
  - Microbial groups in soil-bacteria, actinomycetes, fungi, algae, and protozoa – their characteristic morphology, significance and environmental influences
  - Microbial transformations of nutrients in soil – cycles of carbon, nitrogen, phosphorus and sulfur
  - Biological nitrogen fixation – symbiotic and non-symbiotic, microorganisms involved and their biochemistry

UNIT -V

- **Beneficial microorganisms in Agriculture**

•Biofertilizers

- Biofertilizers – classification, physiological relationships, principles of isolation, purification and maintenance of strains
- Production, application, precautions in handling and benefits from their uses

•Biopesticides

- Biopesticides – classification, basic modes of actions

Production (small and large scale), application, and precautions in handling

Practical

1. Acquaintance to Plant Pathology laboratory and equipments
2. Preparation of culture media for fungi and bacteria.
3. Isolation techniques. Preservation of disease samples.
4. General instructions:Familiarization with laboratory microbiological instruments materials, glassware etc. Methods of sterilization and preparation of media:
    a. Preparation of nutrient broth, nutrient agar plate's, nutrient agar and slant and nutrient agar stabling – II
    b. Sterilization of glassware by dry heating
    c. Sterilization of nutrient broth by filtration planting method for isolation and purification of bacteria
5. Isolation of bacteria by streak plate method

References

1. Introduction to Principles of Plant Pathology — R.S. Singh
2. Agricultural Microbiology — Rangaswami and Bhagyaraj
3. Agricultural Microbiology — N. Mukherjee and T. Ghosh

Swami Vivekanand University, Sagar(M.P.)

Course Title: Fundamentals of Livestock and Poultry Management

Theory

UNIT -I

- Role of Livestock in National Economy
- Different Livestock Development Programmes of Govt. of India
- Important Indian breeds of cattle, buffalo, sheep, goat and swine
- Important exotic breeds of cattle, buffalo, sheep, goat and swine
- Measures and factors affecting fertility in Livestock
- Reproductive behaviour like oestrus parturition and furrowing etc

UNIT -II

- Mechanism of milk secretion
- Clean and hygienic milking of animals
- Factors affecting milk yield and their composition
- Selection and breeding of livestock for higher milk production
- Selection and breeding of livestock for meat production
- Feeding and management of calves, growing heifers and milch animals and other types of animals

UNIT -III

- Hosing principles, space requirements for different species of livestock
- Disease control measures, sanitation and care
- Breeding, feeding and production records
- Breed characteristics of poultry
- Methods of rearing of poultry
- Breeding of poultry

UNIT -IV

- Feeding and Management of poultry
- Structure and keeping quality of eggs
- Incubation and hatching management
- Brooding
- Vaccination schedules for prevention of poultry disease
- Preservation of eggs

UNIT -V

- Marketing of eggs
- Economics of layer production
- Cost of milk production
- Economical unit of dairy
- Economical unit of Goatery
- Economical unit of Piggery

Practical

1. Visit to Livestock farms
2. Study of external body parts of Livestock species
3. Identification methods for different livestock species
4. Handling and restraining of animals
5. Judging and culling of dairy animals
6. Feeding and ration formulation
7. Incubation and hatchery maintenance and their management
8. Housing of animals
9. Management of poultry
10. Economics of livestock production

References

1.	Livestock Production Management	–	Dr. N.S.R. Shastry, Dr. R.A. Singh and Dr. Thomas
2.	A Text Book of Animal Husbandry	–	Dr. G.C. Banerjee
3.	Poultry Production	–	Dr. R.A. Singh and others
4.	Animal Husbandry and Draining	–	Dr. Jagdish Prasad
5.	Animal Husbandry	–	Dr. Harbansh Singh & Dr. Moor
6.	Dairy India – 2007		
7.	पशुधन उत्पादन एवं प्रबंध	–	Bhati and Dahma

Swami Vivekanand University, Sagar(M.P.)

Course Title : Agricultural Economics, Finance & Marketing

Theory

UNIT -I

- Agricultural Finance – nature and scope
- Time value of money
- Compounding and discounting
- Agricultural Credit : meaning, definition, needs

UNIT -II

- Classification of credit
- Credit analysis – 4 R's of credit
- 5 C's of credit
- 7 P's of credit
- Repayment plans of credit

UNIT -III

- History of financing agriculture in India
- Commercial banks, nationalization of commercial banks
- Lead bank scheme, Regional Rural Banks, Scale of finance
- Higher financing agencies – RBI, NABARD and AFC

UNIT – IV

- Agricultural Marketing : Concepts and Definition, Scope and subject matter
- Market and Marketing : meaning, definition, components of a market
- Classification of market
- Market structure, conduct and performance, marketing structure
- Market functionaries or agencies

UNIT – V

- Producer's surplus : Meaning, types of producers surplus, marketable surplus, marketed surplus, importance, factors affecting marketable surplus
- Marketing channels : Meaning, definition, channels for different products
- Market integration, meaning, definition, types of market integration
- Marketing efficiency : Meaning, definition, marketing costs, margins and price spread, factors affecting the cost of marketing, reasons for higher marketing costs of farm commodities, ways of reducing marketing costs

Practical

4. Time value of money, compounding and discounting
5. Tools of financial management, balance sheet, income statement and cash flow analysis
6. Study of financial institutions : PACS, DCCB, Apex Banks, RRBs, CBs, NABARD
7. Identification of marketing channels
8. Study of Rythu Bazars, Regulated markets
6. Study of unregulated markets

References

9. An Introduction to Agricultural Finance - U.K. Pandey, Himalayan. Publication Ltd., New Delhi.
10. Agricultural Finance - Theory and Practical - J.P. Singh
11. Agricultural Marketing in India - S.S. Acharya and N.L. Agrawal, Oxford and IBH Publication Co. Pvt. Ltd., New Delhi
12. An introduction to Marketing - Amarchand, D. and B. Vardhrajan, Vikash Publication House Pvt. Ltd., New Delhi

Swami Vivekanand University, Sagar(M.P.)

Course Title : Agricultural Extension and Rural Sociology

Theory

UNIT -I

- Meaning and Definition of Education, Formal, Informal and Non-formal education and their characteristics
- Meaning, definitions, concept, objectives of Extension Education/Agricultural
- Extension, Principles of Extension Education
- Meaning, definition and concept of Rural Development, Objectives of Rural Development. Importance of rural development, Problems in rural development

UNIT -II

- **Development programmes of pre-independence era**
- Shriniketan and Marthandam Project
- Gurgaon Project and Gandhian Constructive Programme

- **Development Programmes of post-independence era**
- Firka Development Programme, Etawah-Pilot Project and Nilokheri
- Experiment Project
- Community Development Programme – Meaning, definition, concepts, philosophy, principles and objectives
- Differences between community development and extension education
- National Extension Service – Meaning and objectives
- Panchyati Raj System – Meaning of democratic decentralization of power, Three tiers of Panchyati Raj System,
- Organizational setup. Powers, Functions of Panchayati Raj System.

UNIT -III

- **Agriculture Development Programme with reference to year of start, objectives and salient features**

  - Intensive Agricultural District Programme (IADP), High Yielding Varieties
  - Programme (HYVP)
  - Institution Village Linkage Programme (IVLP), Watershed Development
  - Programme (WDP)
  - National Agricultural Technology Project (NATP)
  - Agricultural Technology and Management Agency (ATMA)
  - Agricultural Technology Information Centre (ATIC)

UNIT -IV

- Introductory lecture, Meaning and definition of extension education and agriculture extension
- Scope and importance of sociology in agriculture extension and interrelationship between rural sociology and agriculture extension, Meaning of rural sociology and its important characteristics
- Difference and relationship between rural and urban societies
- Meaning and Definition of social group and its classification, Factors considered in formation and organization of a group, Motivation in group formation and role of social group in agricultural extension

UNIT -III

- Meaning and definition of social institution and major institutions in rural society, Function and role of major institutions in agriculture extension
- Meaning and definition of social organization and types of organizations, Role of social organization in agriculture extension
- Meaning and definition of social control, Need and means of social control
- Meaning, definition and nature of social change, Dimension and factors responsible for social change

Practical

1. Visit to Village and Kisan Mandal to study the ongoing development programmes
2. Visit to Panchayati Raj Institutions to study the functioning of Gram Panchayat (GP), Janpad Panchayat (JP) and Zila Panchayat
3. Visit and study the District Rural Development Agency (DRDA)
4. Participation in monthly workshop of Training and Visit System (T & V system)

References

1. Text Book of Extension Education — Singh, Ranjeet, Oxford & IBH
2. Extension Education — Reddy, A.V.V., Laxmi Press,
3. An Introductory of Agricultural Extension — Mosher, A.T.
4. Extension Communication and Management — Ray G.L., Naya Prakashan 206 Bidhan Sarani, Calcutta-6
5. Introductory Rural Sociology — Chitambar, J.B., Wiley Eastern Private Limited, New Delhi
6. Rural Sociology in India — Desai, A.R., Popular Prakashan, Bombay