

SHRI KHUSHAL DAS UNIVERSITY, HANUMANGARH

SYLLABUS

Diploma Agriculture

Objective:-

This course helps to learn about the agriculture to develop the production, protection Techniques to double the farmers' income and to reduce the losses. This course mainly designed for the license for starting fertilizer who gains knowledge by this course curriculum. a one year diploma will consists of all the subjects related to agriculture to develop their farm income with different modern methodologies.

Course Outcome:-

To develop the practical knowledge in agriculture among students and entrepreneur qualities to start an agri business and to maintain their income of their own farm in scientific manner by the usage of organic and sustainable practices.

Evaluation Matrix:-

❖ Examination

- External theory (50%)
 - Internal Theory + Practical (50%)
- **Courses with Theory and Practical**
Mid-term Exam (30%) + Assignment (5%) in practical oriented courses + Practical (15%)
- **Courses with only Theory**
Mid-term Exam (40%) + Assignment (10%)
- **Courses with only Practical:**
(100%) Internal
- Paper to be set by external: HOD shall ensure the coverage of syllabus. If needed moderation can be done.
 - Evaluation to be done internally by the faculty other than the Course Instructor. Syllabus of the concerned course shall be sent to the external examiner, who shall prepare the question papers. For practical, it is recommended that examination shall be conducted by course instructor(s) and one teacher nominated by HOD.

Evaluation:

Credit Based Grading System

Grade	%Marks range (based on absolute marks system)	Grade Point	Description of performance
A ⁺	91-100	10	Outstanding
A	81-90	9	Excellent
B ⁺	71-80	8	Very Good
B	61-70	7	Good
C ⁺	51-60	6	Average
C	41-50	5	Satisfactory
D	40 Only	4	Marginal
F	below 40	0	Fail.
I		0	Incomplete.
W		0	Withdrawal

The Semester Grade Points Average (SGPA) and Cumulative Grade Point Average (CGPA) shall be calculated as under:-

$$SGPA = \frac{\sum_{i=1}^n c_i p_i}{\sum_{i=1}^n c_i}$$

Where CI is the number of credits offered in the i th subject of a Semester for which SGPA is to be calculated , pi is the corresponding grade point earned in the i th subject, where i = 1,2,..... n , are the number of subjects in that semester.

$$CGPA = \frac{\sum_{j=1}^m SG_j NC_j}{\sum_{j=1}^m NC_j}$$

Here, NCj is the number of total credits offered in the jth semester, SGj is the SGPA earned in the jth semester, where j = 1,2,..... m, are the number of semesters in that course.

Semester I

S. No.	Subject Code	Subject Name	Internal		End Semester		Practical/Assign.		Total	CREDITS		
			Max marks	min. marks	Max marks	Min marks	Max marks	Min marks		T	P	Total
1.	DAGR-101	Introductory Agriculture and Principles of Agronomy	30	12	50	20	20	08	100	2	1	3
2.	DAGR-102	Field Crop Production -I (kharif)	30	12	50	20	20	08	100	3	1	4
3.	DAGR-103	Plant nutrition, manures and fertilizers	30	12	50	20	20	08	100	3	1	4
4.	DAGR-104	Principles of Insect control	30	12	50	20	20	08	100	2	1	3
5.	DAGR-105	Principles of Plant Protection	30	12	50	20	20	08	100	3	1	4
TOTAL												18
GRAND TOTAL			Max marks(END SEMESTER)=500									

DAGR-101-Introductory Agriculture and Principles of Agronomy Credits 3(2+1)

Theory:

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. 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.

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

DAGR-102-Field Crop Production -I (kharif) Credits 4(3+1)

Theory:

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, earthing 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. **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.

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

DAGR-103-Plant Nutrition, Manures and Fertilizers Credit 4(3+1)

Theory:

Mineral nutrients-Definition of plant nutrients and soil fertility. Criteria of essentiality of an element, Classification of plant nutrients, Available forms of the nutrients in soil. Beneficial elements. Integrated nutrient management (INM). Types and roles of organic manures. Fertilizers- Classification of fertilizers with nutrient content. Methods of fertilizer application. Type of bio-fertilizers and their potential. Merits and constraints of bio-fertilizer use. Precautions for the use of bio-fertilizers.

Practicals:

1. Identification of manures and fertilizers and their nutrient content
2. Calculation of fertilizer quantity for different recommended doses.
3. Preparation of ppm and percentage solution of fertilizer.
4. Compatibility of fertilizers with pesticides.
5. Coating of fertilizers.
6. Study on application methods of bio-fertilizers.
7. Preparation of micro-nutrient solution for foliar application.

DAGR-104-Principles of Insect Control Credits -3(2+1)

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, Pheromones, Allelochemicals, Attractants, Repellents, Antifeedants, Chemosterilants, Genetic control. Integrated pest management. Formulation of insecticides

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

DAGR-105-Principles of Plant Protection 4(3+1)

Theory:

Introduction: Importance and scope. Methods of plant protection (Cultural, Mechanical, Physical, Biological, Ecological, Reproductive, Legislative & Chemical Control). Pesticide equipments. Agro-ecosystem. Integrated pest management (IPM). Concept of community agriculture, principles and components of participatory IPM: Training of Facilitators (TOF) & Farmer Field Schools (FFS). Concept of field biodiversity conservation. Crop appraisal (Damage vs loss).

Practical:

Study of nature and extent of major pest damage. Demonstration of various methods of pest control and use of equipment. Conflict resolution. Demonstration of communication/facilitation skills. Visits to FFS & TOF.

SEMESTER-II

S.No	Subject Code	Subject Name	Internal		End Semester		Practical/Assign.		Total	CREDITS			
			Max marks	min. marks	Max marks	Min marks	Max marks	min marks		T	P	Total	
1	DAGR-201	Soil chemistry, soil fertility and nutrient management	30	12	50	20	20	08	100	3	1	4	
2	DAGR-202	Crop Production -II (Rabi)	30	12	50	20	20	08	100	3	1	4	
3	DAGR-203	Diseases of field crops and their management	30	12	50	20	20	08	100	2	1	3	
4	DAGR-204	Organic Farming and Sustainable Agriculture	30	12	50	20	20	08	100	2	1	3	
5	DAGR-205	Pesticides Management and their Application Techniques	30	12	50	20	20	08	100	3	1	4	
TOTAL													18
GRAND TOTAL			Max marks(END SEMESTER)=500										

DAGR-201-Soil Chemistry, Soil Fertility and Nutrient Management Credit: 4(3+1)

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. Problematic 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

Practicals:

2. Estimation of available nitrogen in soil
3. Determination of available phosphorus in soil using spectrophotometer (Olsen's method)
4. Determination of available potassium in soil using flame photometer
5. Determination of gypsum requirement of soil
6. Determination of EC and pH of water
7. Determination of CO₃, HCO₃ and Cl from water
8. Determination of Ca, Mg and Na from water

9. Sampling, processing and preparation of acid extract for the determination of elements from plant tissues
10. Determination of total nitrogen from plant sample by kjeldahl method
11. Determination of phosphorus from plant using spectrophotometer

DAGR-202- Crop Production-II (Rabi) Credits 4(3+1)

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, earthing 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.

Practicals:

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

DAGR-203-Diseases of Field Crops and their Management Credits 3(2+1)

Theory:

Symptoms, favourable weather conditions and management of Bajra: Downy mildew, Ergot, Smut Sorghum: Smuts, Anthracnose

Wheat: Rusts, Loose smut

Rice: Blast, Bacterial blight, Brown

leaf spot Maize: Maydis blight,

Turcicum blight Groundnut: Tikka,

Collar rot

Castor: Wilt, Root rot

Cotton: Angular leaf spot, Wilt

Sesamum: Phyllody, Phytophthora

blight

Tobacco: Damping off, Leaf curl, Mosaic Pigeonpea: Wilt, Sterility

mosaic Green gram: Powdery mildew, Yellow mosaic

Chickpea: Stunt virus, wilt

Cumin: Blight, Powdery

mildew

Fennel: Alternaria blight,Ramularia blight

Practicals:

1. Field visit to study different diseases of above mentioned crops at regular intervals
2. Microscopic examinations of diseased specimen and their diagnosis.
3. Collection and dry preservation of diseased specimens and submission of disease album.

DAGR-204-Organic Farming and Sustainable Agriculture Credits 3(2+1)

Theory:

Scope, definition and Concept of organic farming. Objectives of organic farming. Importance of organic farming. Component of organic farming and their role in sustainable crop production. Principles of organic farming. Organic farming in relation to soil health and quality production. Nutrient management in organic farming. Disease and pest management in organic farming. Certification and accreditation process of organic product. Sustainable Agriculture: Introduction, definition, goal and concepts. Land degradation and conservation of natural resources.

Practicals:

1. Study of different organic materials
2. Preparation of enriched Farm Yard Manure
3. Study of composting methods
4. Preparation of vermi compost
5. Study of recycling of farm waste
6. Study of green manuring
7. Visit to urban waste recycling unit
8. Study of bio fertilizer.

DAGR-205-Pesticides Management and their Application Techniques 4(3+1)

Objectives:

To acquaint the students with the nature and safe use of pesticides.

Theory:

Introduction, history, classification and formulation of pesticides. Pesticide regulation, registration and distribution. Code of conduct for pesticide use and handling Pesticide hazards, safety (protective devices, first aid). Pesticide storage, indoor, ground, aerial, soil applications and fogging. Pesticide compatibility and selectivity. Pre-harvest safety intervals. Pesticide application equipments. Calibration methods, measurement of droplet size and aerosols.

Practical:

Demonstration of pesticide application techniques. Pesticide application equipments and calibrations. Types of sprayers, nozzles and their use. Measurement of droplet size. Visit to formulation plant/ quality testing lab. Pesticide safe handling, precautions and first aid.

Book recommendation:-

BOOK NAME	AUTHORS NAME
Dictionary of Agriculture	Gupta P.C., Birjesh Kumar, Prakash Kumar
Introductory Ornamental Horticulture	Arora J. S.

A Textbook of Vegetable Culture	Arya Prem Singh
Spice Crops of India	Arya Prem Singh
Protected Cultivation of Vegetable Crops	Balraj Singh
Advances in Temperate Fruit Production	Banday F.A., Sharma M.K.
Manures and Fertilizers	Das P.C.
Soils in India	Das P.C.
Floriculture at a Glance	Desh Raj
Green House Technology -The Future Concept of Horticulture	Ghosh Arupratan
Soil, Plant and Water Analysis	Jaiswal P.C.
Basic Horticulture	Jatinder Singh
Weed Science Principles	Jaya Kumar R.
Food Preservation & Processing,	Kalia Manoranjan, Sood Sangeta,
Tools, Implements and Machines in Agriculture and Allied Services	Lenka D.
Plant Propagation at a Glance	Maiti R.G.
Textbook of Entrepreneurship and Rural Development	Mondal Sagar
Textbook of Rural Sociology and Educational	Mondal Sagar
Rural Agricultural Work Experience (RAWE) Programme Practical Manual	Narain Sarju, LakhanSingh
Organic Farming for Sustainable Agriculture	Panda S.C.
Principles of Seed Technology	Phundan Singh
Agronomy of Field Crops	Reddy S.R., Ramu Y. Reddy
Handbook of Agriculture	ICAR
Handbook of Horticulture	ICAR
Textbook of Soil Science	ICAR
Principles of Agronomy	Reddy, S.R.

Reference book:-

- ✓ Reddy, S.R. 2016. Principles of Agronomy. Kalyani Publishers, Ludhiana, 5th Edition.
- ✓ Yellamanda Reddy, T. and SankaraReddi, G.H. 2016. Principles of Agronomy, Kalyani Publishers, Ludhiana.
- ✓ Punthan Singh, 2006, Genetics, Kalyani Publishers, Ludhiana
- ✓ Singh, B.D. 2015. Fundamentals of Genetics. Kalyani Publishers, Ludhiana
- ✓ Gupta, P.K.2007. Genetics. Rastogi Publications, Meerut
- ✓ Indian Society of Soil Science 2012. Fundamentals of Soil Science. IARI, New Delhi
- ✓ Das,D.K. 2015Introductory soil science, 4th edition, Kalyani Publishers, New Delhi.
- ✓ Dewett,K.K. and Varma, J.D.2003.Elementary Economic Theory. S.Chand and Co, New Delhi
- ✓ Paul A. Samuelson and Nordhus.2010. Economics. 19th Edition, Tata-Mac Graw Hill Education, New Delhi
- ✓ Rangaswamy,R 1995. A Text Book of Agricultural Statistics. New Age International (P) Ltd., Publishers, Hyderabad.
- ✓ Nene Y.L. (ed.) 2005. Agricultural Heritage of Asia. Proceedings of the International conference, 6-8 December 2004, Asian-Agri History Foundation, Secunderabad- 500 009, Andhra Pradesh, India.
- ✓ Balasubramanian, T. 1989. A Text Book of Phonetics for Indian Student, Orient Longman, New Delhi.

- ✓ Chadha,K.L.2001. Handbook of Horticulture,ICAR, New Delhi
- ✓ Jitendra Singh, 2012, Basic Horticulture, Kalyani Publishers, New Delhi
- ✓ Dube,H.C. 2013, An Introduction to Fungi, 4th (Edition), Scientific Publishers, Jodhpur, India, (major text book)
- ✓ Webster, j.1989. Introduction to fungi, Cambridge Univ.Press(forlife cycles of Fungi)
- ✓ Dasgupta, M.K.1987. Principles of Plant Pathology, Allied Publ.Pvt.Ltd. p985.(for rust life cycles)
- ✓ Adivi Reddy, A. 2006. Extension Education. Sree Lakshmi Press, Bapatla
- ✓ Chitamber, J.B. 1997. Introductory Rural Sociology. Wiley Eastern Limited, New Delhi.
- ✓ Daivadeenam,P. 2006. Educational Psychology in Agriculture. Agrotech Publishing Academy, Udaipur.
- ✓ Text Book for A.P Intermediate Mathematics-Paper (IA & IIB)
- ✓ MVSL DN Raju and K.V.Ramana-Agricultural Mathematics
- ✓ Negi,S.S.1999. Agroforestry hand book, Internaltional book distributor, DehraDun.
- ✓ Reddy, S.R. 2014. Introduction to Agriculture and Agrometeorology. Kalyani Publishers, Ludhiana, Punjab
- ✓ Microbiology A Laboratory Manual: James, C and Natile, S.(10th Ed.) 2014. Pearson India Education Services Pvt. Ltd., South Asia.
- ✓ Experiments in Microbiology, Plant Pathology and Biotechnology, Aneja, K.R.2011. New Age International (P) Ltd., Publishers, New Delhi.
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- ✓ SankaraReddi, G.H. and Yellamanda Reddy, T. 2006. Efficient Use of Irrigation Water. Kalyani Publishers, Ludhiana
- ✓ Upadhyaya K D and Divide 1997. A text book of plant nematology. Aman Publishing House Meerat
- ✓ Rao, V.S. 1992. Principles of weed science (2nd edition), Oxford &IBH Publishing Co. Pvt Ltd, New Delhi.
- ✓ A Textbook of Animal Husbandry – G.C. Bener
- ✓ Indian Society of Soil Science 2012. Fundamentals of Soil Science. IARI, New Delhi