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# **YBNUNIVERSITY**

**Established by the Act of Government of Jharkhand Act 15, 2017  
Gazette Notification No. 505, Dated 17<sup>th</sup> July 2017  
As per Section 2(f) of UGC Act. 1956**

## **SCHOOL OF AGRICULTURAL SCIENCE**

# **SYLLABUS FOR DIPLOMA IN AGRICULTURE (2 YEARS DIPLOMA PROGRAM)**

# SYLLABUS FOR DIPLOMA IN AGRICULTURE

## SEMESTER - WISE COURSE DISTRIBUTION

Sl. No.	Paper code	Name of the paper	Credit Hours
<b>Semester: I</b>			
1.	1Y2DAG101	Agronomic Principles, Practices and Meteorology	1+2
2.	1Y2DAG102	Soils and Fertility Management	2+1
3.	1Y2DAG103	Fruit Culture and propagation	2+1
4.	1Y2DAG104	Farm Structures, Machinery and Post Harvest Processing	1+2
5.	1Y2DAG105	Fundamentals of Livestock and poultry Production	2+1
6.	1Y2DAG106	Computer Application	0+2
7.	1Y2DAG107	Physical Education	0+1
		<b>Total</b>	<b>8+9 = 17</b>
<b>Semester: II</b>			
1.	1Y2DAG201	Irrigation and Weed Management	1 +1
2.	1Y2DAG202	Agronomy of Field Crops	2+2
3.	1Y2DAG203	Vegetable Culture	1+1
4.	1Y2DAG204	General and Economic Entomology	2+1
5.	1Y2DAG205	Principles of Plant Pathology	1+1
6.	1Y2DAG206	Energy and Environment	1+1
7.	1Y2DAG207	Food Science and Nutrition	1+1
		<b>Total</b>	<b>9+8 = 17</b>

<b>Semester: III</b>			
1.	1Y2DAG301	Crop production	0+2
2.	1Y2DAG302	Commercial Floriculture and Ornamental Gardening	0+2
3.	1Y2DAG303	Breeding of Field Crops	1+1
4.	1Y2DAG304	Crop Pests and their Management	1+2
5.	1Y2DAG305	Crop Diseases and their Management	1+1
6.	1Y2DAG306	Commercial Agriculture	0+2
7	1Y2DAG307	Agricultural Economics and Marketing	2+1
		<b>Total</b>	<b>5+11=16</b>
<b>Semester: IV</b>			
1.	1Y2DAG401	Dry Farming and Agro-forestry	1+1
2.	1Y2DAG402	Spices Plantation and Medicinal Plant Culture	1+1
3.	1Y2DAG403	Seed Production	1+1
4.	1Y2DAG404	Sustainable Agriculture	0+2
5.	1Y2DAG405	Fundamentals of Agriculture Extension Education	1+1
6.	1Y2DAG406	Language for Communication/Communication skills in English	0+1
7.	1Y2DAG407	Study Tour	0+1
		<b>Total</b>	<b>4+11=15</b>
		<b>Grand Total</b>	<b>26+39=65</b>

## SYLLABUS

<b>101: Agronomic principles, practices and Meteorology</b>
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**Credit hours: 3(1+2)**

**Theory:**

Agronomy and its scope, seeds and sowing, tillage, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil plant water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, water logging.

Growth and development of crops, factors affecting growth and development of crop, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Meteorology-Agro climatic zones of India, Agro meteorology, weather and climate, micro climate, weather elements and their influence on different crops, monsoon , clouds, weather forecasting, weather modification-artificial rain making and cloud seeding, remote sensing.

**Practical:**

Identification of crops, seeds, fertilizers, pesticides and tillage implements, Effect of sowing depth on germination and seedling vigour, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill, Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

<b>102. Soil and Fertility Management</b>
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**Credit Hours: 3(2+1)Theory**

**Theory:** History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

**Practical:**Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry. Estimation of available N in soils. Estimation of available P in soils. Estimation of available K. Estimation of available S in soils. Estimation of available Ca and Mg in soils. Estimation of available Zn in soils.

Estimation of N in plants. Estimation of P in plants. Estimation of K in plants. Estimation of S in plants.

<b>103. Fruit culture and propagation</b>	<b>Credit Hours: 3(2+1)</b>
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**Theory:**

Propagation and nursery management of fruit crops, seed viability, seed vigour seed germination, polyembryony asexual and sexual propagation, apomixis, seed dormancy, organic fruit culture, indigenous practices for organic fruit farming system, role of biofertilizers, EM technology and its impact in organic farming, GAP principles and management, post harvest management of organic fruit production, Certificate of organic products and systems, biological/natural control of diseases of fruit, canopy management of fruit crops.

**Practical:**

Studies on rooting of cuttings and air layering, rooting media and use of PGR, studies on technique of grafting, budding and graft union, construction of propagation structures, mist propagation, micro propagation, ex-plant preparation, media preparation- in vitro culture, clonal propagation, shoot tip culture.

<b>104: Farm structures, Machinery and Post Harvest Processing</b>	<b>Credit hours: 3(1+2)</b>
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Status of Farm Power in India, Sources of Farm Power , I.C. engines, working principles of I C engines, comparison of two stroke and four stroke cycle engines, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication ,fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor , Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Introduction to Post harvest technology, status of production, losses, need, scope and importance, primary and secondary processing operations, drying technique of cereals and pulses, storage of cereals and pulses.

**Practical:**

Study of different components of I.C. engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow . Familiarization with seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter Familiarization with different types of sprayers and dusters Familiarization with different inter-cultivation equipment, Familiarization with harvesting and threshing machinery.

<b>105: Fundamentals of Livestock and poultry production</b>
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**Credit hours: 3(2+1)**

**Theory:**

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers.

Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry.

Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry.

Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

**Practical:**

External body parts of cattle, buffalo, sheep, goat, swine and poultry. Handling and restraining of livestock. Identification methods of farm animals and poultry. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records. Judging of cattle, buffalo and poultry. Culling of livestock and poultry. Planning and layout of housing for different types of livestock. Computation of rations for livestock. Formulation of concentrate mixtures. Clean milk production, milking methods. Hatchery operations, incubation and hatching equipments. Management of chicks, growers and layers. Debeaking, dusting and vaccination. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

<b>106: Computer Application</b>
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**Credit hours: 2(0+2)**

**Theory:**

Computer fundamentals; hardware and software; input and output devices; word and character representation; features of machine language, assembly language, high-level language and their advantages and disadvantages; principles of programming- algorithms and flowcharts; Operating systems (OS) - definition, basic concepts, introduction to WINDOWS and LINUX Operating Systems; Local area network (LAN), Wide area network(WAN), Internet and World Wide Web, HTML and IP; Introduction to MS Office - Word, Excel, Power Point. Audio visual aids - definition, advantages, classification and choice of A.V aids; cone of experience and criteria for selection and evaluation of A.V aids; video conferencing.

**Practical:**

Exercises on binary number system, algorithm and flow chart; MS Word; MS Excel; MS Power Point; Internet applications: Web Browsing, Creation and operation of Email account; Analysis of fisheries data using MS Excel. Handling of audio visual equipments. Planning, preparation, presentation of posters, charts, overhead transparencies and slides. Organization of an audio visual programme.

<b>107: Physical Education</b>
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**Credit hours: 1(0+1)**

**Theory:**

Course aims at evoking social consciousness among students through various activities viz., working together, constructive and creative social work, to be skilful in executing democratic leadership, developing skill in programme development to be able for self employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society, yogic practices

**Practical:**

Assignment on Fitness test administration, Procedures for Asanas, Benefits and contradiction of any two asanas for each life style, Record file on any one sports of your choice.

<b>201: Irrigation and Weed Management</b>
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**Credit hours: 2(1+1)**

**Theory:**

Water resources utilization and irrigation development, types of irrigation, methods applied, importance, need, traditional methods, modern methods, process of sprinkler method, process of drip method of irrigation, effect on crop

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds. Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of

action of herbicides and selectivity. Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with nutrients and their application. Integration of herbicides with non chemical methods of weed management. Herbicide Resistance and its management.

**Practical:**

Techniques of weed preservation. Weed identification and their losses study. Biology of important weeds. Study of herbicide formulations and mixture of herbicide. Herbicide and nutrient compatibility study. Shift of weed flora study in long term experiments. Study of methods of herbicide application, spraying equipments. Calculations of herbicide doses and weed control efficiency and weed index.

<b>202: Agronomy of Field Crops</b>
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**Credit hours: 4(2+2)**

**Theory:**

Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil plant water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, water logging.

Weeds- importance, classification, crop weed competition, concepts of weed management- principles and methods, herbicides- classification, selectivity and resistance, allelopathy. Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

**Practical:**

Identification of crops, seeds, fertilizers, pesticides and tillage implements, Effect of sowing depth on germination and seedling vigour, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill, Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

<b>203: Vegetable Culture</b>
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**Credit hours: 2(1+1)**

**Theory:**

Importance of vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting post harvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Role of ethylene; Post harvest disease and



disorders; Heat, chilling and freezing injury; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Concepts and Standards; Drying/ Dehydration of vegetables and Standards, packaging of products.

**Practical:**

Applications of different types of packaging containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

<b>204: General and Economic Entomology</b>
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**Credit hours: 3(2+1)**

**Theory:**

History of Entomology in India. Factors for insect's abundance. 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. Importance of beneficial Insects, Beekeeping, pollinating plant and their cycle, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee.

**Practical:**

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle. Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.

<b>205: Principles of plant pathology</b>
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**Credit hours: 2(1+1)**

**Theory:**

Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology. Pathogenesis. Cause and classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes

with examples of diseases caused by them. Diseases and symptoms due to abiotic causes.

Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes.

Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction

Viruses: nature, architecture, multiplication and reproduction

Nematodes: General morphology and reproduction, classification, symptoms and nature of damage

caused by plant nematodes (Heterodera, Meloidogyne,

*Anguina* etc.) Principles and methods of plant disease

management.

### **Practical:**

Acquaintance with various laboratory equipments and microscopy. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi. Study of symptoms of various plant diseases. Study of representative fungal genera. Staining and identification of plant pathogenic bacteria. Transmission of plant viruses. Study of phanerogamic plant parasites.

<b>206: Energy and Environment</b>
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**Credit hours: 2(1+1)**

### **Theory:**

Natural Resources: Renewable and non-renewable resources Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefitsh and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

- f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.

Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, wasteland reclamation, Ecological succession, Food chain, Food web, Structure and function of ecosystem, Environmental protection act.

### **Practical:**

Field work: Visit to a local area to document environmental assets river/forest/grassland/hill/mountain, visit to a local polluted site Urban/Rural/Industrial/Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

## 207: Food Science and Nutrition

**Credit hours: 2(1+1)**

### **Theory:**

Food as a source of nutrient, Food guide, basic five food groups and usage of food guide. Carbohydrates, types of carbohydrates, Fats, Fatty acids, Amino acids, Enzymes, Proteins, Functions of protein and enzymes, Monosaccharide, Disaccharide, Polysaccharide, Different types of nutrient, micronutrient, macronutrient, Fat soluble vitamins, types and function of different types of vitamins.

Introduction to nutrition, functions of foods, definition of nutrition, adequate, optimum and good nutrition, malnutrition, water as a nutrient.

Mineral functions, source, bio-availability and deficiency of minerals.

### **Practical:**

Estimation of carbohydrates, proteins and fats. Study on sustainable and environmental friendly nutrition, survey on nutrition education, seminars on importance of nutrition, malnutrition, immunity and mental wellness survey.

## 301: Crop Production

**Credit hours: 2(0+2)**

### **Theory:**

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Kharif* crops. Cereals – rice, maize, sorghum, pearl millet and finger millet, pulses-pigeonpea, mungbean and urdbean; oilseeds- groundnut, and soybean;

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Rabi* crops; cereals –wheat and barley, pulses-chickpea, lentil, peas, oilseeds-rapeseed, mustard and sunflower; sugar crops-sugarcane; other crops- potato.

**Practical:**

Rice nursery preparation, transplanting of Rice, sowing of soybean, pigeonpea and mungbean. maize, groundnut and cotton, effect of seed size on germination and seedling vigour of kharif season crops, effect of sowing depth on germination of kharif crops, identification of weeds in kharif season crops.

Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops, study of morphological characteristics of rabi crops, study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of *rabi* crops at experimental farms.

**302: Commercial Floriculture and Ornamental Gardening**
**Credit hours: 2(0+2)**
**Theory:**

Principles, theoretical aspects, developing skills in protected cultivation of flower crops, prospects of protected floriculture in India, types of protected structure- green houses, polyhouses, shade-net, rain shelters etc. suitable flower crops for protected cultivation viz. chrysanthemum, rose, liliun, anthurium. Production technology of important medicinal plants like asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, Processing and value addition in ornamental crops.

**Practical:**

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and Protected structures – care and maintenance. Intercultural operations in flowers . Harvesting and post harvest handling of cut and loose flowers. Visit to commercial flower nursery

**303: Breeding of Field Crops**
**Credit hours: 2(1+1)**
**Theory:**

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production. Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools. Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.

**Practical:**

Floral biology in self and cross pollinated species, selfing and crossing techniques. Techniques of seed production in self and cross pollinated crops using A/B/R and two line system. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production. Concept of rouging in seed production plot. grading and packaging. Visit to public private seed production and processing plants.

### **304: Crop Pests and their Management**

**Credit hours: 3(1+2)**

#### **Theory:**

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop, vegetable crop, fruit crop, plantation crops, ornamental crops, narcotics, spices and condiments. Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

#### **Practical:**

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Visit to nearest FCI godowns.

### **305: Crop Diseases and their Management**

**Credit hours: 2(1+1)**

#### **Theory:**

Symptoms, etiology, disease cycle and management of major diseases of following crops:

Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize:

stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose, Bajra downy mildew and ergot; Groundnut: early and late leaf spots, wilt

Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram: Cercospora leaf spot and anthracnose, web blight and yellow mosaic; Castor: Phytophthora blight; Tobacco: black shank, black root rot and mosaic. Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top; Papaya: foot rot, leaf curl and mosaic; Pomegranate: bacterial blight; Cruciferous vegetables: Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic; Beans: anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight; Coconut: wilt and bud rot; Tea: blister blight; Coffee: rust

### **Practical:**

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for Herbarium; Note: Students should submit 50 pressed and well-mounted specimens.

Symptoms, etiology, disease cycle and management of following diseases:

Field Crops: Wheat: rusts, loose smut, karnal bunt, powdery mildew, alternaria blight, and ear cockle; Sugarcane: red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng;

Sunflower: Sclerotinia stem rot and Alternaria blight; Mustard: Alternaria blight,

## **306: Commercial Agriculture**

**Credit hours: 2(0+2)**

### **Theory:**

Introduction to commercial farming agriculture, categories of commercial farming, types, mixed crop, dairy farming, grain farming, Livestock ranching, Mediterranean agriculture, commercial gardening and fruit farming, primitive subsistence farming, intensive subsistence farming, shifting cultivation, commercial grain farming, commercial mixed farming, commercial plantation farming, Different types of Farm in India.

### **Practical:**

Different types of seed collection: wheat, rice, jowar, bajra, ragi, maize, oilseeds, pulses available and find out their types of commercial farming status in India, Compare physical and human farm input, Visit to a field related to commercial farming.

## **307: Agricultural Economics and Marketing**

**Credit hours: 3(2+1)**

**Theory:**

Agricultural Economics : Meaning, scope, definition, concepts and definitions of market, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities; product life cycle (PLC).

**Practical:**

Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behavior over time for some selected commodities; collection of data regarding marketing costs, margins and price spread and presentation of report in the class; Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning; Application of principles of comparative advantage of international trade.

**401: Dry Farming and Agroforestry****Credit hours: 2(1+1)****Theory:**

Introduction to dry land agriculture, dry land farming, process , technique, properties of Arid-zone Agriculture, crop grown in dry lands, watershed management, concept, objectives.

Introduction – definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers; Artificial regeneration – objectives, choice between natural and artificial regenerationage determination of trees. Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens. Cultivation practices of two important fast growing tree species of the region.

**Practical:**

Identification of tree-species. Diameter measurements using calipers and tape, diameter measurements of forked, buttressed, fluted and leaning trees. Height measurement of standing trees by shadow method, single pole method .Nursery lay out, seed sowing, vegetative propagation techniques. Forest plantations and their management. Visits of nearby forest based industries

**402: Spices plantation and medicinal plant culture****Credit hours: 2(1+1)****Theory:**

Importance of spices in human nutrition and national economy, brief about origin, area, production, improved varieties and cultivation practices such as time of sowing, sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting, storage, physiological disorders, disease and pest control and seed production of important spices, importance and scope of medicinal plants.

**Practical:**

Identification of spices crops and their seeds. Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different spices and medicinal plants, Fertilizers applications, Study of plant part used as medicine.

<b>403: Seed Production</b>
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**Credit hours: 2(1+1)**

**Theory:**

Introduction to seed quality, History and development of seed industry in India, principles and practices of seed production, aim of seed production, seed production technologies, steps of seed production methods, scope of seed production, importance, seed drying, processing and their steps, seed treatment, seed packing, seed storage, measures for pest and disease control during seed storage, seed marketing.

**Practical:**

Seed production in major cereals: Wheat, Rice, Maize, Sorghum and Bajra. Seed production in major pulses: Urd, Mung, Pigeon pea, Lentil, Gram pea, Field pea. Seed production in major oilseeds: Soybean, Mustard, Seed production in vegetable crops, Seed sampling and testing, Field inspection, report, visit to seed production farms.

<b>404: Sustainable Agriculture</b>
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**Credit hours: 2(0+2)**

**Theory:**

Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

**Practical:**



Field visit to various farms to study sustainable agriculture methods and farming practices, study on mulching, crop rotation, contour farming, diversified farming, organic animal raising.

#### **405: Fundamentals of Agricultural Extension Education**

**Credit hours: 2(1+1)**

##### **Theory:**

Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development

Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, Physiology of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods

##### **Practical:**

A visit to village to understand the problems being encountered by the villagers/ farmers; to study organization and functioning of DRDA and other development departments at district level; visit to NGO and learning from their experience in rural development; understanding PRA techniques and their application in village development planning; exposure to mass media: visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

#### **407: Language for communication/ Communication skill in English**

**Credit hours: 1(0+1)**

##### **Theory:**

Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words. Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations. Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Written Skills: Paragraph writing, Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing. Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and process.

**Practical:**

Listening Comprehension: Listening to short talks lectures, speeches (scientific, commercial and general in nature). Oral Communication: Phonetics, stress and intonation, Conversation practice. Conversation: rate of speech, clarity of voice, speaking and Listening, politeness & Reading skills: reading dialogues, rapid reading, intensive reading, improving reading skills. Mock Interviews: testing initiative, team spirit, leadership, intellectual ability. Group Discussion.