Dr. Ram Manohar Lohia Avadh University, Faizabad
Programme for B.Sc. (Ag.)

PROPOSED SYLLABUS

Compulsory Course

	B.Sc. (Ag) –1st year 2011 –12	Theory	Practical
1	Agricultural Statistics and Mathematics	50	50
2	Agricultural Botany	50	50
3	Livestock Production and Management	50	50
4	Principles of Crop Production	50	50
5	Soil, Fertilizers and Manures	50	50
6	Agricultural Economics	50	50

	B.Sc. (Ag) –2nd year 2011 – 12	Theory	Practical
1	Agricultural Biochemistry	50	50
2	Agricultural Engineering –I	50	50
3	Ornamental, Horticulture, Medicinal & Aromatic Plants	50	50
4	Dairy Chemistry and Animal Nutrition	50	50
5	Crop Production and Farm Management	50	50
6	Genetics and Plant Breeding	50	50

	B.Sc. (Ag) –3rd year 2011 - 12	Theory	Practical
1	Agricultural Entomology	50	50
2	Plant Pathology	50	50
3	Agricultural Extension and Rural Journalism	50	50
4	Vegetable Science	50	50
5	Dairying	50	50
6	Agricultural Engineering –II	50	50

	B.Sc. (Ag) –4th year 2011-12	Theory	Practical
1	Production Economics & Farm Management	50	50
2	Rural Sociology and Community Development	50	50
3	Crop Production and Field Experimentation	50	50
4	Fruit Science	50	50
5	Soil and Environment	50	50
6	Rural Agricultural Works Experiences (RAWE)	~~50~~	50

Foundation Course (Hindi or English)

DETAILED SYLLABUS

Hindi		
1	अपठित (शीर्षक 2 अंक, सार–4, रेखांकित अंशों की व्याख्या 4 अंक)	10
2	वाक्य शुद्धि	05
3	पत्र लेखन	10
4	लोकोक्ति एवम् मुहावरे	10
5	अंग्रेजी के पारिभाषित शब्दों के हिन्दी पर्याय	10
6	पल्लवन (विशादीकरण)	05
English		
1	Correction of sentences involving different parts of speeches	10
2	Translation for English to Hindi and Hindi to English (The length of the passage would not exceed 100 words)	05
3	Letter and Application writing	05
4	Comprehensive (The passage would not exceed 250 words)	05
5	Synthesis and transformation of sentences	05
6	Idioms and proverbs	05
7	Antonyms and Synonyms	05
8	Confused words and one word substitution	05
9	Expansion	05

B.Sc.(Ag.) Ist Year
Paper-I Agricultural Statistics and Mathematics:

Frequency Distribution:

Classification, Tabulation, Diagrammatic Representation, and Graphic Representation of data, Histogram, Frequency Polygon, Frequency curve and O give.

Measures of Central Tendency:

Mean, Median, Mode, Measures of Dispersion, Range, Mean deviation, Variance, Coefficient of variation and standard error of Mean.

Correlation and Regression:

Meaning of Correlation, Type of Correlation, Karl Pearson, Coefficient of Correlation, Limits of Correlation Coefficient, Rank Correlation, Regression, Lines of Regression, Regression Coefficient. Properties of Regression Coefficient, Angle between two lines of Regression.

Test of Significance:

Concept of random, Sample and Statistics, Test of Significance based on Z, T, F and Chi-square Statistics.

Analysis of Variance:

Analysis of Variance with equal number of observation per cell in one and two way classification, General and Basic Principles of Experimental Design, CRD, RBD, and LSD.

MATHEMATICS:

Algebra of Metrics:

Elementary concept of determinants, minor and cofactor of determinates, Properties of determinants, definition of Metrics, Type of Metrics and Properties, Addition, Subtraction, Multiplication and Inverse of a Matrix.

Quadratic Equations

Solution of quadratic equations, Nature of roots, Symmetric functions of roots and formation of equation by given roots.

Calculus:

Differentiates of Simple function, Products and Division of two function, Integration of standard form, Simple exercise on differentiation and integration.

Paper II Agricultural Botany
(Biotechnology, Crop systematic and physiology)

Section A- Anatomy

1- Introduction and History of biotechnology.

2- Tissue culture tehhnique, Media of Tissue culture and their application.

3- Organ culture, cell subpension culture.

4- Micro propogation methods organogenesis and embryo genies somatic hybridization and hybrids somaclonal variation and its use in crop improvement, Transgenic plant & their use, role of biotechnology in crop improvement.

Section B. Systematics

A systematic study of the following families with special reference to the generia mentioned.

Graminae (Peaceae)	-	Triticum Hordium, Oryza Aoa.
Leguminosae	-	Phaseolur, Pisum, Arachis Crotolaria.
Cucurbitaseae	-	Cucurbita, Luffa, Lagenan
Malvaceae	-	Hibiscus Gossypium
Rosaceae	-	Prunus
Euphorbeaceae	-	Riceinus
Compositae	-	Tagetes
Rutaceae	-	Citrus
Cruciferae	-	Brassica
Linaceae	-	Linum
Pedaliaceae	-	Sessamum
Solanaceae	-	Solanum

Section C. Physiology

Physiology of Cell. Elementary ideas of absorption of water and mineral salts.

Function of Leaves:

1. Transpiration, its types; mechanism and factors affecting it significance.
2. Carbon Assimitation its mechanism and factors affecting.
3. Respiration – its types, mechanism and Factors affecting-Growth and development.

Elementary knowledge of vernalisation.

Elementary knowledge of Photoperiodism.

Practical:

Systematic study of the genera prescribed for the theory. Germination tests of seeds and tubers & Poolen.

Experiments on water and soil culture Simple experiments on transpiration, respiration and photosynthesis.

Demostration of Tissue culture, hydroponic sand culture anther & ovary culture Emuscultation

Presentation of practical records.

Paper-III Livestock Production and Management.

Introduction, Anatomy and Physiology:

Statistics of livestock and their contribution in national wealth, elementary anatomy and physiology of cattle with special reference to digestion, reproduction and lactation.

Breeding:

Aims of breeding, methods of breeding natural *vs.* artificial methods of breeding, systems of breeding and their consequences, Inbreeding coefficient and relationship. Method of selection, cattle breeding problems, plan and progress in India.

Feeding:

Importance of scientific feeding, Feeding standards, Their evaluation and significance, feeding practices, fodder crops and their conservation.

Management:

Aims and objects of successful cattle management its requirements, practice dealing with breeding, feeding, labour, marketing, record keeping and raising replacements. Location grouping, designing and construction of different dairy farm buildings, their cost and space requirements, management of pasture lands.

Elementary Anatomy and physiology of diseases and parasites:

General principles of disease control, quarantine, disinfecting premises sanitation, segregation. Distinction of diseased animals and disposal of carcass, Familiarity with the following comon diseases of dairy animals, their symptoms and first aids, ------ Naval ill, White scour, Pneumonia, Blood, Prolapse of -----uterus and vagina, Foot and mouth, Diseare, Maititis, Mastritis, milk fever, Tuberculosis, Haemorrhagic septicaemia (H.S.). Familiar economic importance and eradication of parasite, liverfluke, tapewarm.

Practicals:

Detailed external anatomy of cattle and their judging.
Assembling and disassembling of artificial vagina.
Demonstration of semen collection.
Examination handling and insemination.
Computation of balanced ration for different classes of animals.
Maintenance of dairy farm records.
Preparation of ointments, dressing oils and laminants.
Identification of common parasites medicines and instruments.
Marking, docking, dehorning and castration of different classes of animals.
Milking of milch animals.
First aid to sprains, abscesses, wound & tumers.

Paper-IV : Principles of Crop Production:

Theory:

Definition and scope of Agronomy.

Tillage its objective, Types and Modern Concept of Tillage.

Classification of crops, cropping systems – monocropping, mixed cropping, relay cropping multicropping, multistoried cropping. Crop rotations Definitions Principles advantage and Intensity of crop rotation,

Soil fertility and productivity management, classification of manures and fertilizers. Differen types of nitrogenous, phosphatic and potassium fertilizers. Time & method of fertilize management. Methods of irrigation and drainage.

Definition and classification of weeds, their characteristics and crop weed competition Principles and methods of weed management. Methods of weed control-machanical, agronomical biological and chemical methods.

Principles of seed production, type of seeds, seed certification, seed testing- purity and germination test. Processing, grading and storage . Seed Act.

Meaning and definition of sustainable agriculture. Problems of modern agriculture managemen practice in sustainable agriculture.

Practical:

Field operation regarding tillage, irrigation, drainage and weed management. Identification o weeds, manures, fertilizers, seeds and agricultural instruments Numerical questions on manures and fertilizers, and herbicides.

Tours and visits- Agriculture farms, K.V.K. and Agriculture University.

Practical record , Viva Voce

Paper – V Soils, fertilizers and manures:

Pedology:

Introductory knowledge of soil body, Soil formation, rocks and minerals, Their classification and characteristics, Weathering of rocks, type of weathering, soil formation processes and factors affecting soil formation, soil taxonomy, important soils of India with special reference to U.P. with respects to chemical, physical and biological characteristics, study of soil profile.

Physical properties of soil:

Important physical properties of soil bulk density, particle density, texture, structure, porosity, permeability, their relationship with plant growth, soil air, composition, exchange and significance, soil water, classification, movement, retention, soil moisture plant relationship and losses of soil moisture.

Soil Chemistry and Technology :

Soil colloids, their classification, general properties, clay minerals and humus, their chemistry in relation to plant growth and ion exchange and their relation to soil fertility, soil reaction and its relation to plant growth, and buffering in soils, salt affected and acid soils, their distribution, formation and management, Quality of irrigation water, its effect on soils, and plants, suitability & management for irrigation,

Soil Microbiology:

Soil Micro organism in soil, their classification, role and factors affecting their growth – Microbial transformation of nitrogen and phosphorus. Nitrogen fixation, soil organic matter, sources, decomposition, role in soil fertility, C/N ratio.

Soil fertility and fertilizers:

Essential plant nutrients, their role in plant growth, deficiency symptoms, sources and behaviour in soil, evaluation of soil fertility, classification of manures and fertilizers, Important nitrogenous, phosphatic, potassic, secondary nutrients and micronutrients fertilizers, Their action in soil and effect on plant growth. Organic manures, Fym, Compost, green manuring, biofertilizers.

Practical:

Soil sampling and use of soil sampling tools, study of soil profile in field and laboratory. Soil forming rocks and Minerals. Determination of bulk density, particle density, percent pore space, water holding capacity, field capacity, determination of soil organic matter, Estimation of chloride, carbonate, bicarbonate, sulphate and hardness of irrigation water and water quality evaluation. Determination of available nitrogen, phosphorus and potassium in soils & fertilizers. Determination of total nitrogen in soil, mechanical analysis of soil.

Paper VI : Agricultural Economies

I- General and Natural Resourcess:

Peculiarities of Indian agriculture, Importance of agriculture in national economy; Land utilization and land use pattern in Indian and U.P.; Sources of Irrigation and extent of irrigation, cropping pattern, Sources of energy in agriculture; Livestock economy, population and food production; yield of major crops and causes of law yield in India.

II- Problems of Land Agriculture Labour:

holding operational and ownership holding. Sub-division and fragmentations-meaning, causes, effects and remedies particularly consolidation of holding and co-operation effects and remedies particularly consolidation of holding and co-operation forming is equal distribution of land and present position causes for small Land holding. Effects and remedies particularly land ceiling; Land reforms, needs, objections and implementation.

III- Agricultural Problems:

Problems of agricultural labour, nature of demand and supply of labour in farming, problem of agriculture labour and its unemployment.

Agriculture labour- meaning, type, effect and remedies, minimum wages and their fixation and their fixation in agriculture. Schemes launched by the Govt. to improve the conditions of agricultural labours in India.

IV- Agricultural Marketing and prices:

Definition and importance of agriculture marketing, Markets – meaning, types, marketing functions, agencies and channels, Problems in agriculture marketing in India; market regulation, co-operative marketing.

Role of FM and NAFED, concept of form retail and sale price. Nature and price movement and reasons and consequences of price fluctuation, price stabilization, Agriculture price policy.

V- Agricultural finance and Banking :

Meaning and importance of finance in agricultural credit meaning, classification, Problems, credit agencies, Institutional and non-Institution Commercial Bank, and Nationalized Banks, Lead area approach Village adoption Schemes.

Practical:

1. Estimation of marketable and marketed surplus food gain .
2. Estimation of marketing cost, margin and price spread in case of khari cereals Ravi cereals and Gurh (at least 3 case studies).
3. Study of regulated market.

Acquaintance with loaning system of any on financing Institution.

B.Sc. (Ag) part – II

Paper – I : Agricultural Biochemistry

Scope of Biochemistry, cell structure, cell components and functions. Theory of dilute solutions, osmosis, osmotic pressure and its measurement colloidal state of matter, properties, classification and stability Modern concept of acid and base and oxidation reduction.

Carbohydrates:

Characteristics, classification, chemistry of important monosaccharides (Glucose and fructose), disaccharides (sucrose, maltose and lactose) and starch.

Nutritional significance and metabolism of carbohydrates. Elementary ideas of mutarotataion.

Lipids:

General characteristics. Classification, physical and chemical properties of fats and oils. Fatty acids Classification and their characteristics and nutritional importance, Elementary idea of the chemistry of sterols and phospholipids. Metabolism of lipids.

Proteins:

Sources, classification, general properties, structure and nutritional significance. Amino acid classification and properties Metabolism of proteins. Nucleic acids: Function of RNA and DNA.

Enzymes:

General characteristics, nomenclature, classification and occurence Mode of enzyme action and factors affecting enzyme activity. Vitamins: sources, definition, classification, deficiency symptoms Physiological role and chemistry of vitamins (A, C, D, E, K, B and B_2) Elementary knowledge of plant pigments.

Practical:

1. Preparation of standard solutions for volumetric analysis.
2. Estimation of Moisture, protein, ash, oil, reducing and non-reducing sugars in agricultural products.
3. Estimation of Ca, P and potassium in plants.
4. Determination of saponification value, R.M. value, P value, iodine value of fats and oils.
5. Determination of ascorbic acid in citrus fruits.

Paper – II : Agricultural Engineering

Farm Maching, power and post Harvest Engineering

Farm operations and scope of farm mechanization, study of operation principles and adjustments of typical fixed machines, sowing, intercultivators, plant protection, harvesting and threshing, farm power sources and utilization, tractor components and ugious systems- their working and keep, study of electric motors, cast analysis.

Post harvest operations, importance of post harvest Engineering, proceeding of food grain with special emphasis on rice parboiling milling, storage and storage structures, oil milling and pulse milling.

Practical:

Study of tillage implements, colibration of seed cumfertilizer drill operation and handling of Reeper and thresher study of two stroke and four stroke engines, study of tractor systems, simple workshop exercises on carpentary, pladesmility, welding, drilling. Study of post harvest machaning like rice milling, Oil milling, pulse milling, determination of moisture contents of grains. Operation and adjustments of engines, tractors and power letter.

Paper- III : Ornamental Horticulture, Medicinal and aromatic Plants

Importance and scope of ornamental gardening detailed study of the cultivation of following : Rose, Chrysanthemum : Canna, Bougainvillia, Dahllias, Jasmines and exhibition Plants.

Meaning Propogation Methods of or namatal Plants and importance of landscaping : Making maintenance and renovational, Heges and lawn, concept of Bonasai culture: Importance, present need and principles of Bonsaimaking.

Climbers, avenue, trees, Garden Feature, Planning and planting of herbaceous and shrubbery border and different types of ornamental Gardens. Principles and practice of landscape Gardening. Aesthetic planning of farms, building compound and such other places. Road and canal side planting.

Definition, classification importance, export and import of aromatic and medicinal plants with special reference to uses, botany, climate and soil, varieties, propagation, nursery, planting cultural practices, harvesting yield, plant protection, measures : Lemon grass, Medicinal yam, Fox glove, opium Pyrethrum, sarpagandha Sofed Musali, Tulsi.

Practical:

1. Important methods of propagation of garden, aromatic and medicinal plants.
2. Identification of garden, aromatic and medicinal plants.
3. Visit to ornamental gardens and distillation plants.
4. Layout of ornamental gardens and distillation industry.
5. Upkeep of lawns & hedges and distillation plants.
6. Cultivation of ornamental, aromatic and medicinal plants in a demonstration pot.
7. Maintenance of proper records of laboratory and field work done by individual student.

Paper- IV : Dairy Chemistry and Animal Nutrition

Dairy Chemistry :

Chemical composition of colostrum and milk, composition of cream, butter,evaporated milk, milk powder, khoa, chhena, cheese, condensed milk and ghee.

Chemistry of milk constituents *viz*, proteins, carbohydrates, lipids, vitamins and mineral.

Chemical changes during storage of milk and ghee.

Adulteration of milk and ghee and its detection.

Preservatives commonly used in milk and simple chemical tests for their detection.

Animal Nutrition:

Constituents of animal body, their function, digestion, absorption and metabolism of carbohydrates, proteins and lipids. Biological value of protein and energy values of feeds.

Classification, composition and nutritive value of feeding stuff and analysis of feeding stuffs.

Practical:

1. Preparation of standard solutions.
2. Milk and milk products analysis, estimation of total solids, SNF, mineral matter, total protein, fats, lactose by fehling's solution and lodemetric method.
3. Feeding stuffs analysis, (a) Total ash (b) Calcium, phosphorus and (c) Crude protein.
4. Estimation of acid values of fats and oils.
5. Demonstration of RM value and polenske value.
6. Demonstration of procedures used in determination of ether extract and crude fibre in feeding stuffs.
7. Estimation of casein in milk.

Paper V : Crop Production and farm Management

A. Study of the following crops with special reference to Uttar Pradesh (Origin, history, distribution, varieties, improved agronomic practices, harvest & yield).

Cereal Crop - Rice, Maize, Jowar, Bajra, Wheat, Barley, Smaller millets- (Manduwa, Cheena, Sawan, Kodon, Kakun).

Forage Crop - Jowar, Bajra, Maize, Napier grass Gunea grass, oats, berseem sudangrass, Dina nath grass.

Fibre Crops - Cotton jute, sunhemp.

B. Farm Management-

Principles underlying successful management of farms, maintained for profits, experimentals and demonstration farms.

Farm lay out and cropping scheme, General survey of land, Layout of fields, roads, building, irrigation and drainage channels.

Practical :

Practical study of crops mentioned theory course.

Planning of farm layout.

Preparation of cropping scheme.

To work out the Cost of seed and fertilizers requirements of crops

Working out cost of fencing & farm building.

Working of cost of cultivation of crops.

Tours and Visits.

Practical Record, Viva Voce.

Paper- VI : Genetics & Plant Breeding

Introduction and brief history of Genetics Morphology and chemical composition of chromosoms, DNA, RNA Cell division (Mitosis & Meiosis).

Work of Mendal

Mendelian Ratios

Early Notions of Heridity.

Modifications of Ratio

Epistatis, diprocate, complementory, supplementory

Inhibitory, polymetric and lethal factors.

Later development of mendalism.

Inheritance of quantitative characters.

Linkage & Crossing ever.

Estimation of linkage from back cross data.

Sie chromosomes

Sex Linked inheritance

Sex determination in plants

Variation (kind & causes)

Chromosomal aberrations, polyploidy, Mutation, Their classification and role in agriculture, cytoplasmic inheritance.

Plant Breeding.

History of plant breeding Mode of reproduction methods of crop improvement.

Introduction, selection and Hybridization.

Hybrid vigeour and its utility in crop improvement.

Review of breeding work in U.P. of wheat.

Pulsecrops (arhar & gram), Rice, Maize and Brassica.

Introduction to biotechnology in Crop pronenal.

Practical:

2. Determination of goodness of fit mendelian ratios.

3. Process of selection and hybridization of important crop of the locality.

4. Technique of emasculation in different crops, knowledge to design layouts for different types of important trial.

5. Preparation of temporary cytological slides mitosis and meiosis and meiosis by share technique. Identification of cytological preparation sharing meiosis and some chromosomal irregularity like lagging and ridging.

B.Sc. (Ag) part – III

Paper : I Agricultural Entomology

Morphology :

General account of an insect as seen in Grasshopper. Structure and functions of integument. Different regions of the insect body namely – Head, Thorax and abdomen.

Head :

Structure and function of its appendages and their modification.

Thorax :

Segmentation appendages, their structure and function.

Abdomen :

Segmentation, appendages, their structure and function.

Anatomy of Grasshopper :

Structure and function of various systems *viz.* Digestive, Respiratory, Circulatory, Excretory, Reproductive and Nervous system, Sense organs, their structure and function.

Taxonomy:

Main order and chief families of agricultural importance – *viz.* Orthoptera, Coleoptra, Isoptera, Hemiptera, Diptera, Lepidoptera and-Hymenoptera.

Role of Insect in Agriculture Production :

Insect pests and their status, host plants, nature of damage, bionomics and their management.

Cereals and Millets :

Hieroglyphus nigroreplitus, leptocorisa varicornis, Nilaparvata, lugens, Chilo partellus sp.

Pulses :

Agrotis sp. Heliothis armigera.

Insects :

Lypaphis erysimi, Bagrada sp., Athalia sp.

Vegetables:

Leucinodes orbonalis, Dacus cucurbitae, Aulacophora foveicollis, Gnorimoschema operaculilla.

Fruit :

Papilio demoleus, Aphids sp. Drosicha stebbengli Rohinaceras sp. Carpomiya vesuviana.

Fibre :

Pectinophora gossypiella, Earias sp., Sylepta deragota, utethesia pulchella, Dysdercus cingulatus.

Sugarcane :

Scirpophagous nivella Emmalocera depressella, Chiloinfuscatellus, pyrilla perpusilla, Aleurolobus barodensis.

Insect pests :

Their Status, host plants, nature of damage, bionomics and their management.

Polyphagons :

Locust, Termite, Hairy-Caterpillars and cut worms or surface cater pillars Stored grain insect-pest – *Sitotroga cerealella, Sitophilus oryzae, Trogoderma granarium, Rhizopertha dominca, Tribolium castaneum, Callosobruchus chinensis.*

Importance and safe methods of storage, sources of infestation.

Industrial insects :

Elementary knowledge of sericulture and Lac culture, Apiculture (Bee Keeping).

Preparation of two solution of Insecticides :

Ecological factors responsible for insect pest out breaks and their control; Plant protection appliances towards application of insecticides.

Non-insect pests of agricultural importance and their control : (i) Nematodes (ii) Rats (iii) Birds.

Practical :

1. Study of morphological characters of head, thorax and abdomen, mounting of mouth parts, Legs and antennae of insect.
2. Di-section of grasshopper and cockroach.
3. Collection and mounting of insects pests.
4. Field and Laboratory acquaintance with common insect pests and pesticide application equipments.
5. Application of pesticides and their formulations.
6. Familiarity with spraying and dusting appliances and appratus used in pest control.

Paper II Plant Pathology :

Knowledge of common term related to classification of fungi with special reference to the characters of genera maintained below.

Pythium, Phytophthora, Albugo, Aspergillus, Penicillium, Mucor, Rhyzopus, Sachorenyces, Erysiphe, phyllactima vastilago, Sphacelotheca, Talyposporium, Pyccultaria, Altenaria, Helminothosporium cercospora, Fusarium and Rhizoctonia life cycle of following fungi-pythium, Debaryanum, Rhyzopus, Nigricans, Taphrina, deformans, Erysiphe polygoni Ustilago hordei, Puccinia graminis General account of history, morphology structure and reproduction of bacteria classification of plant pathogenic bacteria Nature, properties, transmission and reproduction of plant viruses. Elementary idea about general properties of mycoplasma. Study of citrus canker and tobacco mosaic.

Definition of plant diseases and its classification according to its causal agents and occurrence. General symptoms of plant diseases.

Kochs postulates, factors required for disease production and states in the development of a disease *i.e.* inoculation, penetration, infection, incubation period invasion, reproduction, dissemination and perpetuation of a pathogen preparation of P.D.A. Steam Sterilization and isolation of a pathogen study of black tip of mango khaira disease of paddy and cuscuta, study of following diseases with special reference to symptoms, disease cycle and control measures.

Late blight of potato, white blister of crucifer's green ear disease of bajra, powdery mildow of pea, Loose smut of wheat and barley, covered smut of barley, Smut of bajra, Rusts of wheat, Rust of linseed, Red rot of sugarcane, Early blight of potato, Tikka disease of groundnut, blast of paddy and wilt of Arhar.

Practical :

Seasonal survey of farms, collection of infected plant materials.

Paper – III Agricultural Extension and Rural Journalism

Meaning, Definition, Scope, Principles, Objectives and philosophy of Extension Education; Importance of Agricultural Extension in Rural Development, Historical "Development of Agricultural and Rural Development programme/Activities being launched in India.

Extension Teaching and Learning :

Meaning, Definition, Steps Principles and factors effecting Teaching and Learning Situation; Extension Teaching methods and teaching aids; classification and importance of Audio – visual aids.

Programme planning and Evaluation :

Programmeplanning – Definition, Principles, Procedure/cycle, Steps. Importance of programme planning in agriculture and rural development, Decision making process; Method, types and role of decision making in context programme planning.

Evaluation – meaning, definition objectives, and procedure and steps involved in programme evaluation.

Rural Journalism :

Meaning, Scope and limitation of Rural Journalism. Orign, Growth and present status of form journalism in India. Qualities of ideal Journalist.

Principles and Teachnique of Journalism :

Editing, Proof Reading, Reporting, Techniques of writing editorial, articles, News and New Letters, News stories, Pumphlet, Bulletins etc.

Practical :

1. Preparation of simple visual aids, Poster, Chart, Flash Cards, Flannel Graphs, Slides and Photographs etc.
2. Writing Extension literature : Circular letter, News stories, Radio talk, New letter Articles, Preparation of Booklet, pamphlet and bulletins.
3. Practicing and handling of projectors; Projectors- (Slides, Overhead, Opaque); Camera, Tape recorder etc.
4. Practice of editing and proof reading, Practice of collection of new and treatment.
5. Visit of CD Block and Extension training centres; A compulsory tour and visit of different Rural Development centres and Agricultural Universities (For all the Students).

Paper – IV : Vegetable Science

Importance of vegetables in human diet and nation's economy. Classification of vegetables. Types of vegetable growing. Principles of vegetable preservation.

Cultivation of following vegetables and special reference in soil, climate, manuring, irrigation, interculture, seed raising, varieties, insect, pests, and diseases, harvesting, packing and disposal. Cauliflower, cabbage, brinjal, tomato and chillies, Potato.

Cultivation of following vegetables with special reference to soil climate, manuring, irrigation, interculture, seed raising, varieties, insect, pests, and diseases, harvesting, packing and disposal Carrot, Radish, Onion, garlic.

Definition of spices and condiments, classification of spices, places of cultivation of important spices in India, importance and future scope of spices industry in India, Export and import of spices in India.

Cultivation of following spices with particular reference to importance, botany, climate and soil, varieties, propagation, selection of site, system of cultivation, planting, cultural practice, harvesting, curing, yield plant protection.

Black pepper, cinnamon, clove, nutmeg, cardamom, ginger, turmeric, coriander, fenugreek, fennel, Cumin.

Practical :

1. *Preparation of nurseries for the vegetables of Rabi, Kharif and Zaid Seasons.*
2. Seed raising of early cauliflower, tomato, onion, radish and okra.
3. Cultivation of following vegetables in a demonstration plot: Cole crops, Solanaceous vegetables, root crops, pears and beans bulb and leafy vegetables, spices, cucurbits etc.
4. Layout of kitchen Market and truck gardens.
5. Economic studies in the production of cauliflower, brinjal, okra, onion and carrot.
6. Making of tomato sauce and ketchup.
7. important methods of propagation of vegetables and spices.
8. Identification of important major and minor vegetables & spices.
9. Visit to important vegetable and spice growing farms.
10. Maintenance of proper record of laboratory and field work by individual students.

Paper – V : Dairying

Milk production and Marketing :

Sanitary production of milk, cost of milk production, factors affecting cost of milk production.

Marketing :

Marketing agencies including cooperative milk union and dairy schemes, methods of transportation and distribution milk.

Processing of milk :

Standardization, Homogenisation pasteurisation, sterilisation, cooling and bottling of milk.

Milk and Micro-organism :

Sources of Contaminmation of milk, Micro-organisms and the changes they bring about in milk, quality control of milk, plat form and laboratory test.

Milk Products :

(1) **Cream :** Centrifugal cream separation and its advantages over gravity method. Efficiency and capacity of cream separators, factors affecting richness of cream.

(2) **Butter :** Procurement, grading, neutralization pasteurisation and ripening of cream, General procedure for butter making. Factors influencing churning and body of butter Ghee: manufacture of ghee by indigenous and improved methods, factors affecting the marketability and keeping quality of ghee, legal standards of ghee.

(3) **Ice Cream :** Steps involved in ice cream manufacturing and their significance. Refrigeration. Importance of refrigeration. Systems of refrigeration – natural and mechanical, compression refrigeration, systems, principles, and ways of utilisation.

Practical :

1. Cleaning and sterilisation of dairy appliances.
2. Filling of cream separator, separation of cream, determination of fat and fat recovery.
3. Testing of milk : Sampling, determination of sp. gravity by lactometer, fat by gerber's method and SNF with the help of formula and with Richmond's scale Acidity of milk, cream and dahi.
4. Demonstration of :
   a. Sediment test
   b. Simple platform test, like alcohol test, C.O.B. test, BCP and Resazurin Rennet test.
   c. Creamery butter.
   d. Dahi

e. ... Channa

f. Ghee by direct cream method and creamery butter method

g. Ice-cream

5. Dairy Arithmatic :

General dairy calculation with special reference to :

a. Problems on standardization of milk and cream.

b. Problems on adulteration of milk

c. Problems on Neutralisation of cream

d. Problems on over-run in butter and Ice-cream

e. Visit to dairy farms

Paper – VI Agricultural Engineering – II

(Soil and water, irrigation and Drainage Engineering)

Importance of soil and water conservation, Principles and practices in soil and water conservation, kinds of soil erosion, Runoff, factors affecting runoff, factors affecting erosion, erosion control measures and practices, mechanical measures, wind erosion, control measures, wind breaks and shelter belts.

Type of wells and their construction, centrifugal pumps, Principles of working and operation including installation, Measurement of irrigation water.

Chain and compass survey, plane table survey, Elementary levelling. Soil-water plant relationship. Irrigation requirements and irrigation scheduling, water application method. Sprinkler and drip irrigation equipment.Benefits of drainage, surface and sub surface drainage methods.

Practical :

The practice of surveying methods, study of pump, installation, working, trouble shooting, study of soil conservation practices and preparation of plans, irrigation and drainage system, and selected equipment.

B.Sc. (Ag.) IV Year

Paper – I Production Economics and farm management :

- **farm management its meaning :** Scope and nature its relationship with their subjects. Economic principles applied to farm management Factor- Factor, Factor-Product and Product-Product relationship, Cost concert.

- **Farm Planning & budgeting :** Live stock and crop enter price, budgets, partial and whole farm Planning & budgeting. Elementary idea of linear programming.

- **Farm records and Account :** Advantages of keeping farm records accounts. Farm Inventries. Concept of liabilities and net worth of a far. Valuation of farm assets, depreciation, meaning, and methods of computing depriation.

- **Farm business Analysis :** Types of enterprises, system, and types of farming, measures of farm income, measures of farm size and farm efficiency.

- **Farm Resources Acquisition :** land, Labour and capital management, measures of management efficiencies.]

Practical :

1. Application of economic principles in the field of management analysis of hypothetical data.

2. Preparation of partial and whole farm budgets.

3. Cost of Cultivation : Study of farm business analysis.

4. Aquitance with farm records and account maintained records and commercial farm.

Paper : II
Rural Sociology and Community Development

- **Concept of Rural Sociology :** Meaning, Definition, Nature and Scope of Rural Sociology Importance of Rural Sociology in extension education; characteristics of rural society.

  Relationship of rural sociology with other social science.

- **Agricultural Community :** Definition, Nature and types of communities; Elements and changing pattern of agricultural Community in India.

  Socio-economic and psychological characteristics of rural people.

- **Social Group and Rural leadership :** Social Group- Meaning and types of groups; Rural leadership – Meaning, Definition and emerging pattern of rural leadership; Types of leader and techniques of identifying of rural leader. Qualities of leader and their role in rural development.

- **Community Development :** Concept, philosophy and principles of community Development extension work in USA, UK, Denmark and China; History of Rural Development programme in Indian with reference to Shri Niketan, Seva Gram, Marshandam, Indian village services, Etawah Pilot project and Surbodaya; Organisational set up of community development Programme.

- **Village institutions and Rural Development Programme-:** Basic Rural institutions *i.e.* Village Panchayat, Cooperative societies and Village school and their role in rural Development; Programme for rural development – IADP, IRDP, JRY,LL.P, ICDS, KVK,H.Y.V.P, D.P.A.P, D.W.C.R.A. etc. Green Revolution, White Revotion & Blue Revolution in India.

Practical :

1. Visit to development block (Kshetra Panchayat Samiti) & Different Training Centers.
2. Study of various function and role of Panchayat, Co-operative Society and Village School.
3. Socio Economic survey – collection of primary data, classification and presentation of data.
4. Preparation of farm production plan.
5. Study of Various Rural development programme in village and study the function and role of NGO's Govt. Organisations.

Paper : III Crop Production and Field Experimentation

(A) Study of the following crops with special reference to U.P. (Origin, History, Climate, Soil, Distribution, Varieties, Improved Agronomic Practices, harvesting, and yield)

(a) **Pulse crop** – Pigeon pea (Arhar), Green Gram (Mung), Black Gram (Urd), Cow pea (Lobia) Soybean, Gram, Pea, Lentil.

(b) **Oil seed Crop** – Groundnut, Sesamum (Til) Castor (Rendi) Mustard (Rai), Toria(Lahi), Linseed, Sunflower.

(c) **Special Crops** – Sugarcane, Potato, Tobacco.

(B) **Field Experimentation-** Object & Principles of field experimentation, Study of C.R.D., R.B.D. & L.S.D.

Practical :

1. Practical study of crops mentioned in theory course.
2. To work out the cost of seed and fertilizer requirement of crops.
3. To work out the cost of cultivation of crops mentioned in theory course.
4. Planning of field experiments.
5. Tours & Visits.
6. Viva-Voce

Paper – IV : Fruit Science

Theory:

Importance, present position and future scope of fruit growing in India. General survey of fruits grown in U.P. with special reference to climate, Selection of site for an orchards.

Planting of new orchards. Systems of layouts selection of planting material after-care of new orchards.

Management of established orchards; manures and maturity) principles. time, method and amount), Irrigation (Principles and methods including sprinkler and drip) sod vs. Clean cultivation Training and priming (Definitions system of training, principles of pruning and inter cropping and-cover-cropping. Principles of fruit preservation. Causes of unfruitfulness and their remedial measures.

Cultivation of following fruit crops with special reference to importance, climate soil, varieties, commercial (Common) Methods of Propagation, Irrigation, Manuring cultivation transfer and pruning, intercropping, pest and deseases and their control, harvesting, marketing. Mango, Guava, Papaya, Banana, Oranges, Limes and Lemon, Grapes, Litchi, Jackfruit, Aonla, Phalsa, Ber, Apple and Peach

Cultivation of following plantation crop under the headings mentioned under Unit-III: Tea (Comellia Sinensis Coffee (Comephora Spp.), Coconut, Cashew and Arecanut.

Practical :

1. Commercial methods of propagation of fruit plants.
2. Lifting, packing and disposal fruit plants.
3. Acquaintance with the methods of layout of orchards for the plains of U.P.
4. Identification of fruit crops with the aid of Reaves, flowers, fruits and seed.
5. Acquaintance with the common cultural operations practiced.
6. Practical steps for the preparation of gelly, jam, and squash.
7. Visit to commercial orchards and nurseries.
8. Maintenance of proper records of laboratory and field work by individual student.

Paper- v : Soil and Environment

Environmental factors and their effect in crop growth and development. Principles of crops adaptation. Ecological balance and the biotic circulation. Forest; distribution role, rejuvenation and management, biotic pressure, dams and irrigation potential leading to deforestation. Green revolution leading to rapid desertification, organic wastes, use of organic wastes for crop production, Soil as organic waste disposal site and its biodegradation, soils and the Greenhouse effect.

Effect of agricultural activities on environment. Water table chemical degradation and physical make up (aggregation, compaction, puddling). Amelioration of soil impedance (Deep ploughing, Sub Soiling, Conservation, Tillage), Long term effect of soil management in soil environment. Environmental pollution: Definition, types of pollution and pollutants. Atmospheric pollution, sources effects and control of air pollution, water pollution, sources, effects and control of water pollutions from city wastes and agricultural lands. Soil pollution, Pesticides, kinds of pesticides, behaviour of pesticides in soil, effects of pesticides on environment, biodegradation of agricultural pesticide, Contamination of chemicals in sewage, sludge, Behaviours of inorganic contaminants in soil. Prevention and elimination of inorganic contamination.

Land degradation, factors responsible for land degradation, definition, distribution, nature and concept and causes of different kinds of degraded lands (water logged, saline, sodic, Acidic, Desert, Eroded) and their management.

Practical :

1. Determination of organic matter, in organic wastes.
2. Analysis of underground water.
3. Analysis of Gammaxine and Bordeaux mixture.
4. Determination of soil reaction, soluble salt concentration and gypsum requirement of soil.
5. Estimation of bulk density, particle density, porosity, hydraulic conductivity and water holding capacity.
6. Field examination of soil for productivity evaluation.
7. Field visits to environmental problematic locations.

B.Sc. (Ag) Fourth Year
paper – VI Rural Agricultural Works Experience
Course outline of RAWE

1. Socio economic survey of village.
2. Soil and water sample collection and analysis.
3. plant clinics.
4. Attachment is agrobasing industries.
5. Participation in special Kharif/Rabi sowing programme.
6. Visits to important institutions.
7. Crop-wise records of agricultural operation performed by selected/assigned farmers.
8. Visit of Markets/Mandis.
9. Visit of Commercial orchards and Nurseries.
10. Mass Plantation Programme. (वृहद वृक्षारोपण कार्यक्रम)
11. Record of work.
12. Evaluation.