MK UNIVERSITY

Campus: Deesa -Highway, Opp. Hngu, Matarvadi Part, Gujrat-384265
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Syllabus
Of

DIPLOMA IN AGRICULTURE

ONE YEAR/ TWO SEMESTERS
AS PER NEP2020

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SEMESTER 1							
Sr No	**Course code**	Course Name	TEACHING SCHEME				
			L-T-P	CREDITS	MARKS		
					Internal	External	Total
1	DAG101	Introductory Agriculture and Principles of Agronomy	2-0-0	2	20	30	50
2	DAG102	Field Crop Production -I (kharif)	2-0-0	2	20	30	50
3	DAG103	Fundamentals of Soil Science	2-0-0	2	20	30	50
4	DAG104	Fundamentals of Entomology	2-0-0	2	20	30	50
5	DAG105	Economic Botany	2-0-0	2	20	30	50
6	DAG106	Principles of Horticulture	2-0-0	2	20	30	50
7	DAG107	Biomathematics	2-0-0	2	20	30	50
8	DAG108	Comprehension and Communication Skills in English	0-0-2	2	20	30	50
9	DAG109	Introductory Agriculture and Principles of Agronomy Lab	0-0-2	2	20	30	50
10	DAG110	Field Crop Production -I (kharif)Lab	0-0-2	2	20	30	50
11	DAG111	Fundamentals of Soil Science Lab	0-0-2	2	20	30	50
12	DAG112	Fundamentals of Entomology Lab	0-0-2	2	20	30	50
13	DAG113	Economic Botany Lab	0-0-2	2	20	30	50
14	DAG114	Principles of Horticulture Lab	0-0-2	2	20	30	50
		Total		**28**			**700**

SEMESTER 2							
Sr No	**Course code**	Course Name	TEACHING SCHEME				
			L-T-P	CREDITS	MARKS		
					Internal	External	Total
1	DAG201	Crop Production -II (Rabi)	2-0-0	2	20	30	50
2	DAG202	Soil chemistry, soil fertility and nutrient management	2-0-0	2	20	30	50
3	DAG203	Principles of Insect control	2-0-0	2	20	30	50
4	DAG204	Introductory Plant Pathology and Nematology	2-0-0	2	20	30	50
5	DAG205	Principles of Live stock& Poultry Production	2-0-0	2	20	30	50
6	DAG206	Fundamentals of Agricultural Engineering	2-0-0	2	20	30	50
7	DAG207	Principles of Agricultural Economics	2-0-0	2	20	30	50
8	DAG208	Agricultural meteorology	0-0-2	2	20	30	50
9	DAG209	Crop Production -II (Rabi) Lab	0-0-2	2	20	30	50
10	DAG210	Soil chemistry, soil fertility and nutrient management Lab	0-0-2	2	20	30	50
11	DAG211	Principles of Insect control Lab	0-0-2	2	20	30	50
12	DAG212	Introductory Plant Pathology and Nematology Lab	0-0-2	2	20	30	50
13	DAG213	Principles of Live stock& Poultry Production Lab	0-0-2	2	20	30	50
14	DAG214	Fundamentals of Agricultural Engineering Lab	0-0-2	2	20	30	50
		Total		**28**			**700**

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SEMESTER 1

DAG101 Introductory Agriculture and Principles of Agronomy

Credits 2

Theory:

Unit 1
Agriculture: definition, meaning and its branches, Agronomy:-definition, meaning and scope of agronomy. Classification of field crops. Factors affecting on crop production, Agro-climatic zones of Gujarat. Tillage: Definition of tillage and tilth.

Unit2
Classification of Tillage : Influence of tillage on physical properties of soil. Planting geometry and its effect on growth and yield. Cropping systems: Definition and types of cropping systems. Difference between dryfarming, dry land farming and rainfed farming. Problems of dry land agriculture.

DAG102 Field Crop Production -I (kharif)

Credits 2

Theory:

Unit 1

Name of crop, Local name, Scientific name and family. Origin, economic importance, soil and climatic requirements, cultural practices viz., selection of seeds, seed treatment, sowing method, seed rate, fertilizer recommendations,time and method of application of manures and fertilizers including bio-fertilizers. Thinning, gap filling, earthting up, interculturing, weed control measures, irrigation, crop rotation, inter-mixed/relay cropping, major insect-pests and diseases, harvesting, threshing, winnowing, cleaning, drying, storage, high yielding improved and hybrid varieties, yield, main and sub research stations.

Unit2

Cereals–Major crops: rice, maize, sorghum, pearl millet and Minor crops: finger millet and Kodomillet. **Pulses**: pigeonpea, mung bean, urd bean, cluster bean and cowpea. **Oilseeds**: groundnut, castor, sunflower and sesame. **spices**– Fennel. **Fibre** crops: cotton and sunhemp. **Commercial crop**: tobacco.*Kharif* Forage and grasses crops: Jowar, Rajka bajara, Maize.

DAG103 Fundamentals of Soil Science

Credit 2

Theory:

Unit 1
Soil- Definition and components of soil. Physical properties of soil - Soil texture, soil structure, density of soil, porosity of soil, soil colour, soil temperature and their role in soil fertility. Soil air- Definition and its importance, factors affecting the composition of soil air.

Unit 2
Soil water- importance of soil water, physical classification of soil water and biological classification (only names).Soil pH and its effect on availability of nutrients and plant growth.

Unit3
Salt affected soils:- Nature and classification, characteristics, detrimental effects of soil salinity and alkalinity and their reclamation. Soils types in Gujarat. Role of organic matter in crop production.

DAG104 Fundamentalsof Entomology

Credits 2

Theory:

Unit1

Introduction, Position of insect in Animal Kingdom, Important characters of phylum Arthropoda and its classification up to class insect, Dominance of insects in animal kingdom,

Unit2

Economic importance of insect in agriculture, General organization of an insect body, Moulting, Metamorphosis, Classification of insect, Various systems of insect

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DAG105 ECONOMIC BOTANY

Credits 2

Theory:

Unit1

Origin of Cultivated Plants: Vavilov's concepts of centers of origin, domestication, and evolution of crop plants.
Cereals and Millets: Morphology, cultivation, and processing of Rice (*Oryza sativa*), Wheat (*Triticum aestivum*), and millets (e.g., Jowar, Bajra).
Legumes and Pulses: Cultivation and economic importance of Soyabean, Gram, and Mung bean.
Spices and Condiments: Botanical names, parts used, and uses of major spices like Black Pepper, Ginger, and Turmeric.
Beverages: Morphology, chemistry, and processing of Tea and Coffee.

Unit2

Oil-Yielding Plants: Classification into fatty oils (e.g., Coconut, Mustard, Groundnut) and essential oils (e.g., Eucalyptus, Citronella).
Fiber-Yielding Plants: Classification and extraction of fibers, focusing on Jute and Cotton.
Medicinal and Drug Plants: Study of therapeutic plants
like *Cinchona* (Quinine), *Rauwolfia* (Reserpine), and *Digitalis*.
Industrial Plants: Rubber yielding plants (*Hevea brasiliensis*), timber yielding plants, and tobacco

DAG106 Principlesof Horticulture

Credits 2

Theory:

Unit1

Introduction, definition, branches of horticulture and importance of fruits and vegetables in human diet. Scope, current situation and importance of horticulture in Gujarat/India. Propagation of horticultural crops, definition, types, classification, merits and demerits. Methods of propagations.

Unit2

Hormones- Role of hormones in horticultural crops. Principles of pruning and training - need, objectives and scope. Choice of trees and plants

DAG107 Bio Mathematics

Credits 2

Theory

Unit1

Calculus :

Functions and Limit : Definition of function, Examples, Concept and rules of limits,

Differentiation: Definition, Derivation of constant function, Formula :x^n, a^x, sin x, e^x etc. Formula for sum, Product and quotient of functions.Chain rule, Derivation of parametric and implicit functions. Second order differentiation.

Unit2

Integration : Introduction of integration, Formulas for standard functions as per formulax^n, a^x, sin x, e^x etc. Simple basic rules of indefinite integration.Definite integral, Lower limit, Upper limit and Properties of definite integral.

DAG108 Comprehension and Communication Skills in English
Credits 2

Theory:

Topic 1: Introduction to Communication

1.1 Importance of Communication
1.2 Types of Communication – verbal and non-verbal
1.3 Essentials of good communication
1.4 Barriers to Communication

Topic 2: Grammar

1.1 Articles
1.2 Prepositions
1.3 Tenses
1.4 Modal Auxiliaries
1.5 Common Errors in English

Topic 3: Increasing Vocabulary

3.1 Words confused and misused
3.2 Synonyms and Antonyms
3.3 One Word Substitutions
3.4 Idioms and their use
3.5 Word Formation

Topic 4: Translation

4.1 Translation of commonly used scientific and technological terms in Hindi/Gujarati to English and English to Hindi/Gujarati
4.2 Translation of individual simple sentences from Hindi/Gujarati to English and English to Hindi/Gujarati

Topic 5: Correspondence

1.1 Personal Letters
1.2 Application Writting

Topic 6: Paragraph Writting

1.1 Paragraphs on general topics e.g. My hobby, favourite leader, visit to exhibition etc. (Not more than 200 words)

DAG109 Introductory Agriculture and Principles of Agronomy

Credits 2

Practicals:

1. Study of different hand tools
2. Acquaintance with field crops grown in crop cafeteria.
3. Identification and study of tillage implements and practice of ploughing/harrowing
4. Identification and study of seeding equipments and practice of different methods of sowing
5. Identification and calculation of manures, fertilizers and green manure crops
6. Identification of intercultivation implements and their practice
7. Practice of methods of fertilizer applications

DAG110 Field Crop Production -I (kharif)

Credits 2

Practicals:

1. Identification of seeds and varieties of major *kharif* crops
2. Seed treatment of different *kharif* crops
3. Preparation of different methods of rice nursery
4. Study of different land configuration techniques
5. Practice of different methods of sowing of *kharif* crops
6. Visit/Preparation to crop cafeteria and record growth and yield attributing observations of
   kharif crops

DAG111 Fundamentals of Soil Science

Credit 2

Practicals:

1. Collection of representative soil sample for laboratory testing
2. Determination of particle and bulk density of soil
3. Determination of maximum water holding capacity of soil
4. Estimation of EC and pH of soil
5. Irrigation water quality analysis: EC, carbonate, bicarbonate, chloride.
6. Irrigation water quality analysis: Calcium, magnesium and sodium.
7. Recommendation for quality of irrigation water.

DAG112 Fundamentalsof Entomology

Credits 2

Practicals:

1. Methods of insect collection and preservation
2. Methods for preparing insect killing jar
3. External morphology of grass hopper
4. Classification of insects
5. Submission of well preserved collection of insects of different orders

DAG113 ECONOMICAL BOTANY LAB

Credits 2

Practicals:

- Identification of plant materials (tea, coffee, rubber, spices).
- Microscopic study of starch grains.
- Testing for oils and fats.
- Extraction of essential oils.
- Microscopic studies of fibers

DAG114 Principles of Horticulture
Credits 2

Practicals:

1. Study of horticultural tools and different containers
2. Preparation of nursery beds and sowing
3. Study of potting and repotting
4. Study of propagation by seeds and seed treatment
5. Study of plant propagation by cutting and layering .
6. Study of propagation by budding and grafting
7. Study of different types of media and their uses in horticulture
8. Preparation of different hormone solution
9. Visit to commercial nurseries

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SEMESTER 2

DAG201 Crop Production -II (Rabi)

Credits 2

Theory:

Name of crop, local name, botanical name and family. Origin, economic importance, soil and climatic requirements, cultural practices viz., selection of seeds, seed treatment, sowing method, seed rate, fertilizer recommendation, time and method of application of manures and fertilizers including bio-fertilizers, thinning, gap filling, earthling up, interculturing, weed control measures, irrigation, crop rotation, inter-mixed/relay cropping, major insect-pests and diseases, harvesting, threshing, winnowing, cleaning, drying, storage, preparation of produce for market, value addition, high yielding improved and hybrid varieties, yield, main and sub research stations. **Cereals**– Major crop: Wheat (irrigated and unirrigated), **Pulses**– Major crop: Chickpea and Indian bean. Minor crops: Lentil, peas. **Oilseeds**–Major crops: Mustard. Minor crops: Safflower and Linseed. **Spices**-Cumin, Fenugreek, Coriander, Dilseed and Ajvain. **Sugar crops**– Major crop: Sugarcane. **Regional medicinal crops**- Major crop: Isbgul. **Commercial crops** - Calcutti Tobacco, chicory and Potato. **Rabi Forage crops**:- Lucerne and oat.

DAG202 Soil Chemistry, Soil Fertility and Nutrient Management

Credit: 2

Theory:

Plant nutrients:-

Soil as a source of plant nutrients. Essential and beneficial soil fertilizers elements, forms of nutrients in soil, mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Measures to overcome deficiencies and toxicities.

Problemetic soils

Problemetic soils - acid, salt affected and calcareous soils, characteristics, nutrient availabilities.

Reclamation of soil - mechanical, chemical and biological methods.

Soil fertility - Different approaches for soil fertility evaluation. Methods, 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.

Fertilizer recommendation

Soil test based fertilizer recommendations to crops. Factors influencing nutrient use efficiency (NUE) in respect of N, P, K, S, Fe and Zn fertilizers.

Source, method and scheduling of nutrients for different soils and crops grown under rainfed and irrigated conditions.

DAG203 Principles of Insect Control

Credits 2

Theory:

Definition and types of insect pests. Principles and methods of pest management viz., Natural control, Physical, Mechanical, Cultural, Biological& Chemical control. Host plant resistance, Biotechnological approaches and legal control. Modern concepts in pest management viz., Semiochemicals, Pheromens,Allelochemicals, Attractants, Repellents, Antifeedents, Chemostrerilents, Genetic control. Integrated pest management. Formulation of insecticides.

DAG204 Introductory Plant Pathology and Nematology

Credits 2

Theory:

Economic importance of Plant Pathology. General morphological characteristics of Fungi, Bacteria, Virus, Mycoplasma and plant parasitic Nematodes. Feedings habits of nematodes. Classification of Plant diseases. Principles of plant disease management. Methods of plant disease management- cultural methods, legal methods, biological methods, chemical methods and use of resistant variety.

DAG205 Principles of Livestock and Poultry Production

Credits 2

Theory:

General discourse on origin, domestication and utility of farm animals and their role in Indian economy, Animal husbandry methods in India, common terms pertaining to different species of livestock, Utility classification of breeds of cattle. Familiarization with different breeds of cattle (indigenous and exotic) and buffaloes with special emphasis on breeds of Gujarat. Classification of breeds of sheep and goat. Introduction to common feeds and fodders, their classification and utility, Introduction to poultry industry in India (past, present and future status) Common terms pertaining to poultry production and management. Concept of mixed farming and its relevance to socio-economic conditions of farmers in India. Complimentary and obligatory nature of livestock and poultry production with that of agricultural farming. Importance of fisheries in India. Common terms pertaining to fish production.

DAG206 Fundamentalsof Agricultural Engineering

Credits 2

Theory:

1. Farm mechanization. Engine terminology. Tractors-type of tractors and their utility. Types of pumps and their utility. Types of biogas plants and its use. Renewable energy: Wind and solar energy. Basic principles of surveying and levelling with use of chain and cross staff and dumpy level. Soil erosion and their control measures including soil and water conservation structures.

DAG207 Principles of Agricultural Economics
Credits 2

Theory:

Economics: Definition, Divisions and importance of Economics. Agricultural Economics: Definition: Basic Concepts: Goods, Service, Utility, Value, Price, Wealth, Welfare. Wants: Meaning, Characteristics, Classifications of Wants and Importance. Theory of consumption: Law of Diminishing Marginal utility. Definition, Assumption,Limitations, Importance. Consumer's surplus: Definition, Importance. Demand: Definition, Kinds of Demand, Demand schedule, Demand Curve, Law of Demand and elasticity of demand. Nature & Factors of Production. Laws of Returns, costs & cost curves. Market & Market forms

DAG208 Agricultural meteorology Credit 2

Theory:

1. Meaning and importance of Meteorology and agricultural meteorology.
2. Weather and climate
3. Influence of weather on agricultural production.
4. Characteristics of Indian monsoon.
5. Rainfall characteristics and artificial rainmaking.
6. Influence of drought and frost on agricultural production.
7. Global warming and impact of climate change on agriculture.
8. Types of weather fore casting.
9. Agro climatic zones of Gujarat.

DAG209 Crop Production -II (Rabi)

Credits 2

Practicals:

2. Seed bed preparation and sowing of wheat, sugarcane and cumin crops
3. Seed treatment of different *rabi* crops
4. Raising seedling beds
5. Top dressing of nitrogen in *rabi* crops and visit to fertilizer experiments
6. Identification of seeds and plants of *rabi* field crops
7. Study of yield contributing characters of wheat , chickpea and mustard
8. Working out quantity of required fertilizers from different sources for *rabi* crops
9. Judging of maturity symptoms of wheat, sugarcane and mustard
10. Visit/Preparation of crop cafeteria and record observations of *rabi* crops

DAG210 Soil Chemistry, Soil Fertility and Nutrient Management

Credit: 2

Practicals:

1. Estimation of available nitrogen in soil
2. Determination of available phosphorus in soil using spectrophotometer (Olsen's method)
3. Determination of available potassium in soil using flame photometer
4. Determination of gypsum requirement of soil
5. Determination of EC and pH of water
6. Determination of CO_3 , HCO_3 and Cl from water
7. Determination of Ca, Mg and Na from water
8. Sampling, processing and preparation of acid extract for the determination of elements from plant tissues
9. Determination of total nitrogen from plant sample by kjeldahl method
10. Determination of phosphorus from plant using spectrophotometer

DAG211 Principles of Insect Control

Credits 2

Practical:

1. Precautions for storage and safe handling of pesticides
2. First aid precaution and antidote for pesticide poisoning
3. Calculation and preparation of spray fluid
4. Preparation of poison baits for rodent, fruit fly and crab
5. Study of different types of sprayers
6. Study of different parts of typical sprayers
7. Study of nozzles
8. Study of different types of dusters and fumigators

DAG212 Introductory Plant Pathology and Nematology

Credits 2

Practicals:

1. Acquaintance with lab equipments.
2. Study of microscope and its maintenance
3. Preparation of the culture media .
4. Isolation of plant pathogens (bacteria and fungi)
5. Methods of preservation of diseased specimen (Dry and wet)
6. Preparations of Bordeaux mixture, Bordeaux paste

DAG213 Principles of Livestock and Poultry Production

Credits 2

Practicals:

1. Study of body parts and points of cattle, sheep, goat and poultry and their significance.
2. Measuring and weighing of farm animals.
3. Use of common restraints used in different animals
4. System of identification of livestock
5. Determination of age in farm animals
6. Identification of common feeds and fodders
7. Importance of eggs in human nutrition.