BACHELOR OF AGRICULTURE

B.Sc. (Ag.)

(FOUR YEAR DEGREE COURSE)

SUBJECT

AGRICULTURE

B.Sc. (AGRICULTURE)

B.Sc. Ag., SEMESTER-I

(11+9)

S. No.	Department	Credit Hours	Title
1.	English	1+1	Structural & Spoken English
2	Agronomy	2+1	Principles of crop Production
3	Ag. Chemistry & Soil Sc.	2+1	Fundamentals of Soil Science
4	Plant Breeding & Genetics	1+1	Elements of Genetics
5	Ag. Statistics & Maths.	1+1	Elementary Statistics and Applied Maths.
6	Soil Conservation	1+1	Agricultural Meteorology
7	Agriculture Extension	1+1	Rural Sociology and Educational Psychology
8	Horticulture	2+1	Fundamentals of Horticulture
9.	Physical Education	0+1	Physical Education (Only Practical)

Course-I

Semester- I **1+1**

STRUCTURAL & SPOKEN ENGLISH

(A) ELEMENTS OF ENGLISH GRAMMER : A REVISION

1. Study and use of Articles: Pronouns and Prepositions.
2. Tenses in English

(B) SENTENCE STRUCTURE

1. Sentence formation
2. Some common varieties of sentence structure (including errors).

(C) READING COMPREHENSION

Six specified lessons from the following text book:

Name : Glimpses of English Prose.

Author : Dr. O.P. Dixit

Publisher : Sahitya Niketan, Kanpur

(D) WRITTEN COMMUNICATION

1. Letter and application writing
2. Report writing.

(E) VOCABULARY

1. Synonyms and antonyms
2. One word substitution

3. Affixes, prefixes and suffixes

PRACTICALS

1. Speech mechanism-speech event, production of speech, speech organs.
2. Phonetic sounds and symbols-pure vowels, diphthongs and constants (voiceless/voiced, accented/u naccented, aspirated/u naspirated).
3. Stress and intonation-word-accent (syllable, consonant clusters), stressshift, compound words, word accent in Indian English v/s R.P., rules for accentual patterns.
4. Accent in connected speech-rhythm, weak forms, intonation etc.
5. Listening comprehension
6. Reading comprehension.

Course- II

Semester-I **2+1**

PRINCIPLES OF CROP PRODUCTION

1. Definition and scope of Agronomy.
2. Classification of Crops on Different basis.
3. General principles of Crop production : Climate, soil and its preparation, seed and seed sowing, post-sowing tillage, water management, nutrition, plant protection measures, harvesting, threshing and storage.
4. Crop sequences and systems with emphasis on mixed cropping and inter cropping.
5. Nutritional management of crops including application of manures, fertilizers and bio-fertilizers. Concept of integrated nutrient supply system.

Practical

1. Study of weather and weather forecasting.
2. Identification of crops, manures and fertilisers.
3. Framing crop rotations and preparation of cropping schemes for varying agro-climatic conditions.
4. Preparation of seed bed based on important inter-cropping systems.
5. Calculation of fertiliser requirement, fertiliser mixtures and unit values.

6. Methods of fertiliser application.
7. Practical record
8. Viva - Voce

Course- III

Semester- I **2+1**

FUNDAMENTALS OF SOIL SCIENCE

1. Definition of Soil, Components of Soil and their role in agriculture.
2. Soil forming rocks and minerals, Development, of Soil profile, Soil formation, factors affecting soil formation, soil forming processes.
3. Soil reaction and its measurements and significance.
4. Chemistry of clay minerals with special reference to Kaoinite, Montmorrillonite and little.
5. Physical properties of soil, and their significance.
6. Chemical properties of soil, cation and anion exchange phenomenon and their importance in agriculture.
7. Soil organic matter, humus formation and its importance in soil fertility, management and maintenance of organic matter in soils.
8. Soil of U.P., classification, distribution and characteristics.
9. Elementary idea of soils of India-occurrence, characteristics, physicochemical properties of chernozems, pobzol and laterite soil.
10. Basic idea of comprehensive system (7th approximation) of soil classification.
11. Elementary idea of soil survey and Land capability, classification.
12. Occurrence, distribution and functions of Soil Micro-organism. Biological Nitrogen Fixation (Symbiotics and Non-symbiotics), Nitrification, Microbial decomposition of orgame Matter in soil,

13. Role and use of Biofertilizers.in Crop Production,

14. Classification and use of Insecticide, Fungicides and herbicides

eg. BNC, DDT, Malthion, & 2,4,D.

Practical:

1. Preparation of HCL extract of Soil
2. Determination of FeO, R203, Ca and P in HCL extract
3. Determination of soil O.M.
4. Estimation of Cl, C03, HCO3 in soil extract
5. Determination of total nitrogen in soil.
6. Practical Record
7. Viva - Voce

Course- IV

Semester- I **1+1**

ELEMENTS OF GENETICS

1. Definition, significance and historical development in genetics.
2. Mendel's Law's of heredity.
3. Cell division, meiosis and mitosis.
4. Chromosomal theory of inheritance. Linkage and crossing over-types, mechanism and significance.
5. Nucleic acid as genetic material-structure and replication.
6. Mutation-spontaneous and induced.
7. Chromosomal changes- structural and numerical.
8. Multiple factor inheritance and multiple alleles, blood groups in man and body coat colour in rabits.
9. Sex chromosomes and there determination in man and drosophila, sex linked characters.
10. Cytoplasmic inheritance-plasma and nuclear.

Practical

1. Preparation of temporary cytological slides (mitosis and meiosis)
2. Genetical problems using Chi-square test on mono and dihybrid ratios with their modifications.
3. Practical record
4. Viva-voce

Course- V

Semester- I **1+1**

ELEMENTARY STATISTICS AND APPLIED MATHEMATICS

STATISTICS

Definition, Aims, Characteristics and Limitations of statistics, Classification and Tabulation of data.

Definition, advantages and disadvantages of Arithmetic Mean, Median, Mode; Geometric Mean, Harmonic Mean and Weighted Mean as measures of central tendency; and Range, Quartile Deviation, Mean Deviation, Variance, Standard Deviation and Coefficient of variation as measures of dispersion.

Definition of probability, Additive and Multiplicative Laws of probability and simple problems based on them. Definition, merits and demerits of sampling and Random Sampling. Concept of Standard Error. Basic concepts used in tests of Significance like Null Hypothesis, Degrees of freedom and Level of significance. Definition and uses of z and t-tests in testing significance of difference between two means; F-test in testing equality of two variances and (x2= test as a test of independence of attributes in 2x2 contingency table only.

Basic principles of Experimental Design. Description and Analysis of

Completely Randomised Design (C.R.D.), Randomised Block Design (R.B.D.) and Latin Square Design (L.S.D.)

MATHEMATICS

Binomial Theorem for positive integral index only. Uses of Natural and common Logarithems. Exponential Series. Limits and Differentiation. Differentiation of algebraic,

trigonometrical, logarithmic and exponential functions only, Logarithmic differentiation. Differentiation of products, quotients, function of functions, implicit and explicit functions.

Practical

Based on

1. Measures of Central Tendency
2. Measures of Dispersion
3. Tests of Significance
4. Analysis of CRD, RBD and LSD
5. Practical Record
6. Viva - Voce

Course-VI

Semester- I **1+1**

AGRICULTURAL METEOROLOGY

Different meteorological variables related to agriculture.

Rainfall- Hydrologic cycle and it's components. Types and forms of precipitation. Storms, occurrence, variation and measurement of rainfall. Rain guages, Computation and analyses of data. Plotting of mass curve and rainfall intensity curve.

Run-off- Definition, types, factors affecting estimation and measurement of run-off.

Atmosphere - Definition and structure, climate and weather, atmospheric pressure, factors affecting, measurement.

Elementary idea of insolation, Temperature, kinds and measuring instruments, evaporation, factors affecting, measurement

Humidity, definition, windvane, Anemo-meter.

Indian Agro Climatic Zones

Elementary idea of weather forecasting.

Practical

1 Computation of average rainfall.
2 Mass Curve
3 Plotting Bargraph for rainfall data.
4 Rainfall intensity curve.
5 Measurement of rainfall by Rainguage.
6 Measurement of Atmospheric Pressure.
7 Plotting line graphs for illustrating climatic factor such as temperature.

8 Measurement of Relative Humidity.

9 Study of wind vane and Anemometer.

10 Measurement of Evaporation by USDA evaporation pan.

11 Practical record

12 Vive -Voce

Course-VII

Semester- I **1+1**

RURAL SOCIOLOGY AND EDUCATIONAL PSYCHOLOGY

1. Definition and scope of rural sociology.
2. Basic concept of society, community and groups
3. Characteristics and Differences of rural and Urban communities
4. Basic rural institutions and their role in Agriculture development.
5. Definition and types of rural leadership and their role.
6. Definition, nature and importance of psychology in the development of human behaviour.
7. Meaning of habit and habit development.
8. Mas Low's need hierarchy, concept and types of motives.
9. Basic Psychological concepts; motivation, Social Interaction, Attitudes, Emotions, Prejudices and Social Perception.
10. Personality- definition and development.

Practical

1. Socio-economic survey of village communities.
2. Developing schedules and questionnaires.
3. Interactions with basic rural institutions.
4. Identification of important value systems in the rural setting as a means of social control.
5. Identification of rural leads and their traits.

6. Practical Record
7. Viva -Voce

Course-VIII

Semester- I **2+1**

FUNDAMENTALS OF HORTICULTURE

History nature and scope of horticulture. Importance of main branches of horticulture and their present position in India. Classification and importance of nomenclature of Horticultural Plants. Role of climate, weather, soils and environment in horticulture. Growth and development of horticultural crops. Role of manures, fertilizers and bio-fertilizers in horticulture. Irrigation and weed management. Role of plant growth substances in horticulture. Mulches and clean cultivation in horticulture. Training and purring of horticultural crops. Management of insect, pests and diseases. Post – harvest management of horticultural crops.

Practical

1. Nurseries of horticultural plants.
1. Identification of garden tools and plants;
2. Major practices of propagation of horticultural plants
3. Application of plant growth regulators, wedicides and pesticides
4. Visit to nurseries, gardens and research stations.
5. Practical Record
6. Viva Voce

B.Sc. Ag., SEMESTER-II

(13+7)

S. No.	Department	Credit Hours	Title
1.	Agriculture Engineering	1+1	Irrigation and water Management
2	Agriculture Extension	2+1	Fundamentals of Extension Education and Rural Development
3	Plant Breeding & Genetics	2+1	Elementary Crop Physiology
4	Agriculture Zoology Entomology	1+1	Introduction Entomology
5	Plant pathology	1+1	Introductory Plant Pathology
6	Agriculture Chemistry & Soil Sc.	3+1	Elementary Plant Biochemistry
7	Agriculture Economics	3+1	Introduction of Agriculture and Natural Resources Economics and Farm Management Economics

Course- I

Semester- II **1+1**

IRRIGATION AND WATER MANAGEMENT

1. Importance of water in crop production.
2. Soil Moisture constants.
3. Water requirement of crops and factors affecting it.
4. Approaches of irrigation scheduling.
5. Systems and methods of irrigation
6. Quantity and quality of irrigation.
7. Measurement of irrigation water.
8. Elementary idea of drainage on farms.

Practical

1. Measurement of irrigation water.
2. Determination of soil moisture content and quality of water.
3. Calculation on consumptive use of water.
4. Numerical exercises on drainage and irrigation requirement.
5. Calculation of irrigation water use efficiency
6. Visit to irrigation and drainage projects.
7. Practical record
8. Viva Voce

Course- II

Semester- II **2+1**

FUNDAMENTALS OF EXTENSION EDUCATION AND RURAL DEVELOPMENT

1. Extension Education:

(a) Meaning, definition, objectives, Principles, Scope, Philosophy and it's distinguish features.

(b) Extension Teaching and Learning: Teaching, Teaching Elements, steps in Teaching, Learning, Learning Situation, Basic Principles of Teaching and Learning.

(c) Early Extension Efforts in India – both pre and post independence era.

(d) Comparative study of Extension Service in India and USA.

2. Community Development:

(a) Meaning, Definition and objectives of community development.

(b) Organizational set up and Activities of Community development programs in India.

(c) Extension and Rural Development Programmes: Including T & V system, National Demonstration, IRDP, Jawahar Rojgar Yozana and Krishi Vigyan Kendra.

3. Extension Programme Planning, Monitoring and Evaluation:

(a) Meaning, Principles and Procedure of Programme Planning.

(b) Definition, Monitoring and evaluation: purpose, types, criteria and steps involved.

Practical

1. Conducting Survey

2. Preparing schedule and Questionnaire for studying organizational set up of community development, village institutions and farmer's organization.
3. Motivating farmers for option of improved farm technologies.
4. Data Collection for preparation of a village & a Block development programme.
5. Preparation of questionnaire / schedule for evaluation of a programme.
6. Classification, Tabulation and representation of data.
7. Writing study Reports.
8. Practical record
9. Viva Voce

Course- III

Semester- II **2+1**

ELEMENTARY CROP-PHYSIOLOGY

1. Role of plant physiology in agriculture.
2. Cell structure and function.
3. Bio-Physico-chemical phenomenon-diffusion, osmosis plasmolysis and imbibitions.
4. Absorption of water and mineral salts.
5. Photosynthesis - light and dark reactions.
6. Respiration mechanism and its significance.
7. Transpiration mechanism and its significance.
8. Plant growth substances and dormancy.
9. Photoperiodism and Vernalization.

Practical

1. Demonstration of plant physiological experiments on diffusion, osmosis, imbibition, transpiration, photosynthesis and respiration.
2. Practical record
3. Viva Voce

Course- IV

Semester- II **1+1**

INTRODUCTORY ENTOMOLOGY

1. General introduction to Phylum-Arthropoda, including important classes.

2. Insect Morphology: Body wall-structure, composition and functions; Body divisions-Head (Structure and its appendages; structure, functions and modifications of antinae; Mouthparts-Biting and chewing, piercing and sucking, sponging, siphoning, chewing, and lapping); Thorax-its structure and appendages, modifications and functions of legs and wings, wing coupling apparatus and wing venation; Abdomen-its segements and appendages.

3. Anatomy: Digestive, Excretory, Reproductive, circulatory, respiratory and nervous systems of grass hopper.

4. Sense organs : Structure and functions of ocelli, compound eye and johonston's organ.

5. Post-embryonic development including ecdysis, instars, types of larvae and pupae. Different types of metamorphosis.

6. Taxonomy: Insect Classification upto the level of families of agricultural importance of following orders:

Orthoptera : Acrididae;

lsoptera : Termitidae;

Hemiptera : Coreidae, Pyrrhocoreidae, Lophopidae, Aleurodidae,

Jassidae, aphidae, Coccidae, Lacciferidae,

Coleoptera : Dermestidae, Coccinellidae, Bruchidae Chrisomelidae; Curculionidae, Tenebrionidae, Scarabaeidae;

Lepidoptera : Gelechiidae, Pyralididae, Noctuidae, Cymbidae, Papilionidae, arctiidae and Bombycidae;

Hymenoptera: Tenthredinidae and Apidae

Diptera : Trypetidae

Practical

1. Dissection of Grasshopper for the study of digestive, reproductive and nervous system.
2. Study and Temporary mounting of external parts of grasshopper.
3. Identification and comments upon the various insect pests.
4. Collection and preservation of insects.
5. Viva-voce and practical records.

Course- V

Semester- II **1+1**

INTRODUCTORY PLANT PATHOLOGY

1. Definition and importance of plant pathology.

2. Causes of plant diseases.

3. Classification of plant diseases according to cause and occurrence.

4. Plant Pathogens:

(a) Fungis

(i) Economic importance and general characteristics.

(ii) Morphology of different vegetative structures (thallus, mycelium, haustoria, etc.)

(iii) Reorduction

(iv) Different types of spores.

(v) Levels of parasitism

(vi) Nomenclature

(vii) Classification of fungi with special reference to genera listed under item (viii) Life histories of Pythium, albugo. Erysiphe, Ustilago Clareicaps and Puccinia.]

(ix) Diagnositic characters of the following genera, Phytophthora, Peronospora, Sclerospora, Ustilago, Sphacelotheca, Tolyposporium, Melampsora, alternaria, Cerospora, Fusarium, Helminthosporium Pyricularia, Rhizoctonia, Colletrotrichum.

(b) Bacteria:

(i) Brief history of bacteria as plant pathogens.

(ii) Morphology and Cell structure.

(iii) Vegetative reproduction.

(iv) Brief outline of classification of plant pathogenic bacteria.

(v) A brief account of mycoplasma.

(c) Viruses

(i) Nature and properties.

(ii) Transmission of plant virus

(d) Phanerogamic parasites: Cucuta, Loranthuus, Orobanche and striga.

Practical

1. Temporary slide preparation of representative genera of disease causing fungi for morphological studies
2. Simple staining of bacteria from milk and curd
3. Preparation of PDA
4. Practical record
5. Viva voce

Course- VI

Semester- II **3+1**

ELEMENTARY PLANT BIOCHEMISTRY

1. Scope of biochemistry.

2. Carbohydrates - Definition, Classification, Chemistry and Structural formula of the following

(a) Monosaccharides - D Glucose, D. fructose, D. Galactose

(b) Oligosaccharides - Sucrose, Maltose, Lactose.

(c) Polysaccharides - Starch, Cellulose, Inulin.

3. Proteins - definition, classification, composition, important functions Primary and secondary Structure of protein, Biological significance of proteins.

4. Amino acids - Classification, properties of Amino acids structure of the following amino acids- Glycine, Tryptophane, Aspartic acid, serine, lysine, Histidine, Methionine, protein; Essential and non-essential amino acids, Nutritional significance of amino acids.

5. Lipids- Definition, classification, properties and structural formula of the following saturated fatty acids (Butyric acid, caproic acid, palmitic acid, stearic acid) and unsaturated fatty acid (oleic acid, Liniolenic acid, erucic acid).

6. Enzyme - Occurrence, nomenclature, classification, mechanism of action, general properties and factors effecting the rate of enzyme action, coenzyme-A.

7. Vitamins - Classification, biochemical functions and structural formula of vit. A, thiamine, raboflavin, Vit. B12 Ascorbic acid, vit. D.

8. Phytohormones - Occurrence, structure and functions of important plant growth substances viz. Auxins, gibberellins, cytokimuis and Abscisic acid.

9. Alkaloids - Occurrence, classification, uses general properties and Biological significance of alkaloids. Structural formula of Conine Nicotine and Papaverine.

10. Nucleic acid - structural formula of Pyrimidines and Purines, Nucleosides and N<ucleotides Watson and crick model of DNA.

Practical

1. Qualitative test of important sugars, proteins and alkaloids.

2. Estimation of starch in plants.

3. Estimation of reducing and non reducing sugars in cane juice and jaggery.

4. Separation and identification of amino acid by paper chromatography.

5. Iodometric titration.

6. Estimation of Diastase enzyme in plants.

7. Estimation of Ca by EDTA method.

8. Practical record

9. Viva Voce

Course- VII

Semester- II **3+1**

INTRODUCTION TO AGRICULTURAL AND NATURAL RESOURCE

ECONOMICS AND FARM MANAGEMENT ECONOMICS

A. Natural Resource Economics

1. Definition, subject matter and scope of economics.
2. Definition, subject matter and significance of agricultural economics.
3. Primitive and scientific Agriculture. Characteristics and Indian agriculture; major problems including causes of low productivity.
4. Economic Development, role of agriculture Technological change in agriculture and various inter-relationships.
5. Task of an economic system, role of economic theory in agriculture.
6. Different Land reforms measures.

B. Farm Management Economics

1. Definition and scope of farm economics and management
2. Farm Management and production economics. Agricultural Economics and industrial Economics-Similarities and differences.
3. Law of Diminishing, Returns/Principle of variable Proportions laws of return, scale properties, Law of Equi-mangiral Returns, Law of such situation, opportunity cost/opportunity Returns, Law of comparative advantage.
4. Production Function, productivity curves, least cost combination of inputs, Principle of conbining Enterprises Determination of Optumum output.

5. Cost concepts and Principles, Cost Relationship and curves.

6. Farm Records and Accounts.

7. Methods of valuation and depreciation of assets.

8. Types of farming: Diversified, General farm, subsistence or Marginal farming, specialized farms, Mixed farming, Ranching and Dry farming.

9. Systems of farming Cooperative farming, peasant farming, state farming, collective farming and capitalistic farming.

10. Tools of Farm Management: Farm Budgeting (Complete and partial budgeting) and farm planning, Linear Programming (Graphical method).

Practical:

1. Socio-economic survey and collection of data, classification and tabulation with special reference to natural resources of a village.

2. Study of a farm holding (resources, enterprises, costs, profit and complete farm economy) of the allotted farmer by cost-accounting method.

3. Preparation of an alternative farm plan for the farmer.

4. Submission of Report.

5. Practical record

6. Viva Voce

B.Sc. Ag., SEMESTER-III

(14+8)

Sl. No.	Department	Credit Hours	Title of the course
1.	Agronomy	2+1	Cereals Millets, and pulses crops (field crops Kharif Crops)
2	Plant Breeding & Genetics	2+1	Principal of plant breeding
3	Agriculture Engineering	2+1	Farm Power and Machinery
4	Soil Conservation	2+1	Environmental Science Agro Ecology
5	Agriculture Economics	2+1	Agriculture marketing, export and cooperation
6	Horticulture	2+1	Vegetable Production
7	Agriculture Chemistry Soil Science	2+1	Elementary Soil microbiology
8	Agronomy	0+1	Practical crop production

Course- I

Semester- III **2+1**

CEREALS, MILLETS, AND PULSE CROPS

(Field Crops of Kharif)

Importance, origin, distribution, climate, varieties soil preparation, seed & sowing, manuring and irrigation, plant protection, harvesting and processing of the following crops, under different agroclimatic conditions of U.P.

A.	Cereal Crops	:	Paddy, Maize
B.	Millet Crops	:	Sorghlum and Pearlmillet
C.	Oil seed	:	Groundnut, Til, castor
D.	Pulse Crops	:	Pigeon Pea, Urdbean, Moongbean, Soybean, Cowpea.
E.	Fibre Crops	:	Cotton, Jute, Sunhemp, Mesta
F.	Green Manure crops	:	Sann - Hemp and Dhencha
G.	Fodder Crops	:	Sorghum, Pearlmillet, Maize, Napier, Sudan grass, cluster, bean, cowpea
H.	Cash crops	:	Sugarcane, Tobacco

Practical

1. Identification of crop-seeds, plants and associated weeds.

2. Practical knowledge of operations from sowing to harvesting of kharif crops included in theory course.

3. Judging of maturity and estimation of yields.

4. Study of crop production techniques at different farms.

5. Calculation of seed and fertilizer requirement of crops.

6. Preparation of seed beds of important crops.

7. Visit to farms of University and Institutes.

8. Practical record

9. Viva Voce

Course- II

Semester- III **2+1**

PRINCIPLES OF PLANT BREEDING

1. Plant Breeding-history, objectives and scope.
2. Mode of reproduction in crop plants in relation to breeding techniques.
3. Plant variation kind and causes.
4. Genetic consequences of self and cross pollinated crops.
5. Plant Introduction and exploration.
6. Breeding cross methods for self cross and asexually propagated crops.
7. Male sterility and its importance.
8. Polyploidy and mutation breeding.

Practical

1. Technique of emasculation and artificial pollination in important crops.
2. Skeleton of different breeding procedures.
3. Practical record.
4. Viva-voce.

Course- III

Semester- III **2+1**

FARM, POWER AND MACHINERY

1. **Sources of Farm power :-** Their merits and demerits, renewable energy – biogas plant, components of wind mill, collection and storage of solar radiations.

   Farm mechanization :- concept, benefits, scope, limiting factors and suggestions.

2. Working principles of otto & diesel cycle engines, construction and working of four and two stroke cycle engines, common engine troubles – causes and remedies, terminology related to IC engines, calculations on IHP, BHP, FHP, mechanical efficiency, comparison ratio, pis displacement and volumetric efficiency.

3. Classification of tractors elementary knowledge abort main components of tractor and their functions steering clutches, transmission differential, final drive, brakes, belt pulley, pto shaft and hydraulic lift, method of starting and stopping of tractors. General care and maintenance of tractor. Calculation of cost of operation of a tractor.

4. Selection, care and maintenance of electric motors in the farm, role of switches and fuses, electric fencing, electric meter reading, calculation on units consumed by electrical appliances and ohm's law.

5. Study of construction, working principles, troubles and adjustments of the following machines.

Discplough, disc harrow, seed drill, planter, reaper, mower, threshers, combine sprayers and dusters calculation of area covered power requirement and efficiency of above machines.

Practical:

1. Study of construction of four stroke and two stroke cycle engines operating and running of diesel engines.
2. Study of tractors systems tractor driving practice.
3. Study of disc plough, study of seed drill plants and its calibration, study of thresher and combine.
4. Visits to places of engineering interest.
5. Identification of different work shop tools and machines and their used.
6. Practical record
7. Viva Voce

Course- IV

Semester- III **2+1**

ENVIRONMENTAL SCIENCE AND AGRO ECOLOGY

1. Ecology - definition, division and significance.
2. The Environment - environmental management and control of pollution, affecting plant growth a biotic and biotic isothere interaction.
3. Eco-system major ecosystems, energy and its flow in ecosystem biochemical cycles and nutrient cycles.
4. Plant community - classification composition, and study of plant community structure.
5. Plant adoption - ecological classification of plants and their morphological anatomical and physiological adaptations to adverse environments hydrophytes, xerophytes, measophytes, epiphytes and halophytes
6. Ecological problems of major crops-cereals, millets, pulses and oilseeds

Practical

1. To record temperature, relative humidity and light intensity value of the atmosphere.
2. To study the community by quadrat method by determining plant structure different species of crops.
3. To study the getution of the give area by a phyloinic method, biological spectrum method.
4. To determine the biomass production in the given area.

5. To record abiotic components- pH, temperature, light intensity, turgidity and pond ecosystem.

Course- V

Semester- III **2+1**

AGRICULTURE MARKETING, EXPORT AND COOPERATION

A. Agricultural Marketing:

1. Market, Meaning, scope and classification of markets. Definition of agricultural marketing.
2. Marketable surplus, marketed surplus. Integrated marketing.
3. General theory of markets and marketing.
4. Production and market supply.
5. Price Determination and price analysis under different market structures.
6. Marketing Functions and services.
7. Marketing costs margins and efficiency.
8. Defects of Present system of marketing of agricultural produce. Steps taken by the Indian Government and possibilities of improvements.
9. Fixation of agricultural Prices.
10. Marketing Institutions: Regulated and cooperative markets.
11. Market Research.

B. Export.

1. The concept of export as a district business activity in agricultural sector of the Indian economy, its importance and role in economic development.

2. Policies of export of food grains and agricultural commodities pursued by the Indian Government.

3. Import vs. export value of cereals and other agricultural commodities.

C. Cooperation

1. Maning and Concept of Cooperation, principles of Cooperation (Equality, universality, distributive, justice, democracy, unity, honorary services voluntarism). Place of thrift in cooperation, economic planning and cooperation.

2. History and Progress of cooperative movement in India.

3. National cooperative federations, courses of slow growth of agricultural cooperatives, suggestions for rapid development. National Bank for Agriculture and Rural development (1982).

4. Cooperative farming: Meaning thereof, New classification cooperative farming, cooperative joint farming, cooperative collective farming. Advantages thereof. Reasons for apathy of farmers in adopting cooperative joint farming.

Practical

1. Survey of a market (mandi) both primary and secondary (atleast one each).

2. Case studies of marketing of a minor and a major commodity w.r.t. marketing channels costs margin and price spread over.

3. Study of a (i) cooperative marketing society (ii) a warehouse functioning market (iii) a regulated market and (iv) a cold storages.

4. Submission of a report on the above four aspects.

5. Practical record

6. Viva Voce

Course- VI

Semester- III **2+1**

VEGETABLE PRODUCTION

Importance and scope of vegetable production in India; Classification of vegetables. Types of vegetable gardens; Culture and seed production of major vegetable like Potato, Brinjal, Chillies, Tomato, Cauliflower, Cabbage, Onion, Bottle gourd, Muskmelon, Watermelon, Okra, Radish, Carrot, Pea and leafy vegetables. Protected cultivation of vegetables.

Practical

1. Nursery raising of vegetable crops.
2. Production of seeds in vegetable available at the time of course.
3. Layout and visit of commercial vegetable farms and kitchen gardens.
4. Cost of cultivation studies in Potato, Tomato, Cauliflower and Okra.
5. Practical record and posters
6. Viva Voce

Course- VII

Semester- III **2+1**

ELEMENTARY SOIL MICROBIOLOGY

1. Definition, scope and importance of microbiology.
2. A brief survey of microbiology:
   (i) Prokaryotes and Eukaryotes.
   (ii) Types of microorganisms : algae, protozoa, fungi, bacteria and viruses.
   (iii) Size relationships.
3. Simple staining and gram staining techniques of bacteria.
4. Characteristics of gram positive and gram negative bacteria.
5. Classification of bacteria (only important groups)
6. An elementary idea of general characteristics, classification and reproduction of fungi, algae and protozoa.
7. Biogeochemical cycles: Nitrogen, Carbon, Sulphur and Phosporous cycles.
8. General structure of bacteriophage and replication.
9. Sterilization and disinfection.

Practical

1. Study of different parts of light compound microscope and their functions.
2. Gram staining of bacteria.
3. Preparation of nutrient broth, Czapek's and Richard's media.
4. Identification of algae, fungi and protozoa.
5. Practical record
6. Viva voce.

Course- VIII

Semester- III **0+1=1**

PRACTICAL CROP PRODUCTION

In this course, team of about 10 students will be given a sizable plot of land (100 sq.m. minimum) for a full year. The team will manage crop production enterprise from a to z including maintenance of account and preparation of balance sheet. No paid labours will be supplied and other inputs will be supplied on loan and their cost will be deducted from the receipt of the enterprise. The net profit will be distributed among the students. To cope with natural calamities a revolving fund will be raised by deducting 10% amount from net profit every year. The evaluation of students will be done on the basis of actual working units, share in profit, oral examination and maintenance of accounts and records.

B.Sc. Ag., SEMESTER-IV

(12+6)

S. No.	Department	Credit Hours	Title of the course
1.	Agronomy	2+1	Oil seeds commercials crops fields crops-II Rabi crops
2	Plant Breeding & Genetics	2+1	Breeding of field crops
3	Soil Conservation	2+1	Principles of soil physics and conservation, soil survey
4	A.H. & Dairying	2+1	Livestock production and management
5	Agricultural Zoology & Entomology	2+1	Economic Entomology
6	Horticulture	2+1	Fruit production including plantation crops
7	Agronomy	0+1	Practical Crop Production

Course- I

Semester- IV **2+1**

OIL SEEDS COMMERCIAL CROPS

Field Crops II

RABI CROPS

Importance, origin, distribution, climate, improved varieties, agronomic practices manuring and irrigation, plant protection, harvesting and processing of the following crops under various agro climatic conditions of U.P.

A.	Cereal Crops	:	Wheat, Barley, Oats
B.	Oilseed Crops	:	Rapeseed and mustard, Linseed, Sunflower
C.	Pulse crops	:	Chickpea, fieldpea Lentil, Rajmash
D.	Fodder Crops	:	Oats, Berseem, Lucene
E.	Cash Crops	:	Potato and Mentha

Practical

Studies the practical course for the field crops I with suitable allegation of crops included in the syllabus.

Course- II

Semester- IV **2+1**

BREEDING OF FIELD CROPS

1. Origin, distribution and objectives.
2. Breeding problems, systematic description and economic importance.
3. Breeding methods adopted and achievements with reference to following crops:

(a)	Cereals	:	Wheat, rice and maize
(b)	Millets	:	Sorghum and pennisetum
(c)	Pulses	:	Gram, Pea and arhar
(d)	Oil-seeds	:	Mustard and groundnut
(e)	Others	:	cotton and potato

Practical

1. Identification of important varieties of above mentioned corps.
2. Systematic description and artificial hybridization and above mentioned crops.
3. Significant research advances made in above mentioned corps.
4. Practical record
5. Viva-voce.

Course- III

Semester- IV **2+1**

PRINCIPLES OF SOIL PHYSICS AND CONSERVATION, SOIL SURVEY

Physical properties of soil and their determination.

Definition and importance of soil conservation in agriculture. History of soil conservation in India.

Soil survey, definition Land use capability classification different types of soil in India.

Soil erosion, definition types, mechanics and causes of erosion. Factors affecting soil erosion. Agronomical practices for soil and water conservation. Engineering practices for erosion control such as banding, terracing, temporary and permanent structure for Gully control. Grassed water ways. Water harvesting.

Wind erosion mechanics, control, sand dune fixation, shifting cultivation.

Survey, measurement of distance, direction and elevation.

Role of grasses and forests in soil conservation, farm forestry, social forestry.

Practical

1. Familiarization with chain survey equipments.
2. Exercises on chain survey.
3. Familiarization with prismatic compass (P.C.)
4. Open traversing by chain and P.C.,
5. Closed traversing by Chain and P.C.
6. Calculation of included angles.
7. Study and adjustment of Dumpy level (D.L.)
8. Differential leveling by D.L.

9. Profile leveling by D.L.
10. Calculation of Reduced level.
11. Construction and design of bunds with calculation of earth work.]
12. Calculation of infiltration rate and bulk density.
13. Visit to soil conservation research centre for erosion control.
14. Practical record
15. Viva Voce

Course- IV

Semester- IV **2+1**

LIVESTOCK PRODUCTION AND MANAGEMENT

Importance of livestock in Agriculture, Relationship of plants with animal Husbandry Dairy under specialized and mixed farming. Livestock and milk production statistics. Basic anatomy and physiology of cattle with special reference to digestion, Reproduction and Lactation.

Breeds, and Breeding methods of livestock and their consequences. Artificial insemination. Methods and basis of selection, measurement of relationship.

Pasture management, Importance of scientific Feeding, Feeding standard. Forage crops and their conservation.

Care and management of Milk cow at after calving. Housing of dairy animals. Raising of calves and record keeping methods.

Signs of illness, control measures of disease. Classification of diseases. Modes of transmission. Prevention and treatment of disease of bovine (H.S., R.P., B Q. Anthrax, Brucelloses, Mastitis, Milk fever, F,M.D.) Quanantime, sanitation and first aids.

Practical

Study of external body parts, study of phenotypic and physiological difference between cow and buffaloes. Zebu Vs Taurses. Estimation of body weight measurements, Marking, doeking, Dehorning and eastration of different classes of animals. Computation of balanced ration for different classes of animals.

Maintenance of farm records, Grooming, Artificial Vagina. Determining temperature, pulse rate and respiration rate of farm animals.

Course- V

Semester- IV **2+1**

ECONOMIC ENTOMOLOGY

1. Economic importance of insects, nature and extent of damage, life history and management of the major insect pests of following crops as mentioned against them:

Paddy	Leptocorisa variconis, Hieroglyphus Spp., Nilaparvata lugens, Nephotetix, spp., Mythimna separate.
Jower Maize	Chilo partellus, Atherigona varascoccate.
Sugarcane	Tryporyza novella, Emmalocera depressella, Pyrilla prepussila, Aleurolobus barodensis.
Cotton	Pectinophora gossypiella, Earias Spp., Sylepta derogala, Dysdercus Spp., Bomisia tabci, Amrasca blouttula.
Oilseeds	Lipaphis erysimi, Athalia proxima Bagrada Cruciferarun Dasyneura lini.
Pulses	Helicoverpa armigera Agrotis Spp., Etiella Zinckenella, Melanagromyza obtuse, Phytomyze atriornis.
Pests of Fruit crops	Drosicha Mangiferae idioscopus Spp., Papilio Demeclius, Diaphorina citri Phyllocnistis citrelia, Otheris Spp. Virechois isocrates. Eriosoma lanigerum.

	Quadraspidiotus permincousus.
Pest of Vegetable	Leucinodes orbonalis, Epitachna viontioclopunctate.
Crops	Raphidoplapa foveicollis, Dacus Cucurbitae, Plutella Xylostella.
Pests of Stored Grains	Sitophilus oryzae, Trogoderma granarium, Tribullum castaneum, sitotroga cerealella, callsobruchus chinensis
Polyphagus pests	Odontotermes abesus, Schistocerca gregaria, Holotirichia consanquincea spilosoma oblique, spodoptera litura, Amsecta Spp.

2. Elementary knowledge of APICULTURE and LAC-CULTURE.

Practical

1. Collection, mounting and preservation of insect pests of crops stages.
2. Filed and laboratory acquaintance with insect pests, the various stages and damaged materials.
3. Technical knowledge of honey, silk and lac production.
4. Filed application of insecticidal formulations.
5. Practical record and Viva-voce.

Course- VI

Semester- IV **2+1**

FRUIT PRODUCTION INCLUDING PLANTATION CROPS

Importance, scope and present position of fruit and plantation corps in India, Selection of site and establishment of Orchads. Practices involved in the production and rejuvenation of fruit crops: Mango, Guava, Citrus sp., Banana, Grape, Litchi, Papaya, Loquat, Aonla, Ber, Jackfruit, Apple and Peach. Production techniques of plantation crops: Coconut, Cashew nut, Tea, Coffee and Rubber.

Practical

1. Identification of Fruit; and plantation crops.
2. Orchard layout and planting.
3. Propagation methods of fruits and plantation crops.
4. Management practices of fruit plants protection and post harvest management.
5. Application of plant growth regulations.
6. Visit to orchards, nurseries and research centers of fruits and plantation crops.
7. Practical Record and posters
8. Viva Voce

B.Sc. Ag., SEMESTER-V

(12+9)

S. No.	Department	Credit Hours	Title
1.	Plant Breeding & Genetics	1+1	Introduction to plant Biotechnology
2	A.H. & Dairying	2+1	Milk and milk processing
3	Horticulture	2+1	Post harvest management of fruits and vegetables
4	Ag. Zoology & Entomology	2+2	Crop pest and integrated pest management
5	Agronomy	1+1	Weed management.
6	Plant Pathology	2+2	Crop disease and their management (plant pathology)
7.	Ag. Chemistry Soil Science	2+1	Soil fertility and fertilizers

Course- I

Semester- V **1+1**

INTRODUCTION TO PLANT BIOTECHNOLOGY

1. Definition scope and importance of plant biotechnology.

2. Plant tissue culture.

   (i) Culture media used in plant tissue culture.

   (ii) Somaclonal and gametoclonal variation in plants.

   (iii) Micro-propagation of plants.

   (iv) Application of plant tissue culture in crop improvement.

3. Outlines of basic steps involved in plant, biotechnology/genetic engineering such as:

   (a) Isolation of plant DNA and vector DNA

   (b) Restriction digestion of DNA by endonucleases.

   (c) Electrophoresis of restricted DNA fragments.

4. Cloning vectors for recombinant DNA such as-

   (a) Ti-plasmic vector for higher plants.

   (b) Plant viruses such as cauliflower mosaic virus (Ca MV), tobacco mosaic virus (TMV) and gemineae virus as vectors.

5. Application of plant genetic engineering in crop improvement.

Practical:

1. Sterilization of equipments, glassware and culture media by hot air oven, wet and surface sterilization techniques.

2. Preparation of culture media for meristem, embryo and anther culture.

3. Practical Record.

4. Viva – Voce.

Course- II

Semester- V **2+1**

MILK AND MILK PROCESSING

1. Milk:

Milk and its secretion, composition of colostrums and milk of different species. Physico-chemical properties of colostrums and milk. Factors affecting the quantity and quality of milk produced. Clean and safe milk production. Microorganism of milk and their functions. Agencies engaged in handling, transportation, and distribution of milk. Pricing of milk.

2. Definition and composition of milk:

Market milk, filled milk, recombined, reconstituted milk, standard milk, toned and double toned milk and skimmed milk.

3. Milk Processing:

Processing of milk, Filtration, clarification bactofugation pasteurization ultra high temperature treatment, homogenization, sterilization, cooling and chilling of milk. Membrane filtration and revese oxmosin processes.

Practical:

1. Sampling of milk.
2. Determination of specific gravity by lactometer and westphal balance. Fat test by Gerber's method, total solid and SNF percentage by Richmond's scale and formula.
3. Assessment of quality of milk by simple tests like C.O.B. Alcohal test, and Sediment test.
4. Determinations of acidity of milk.

5. Calculations on standardization and adulteration of milk.

6. Practical record

7. Viva voce.

Course-III

Semester- V **2+1**

POST HARVEST MANAGEMENT OF FRUITS AND VEGETABLES

Importance and scope of post harvest management of fruits and vegetables. Post harvest deterioration of fruits and vegetables. Techniques of prolonging the life of fruits and vegetables. Handing grading and packing of fruits and vegetables for market.

Practical

1. Practical knowledge of harvesting, handling, grading.
2. Pre cooling, waxing and use of chemicals to prolong the post harvest life of fruits and vegetables.
3. Visit to storage and centers carrying improved practices of post harvest handling.
4. Bottling of green peas, canning and dehydration of seasonal fruits and vegetables.
5. Preparation of Apple jam, Guava jelly, Lime and Orange squashes, Aonla and Bael preserves, Tomato Juice and ketchup.
6. Practical record and posters.
7. Viva – Voce.

Course-IV

Semester- V **2+2**

CROP PESTS AND INTEGRATED PEST MANAGEMENT

1. Basic principles of pest out- breaks and their economic status.
2. Methods of insect control; including mechanical. Physical, cultural, biological, legal and chemical control use of insecticides repellents and antifieedants. Attractants. Chemosterilants. Pheromones, insect growth regulators.
3. Basic concept of integrated pest management.
4. Elementary knowledge of plant protection equipments.
5. Plant protection organization at the state and national level.
6. Rodents, Mites and Mollusks – A General account.
7. Insect vectors transmitting plant diseases.

Practical

1. Collection and preservation of established predators and parasites.
2. Field and laboratory acquaintance with non-insect pests and their damaged materials.
3. Dilution and application of insecticides.
4. Handling of plant protection equipments.
5. Practical record and viva-voce.

Course-V

Semester- V **1+1**

WEED MANAGEMENT

(A) Definition, classification and general characteristics of weeds, Losses caused by weeds.

(B) Principles and methods of solving weed problem.

(C) Weed control schedules for important field crops of U.P.

(D) Integrated weed management system and its importance.

(E) Control of Abnoxious weeds viz. Sedge grass, Kane, Baisuri and satyanasi.

PRACTICAL

1. Identification and preservation of important weeds of locality.
2. Calculation on quantities of herbicides, weed control efficiency and weed index.
3. Calculation of cost involved in different weed control schedules.

Course-VI

Semester- V **2+2**

CROP DISEASES AND THEIR MANAGEMENT

(PLANT PATHOLOGY)

1. General Symptoms of plant diseases.
2. Methods of plant diseas control.
3. Preliminary knowledge of different groups of fungicides.
4. Study of the symptoms, etiology, mode of perpetuation and control of the following disease:
   - (i) Early and late blights of potato.
   - (ii) White rust of crucifers.
   - (iii) Green ear disease and Ergot of bajra.
   - (iv) Powdery mildew, loose smut, karnal bunt and rusts of wheat.
   - (v) Coveredd smut of barely.
   - (vi) Grian smut of Jowar
   - (vii) Bajra smut
   - (viii) Rust of linseed
   - (ix) Let shos of tikka disease of groundnut
   - (x) Wilt of arher
   - (xi) Stripe diease of barely
   - (xii) Red rot of sugarcane
   - (xiii) Blast of rice.
   - (xiv) Citrus canker
   - (xv) Kharia disease of paddy and Black tip of mango.
   - (xvi) Tobacco mosaic
   - (xvii) Yellow vein mosaic

(xviii) Yellow vein mosaic of bhindi

(xix) Bean common Mosaic

(xx) Mosaics of potato

(xxi) Little leaf of brinjal.

Practical

(i) Diagnosis of important disease by studying symptoms.

(ii) Microscopic examination of diseased parts.

(iii) Preparation of Bordeaux mixture.

(iv) Practical record

(v) Viva voce.

Course-VII

Semester- V **2+1**

SOIL FERTILITY AND FERTILIZERS

1. Soil fertility concept, soil productivity, cactors influencing soil fertility, maintenance of soil productivity.
2. Essential plant nutrients, Criteria of essentiality, functions, deficiency Symptoms, Critical levels of deficiency and toxicity.
3. Mechanism of uptake and transport of minerals salts in plants.
4. Soil fertility evaluation, soil and plant analysis, tissue tests.
5. Mineralization and immoblilization of N and fixation and availability of P and K in soil.
6. Fertilizers- definition, classification, characteristics, reactions of fertilizer in soil, important fertilizer elements- Nitrogen, phosphorus, potassium, sulphur, zinc, Mixed and complex fertilizers Manufacture of urea, ammonium sulphate, superphoshate and marinate of potash. Organic sources of nutrients, digested sludge, manure, compost and green manures.
7. Elementary idea of bio-fertilizers.
8. Integrated nutrient management (INM) concept. Elementary idea of INM models, integrated nutrient management and soil health.

Practical

Analysis of N. P. and K in fertilizers. Determination of availability of NPK and S in soil. Elementary idea of determination of micronutrients in soil. Plant Tissue tests.

B.Sc. Ag., SEMESTER-VI

(10+6)

S. No.	Department	Credit Hours	Title
1.	Agronomy	2+1	Dry land farming and water shed management
2	Soil conservation	2+1	Silviculture and agro-forestry
3	Horticulture	1+1	Production Technology of medicinal, aromatic and spices medicinal and aroma crops
4	Agriculture Chemistry Soil Science	2+1	Management of Problematic Soils
5	Animal Husbandry and Dairying	2+1	Dairy Chemistry and animal nutrition
6	Ag. Statistics & Maths.	1+1	Computer Applications

Course-I

Semester- VI **2+1**

DRY LAND FARMING AND WATER SHED MANAGEMENT

1. Definition, Characteristics and extent of rain fed/dry land farming areas in the country and the state of U.P.
2. Problems in dry land agriculture.
3. Moisture conservation practices and use of antitranspirants in dry land farming.
4. Watershed management concept, Principles and practices.
5. Selection of suitable crops, crop relations and crop mixtures for various categories of rain fed areas.

Practical

1. Preparation of crop rotations and cropping schemes for rain fed farming and dry land agriculture.
2. Determination of Soil Moisture constants.
3. Studies on moisture depletion pattern in rain fed farming.
4. Study of practical application of antitiranspirants.
5. Visit to Dry farming research stations.
6. Maintenance of practical record.
7. Viva Voce

Course-II

Semester- VI **2+1**

SILVICLTURE AND AGRO-FORESTRY

(A) Silviculture:

1. Definition and scope of silviculture, Forestry, its scope and classification.
2. Role of forests- geographic, productive and bioaesthetical.
3. Elementary idea of forest types.
4. Regeneration of forests.
   (a) Natural seed production, seed dispersal, germination and seedling establishment.
   (b) Artificial Afforestation, reforestation and their objectives. Choice of tree species nursery techniques.

(B) Agroforestry

1. Definition, concept and need of agro forestry.
2. Classification of agro forestry systems.
3. Prominent agro forestry system prevailing in Uttar Pradesh.
4. Limitations of agro forestry, choice of tree species for agro forestry for fuel, fodder and timber requirement.

Practical

1. Afforestation, techniques of problematic sites viz. ravines, saline-alkali soils, waterlogged areas, arid areas, hilly areas; roadside and canal bank plantation
2. Nursery techniques- Numerical problems.
3. Numerical problems on planting and cost of earthwork estimation.
4. Identification of forest tree species.
5. Practical Record
6. Viva Voce

Course-III

Semester- VI **1+1**

PRODUCTION TECHNOLOGY OF MEDICINAL AROMIATIC AND SPICES CROPS

1. Importance and scope of medicinal, aromatic and spices crops.
2. Cultivation of Mentha, Citronella, Khus, Ocimum, Rauvolifia and Dioscoria.
3. Cultivation of Turmeric, Zinger, Coriander, Zira Fenugreek and Saunf in North Indian Condition.

Practical

1. Identification of common medicinal and aromatic plants.
2. Calculation of the cost of cultivation of Mentha, Citronella, Rauvolfia, Dioscorea, Turmeric, Coriande and Fenugreek.
3. Identification and demonstration of spices in the course in the field conditions.
4. Visit to commercial growing places and research stations of the medicinal, aromatic medicinal and spices crops.
5. Practical Record and posters
6. Viva Voce

Course-IV

Semester- VI **2+1**

MANAGEMENT OF PROBLEMATIC SOIL

Management of Problem soil

1. Saline and sodic soils- Occurrence classification, formation, diagnosis, characteristics and management.
2. Acid Soils- occurrence, formation, diagnosis, characteristics and management.
3. Waterlogged soils- occurrence, characteristics and management.
4. Eroded soils: Occurrence characteristics and management.

Management of Wasteland

5. Definition, classification, distribution and extent of wastelands in India with particular reference to U.P. and their Management.
6. Factors responsible for land degradation and characteristics of different types of wastelands.
7. Soil Management in Arid and Semiarid areas and sand dune Stabilization.

Practical

1. Determination of pH, EC, gypsum requirement, lime requirement in problem soil.
2. Determination of specific gravity, bulk density, pore space, soil texture.
3. Visit to Area of problem soil.
4. Practical Record
5. Viva Voce

Course-V

Semester- VI **2+1**

DAIRY CHEMISTRY AND ANIMAL NUTRITION

Unit-1 Principles of quality control. Plate-form and laboratory tests. Legal standards of milk and milk product, dahi, ghee, chhana, butter ecological mil, ice- cream. Chemical changes occurring during storage of milk. Preservation of milk. Adulteration of milk and its detection

Unit-II Chemistry of milk constituents viz. lactose, fat, protein, enzymes and vitamins.

Unit-III Role of feed constituents. The metabolism of fat, carbohydrate and protein.

Unit-IV Role of minerals, harmons, vitamins and antibiotics in animals feeding with special reference to deficiency diseases.

Practical

1. Sampling of milk.
2. Analysis of milk for TS, SNF, Fat, Total ash, Calcium and phosphorus.
3. Determination of lactose and proteins in milk.
4. Analysis of feeds for total ash, CaO, P2O5 and Proteins.
5. Demonstration of estimation of Ether Extract and crude fibre in feeds.
6. Practical Record
7. Viva voce

Course-VI

Semester- VI **1+1**

COMPUTER APPLICATIONS

Introduction to computer. A brief history of computing. Data Processing and information. Use. Definition, Anatomy, Components, Classification of computers. Capability and limitation of computer. Number systems. Decimal. Binary, octal, hexadecimal. Character codes. ASCII, EBCDIC, BCD. Computer organization-CPU, Input-output devices. Various types of memories. Introduction to DOS (Disk operating system) and windows. Introduction to software package (MS-WORD, MS-EXCEL). Composition of Mean, Standard Deviation and analysis of experimental designs : CRD, RBD & LSD through EXCEL.

Practical

1. Practical Based on above topics.
2. Practical Record
3. Viva Voce

B.Sc. Ag., SEMESTER-VII

(13+7)

S. No.	Department	Credit Hours	Title
1.	Plant Breeding & Genetics	1+1	Principles of seed Production Technology
2	A.H. & Dairying	2+1	Dairy products Technology
3	Ag. Engineering	2+1	Post Harvest Engineering.
4	Agronomy	2+0	Farming system and sustainable agriculture
5	Agriculture Economic	2+1	Agriculture Finance, Business management and trade.
6	Agriculture Extension	2+1	Communication, Diffusion of agriculture innovation
7.	Plant Pathology	0+1	Plant Pathology: Mushroom cultivation, Mushroom culture and elementary plant Nemetology
8.	Horticulture	2+1	Ornamental Horticulture

Course-I

Semester- VII **1+1**

PRINCIPLES OF SEED PRODUCTION TECHNLOGY

1. History and importance of seed technology.
2. Classes of seeds.
3. Characteristics of quality seeds and its importance.
4. General technique of seed production in important agricultural crops.

(i) Cereals - wheat and rice

(ii) Millets - maize, sughum and bajra

(iii) Pulses - chichkpea, pigeonpea, and mung bean

(iv) Oil Seeds - raps seed and mustard, sesamum.

(v) Commercial corps - sugarcane, potato and cotton.

5. Factors affecting seed longevity and quality.
6. Causes of seed deterioration with reference to genetic and storage.
7. Seed testing- importance, procedures, purity, viability and germination.
8. Certification procedure for important filed crops.

Practical

1. Maintenance of seed purity in the field.
2. Field inspection procedure in important crops.
3. Purity analysis, seed moisture, germination, viability and vigour tests.
4. Practical record
5. Viva Voce

Course-II

Semester- VII **2+1**

DAIRY PRODUCTS TECHNOLOGY

1. Definition, composition and method of manufacture of cream, butter ghee, dahi, khoa, chhana, paneer, ice cream, condensed milk, milk powder, cheddar and cottage cheese.
2. Cleaning and sanitization of dairy equipments.
3. Basic principles of refrigeration and cold storage, storage of milk products. Principles of cooling and heating, Heat transfer equipments.

Practical:

1. Demonstration of cream separation.
2. Demonstration of preparation of cream, butter, ghee, cheese, khoa chhana, paneer, ice cream and dahi.
3. Calculation on Ice cream milk.
4. Calculation on standardization and Neutralization of cream, over run of butter and ice cream.
5. Comparative study of cost of different milk products.
6. Practical record
7. Viva voce

Course-III

Semester- VII **2+1**

POST HARVEST ENGINEERING

1. Importance and advantages of processing of agriculture produce.
2. Study of process and equipments involved in cleaning drying. Storage of farm produce. Rice milling, Pulse-milling, wheat milling, oilseed milling, soyabeen processing cane- crushing, Chaff cutting and animal feed grinding.
3. Utilization of agricultural by products such as rice husk and straws, rice bran and Arhar Stalk.
4. Processing and Preservation of foods and seeds.
5. Biomethanation of agricultural and municipal wastes.

Practical

1. Determination of moisture content of grains.
2. Sieve analysis of ground materials.
3. Study of construction, operation, care and maintenance of different processing equipments.
4. Study of Biogas Plants.
5. Visits of place related to processing of farm produce.
6. Practical record
7. Viva Voce

Course-IV

Semester- VII **2+1**

FARMING SYSTEM AND SUSTANAIBLE AGRICULTURE

1. Farming systems- Definition, types and methods of farming.
2. Definition, scope and advantages of sustainable agriculture.
3. Modern agriculture in relation to sustainable agriculture.
4. Sustainable agriculture in relation to tillage, fertilizers, irrigation, weeds management and plant protection measures.
5. Important cropping systems for sustainable agriculture.

PRACTICALS

1. Framing crop rotations in relation to sustainable agriculture.
2. Preparation of cropping scheme for sustainable agriculture.
3. To workout the economics of different farming systems.
4. To study the farming system for sustainable agriculture.
5. Maintenance of practical record.
6. Viva – Voce.

Course-V

Semester- VII **2+1**

AGRICULTURE FINANCE, BUSINESS MANAGEMENT AND TRADE

A. Agricultural Finance

1. Credit, Meaning, Importance and credit control.
2. Definition, need for finance in agriculture, characteristics of good agriculture finance (credit)
3. Types of loans and classification of agricultural credit.
4. Qualifications of a borrower, Analysis and three R's and credit (Return, Repayment Capacity and Risk-Bearing Capacity). Analysis of three G's of credit (character, capacity and capital).
5. Types of loan, according to liquidity, budgeted loan, loan amortization, Even payment method, Decreasing method.
6. Role and Rural Credit Institutions (Recommendations of the Banking Commission integrated Scheme of Rural Finance (Credit), Institutional Agencies, Taccan.
7. Sources of agricultural finance (Commercial banks, RRB, Lead Bank, Lead) Bank, NABARD, Cooperative Credit (PACs, Land Development Banks, National cooperative Federation, Farmers Service Cooperatives).

B. Business Management

1. Meaning of management, functions of management role of mangers and scope of management in agricultural business. Role and objectives in management references.
2. Decision making by individuals as also by groups.

3. Functional areas of management and their relationship with agriculture production, finance, marketing and human resources as coordination thereof.

4. Acquaintance of book-keeping and cash accounts(s).

Knowledge of business environment for operation of bank account cheques, bank draft etc.

PRACTICALS

Course-VI

Semester- VII **2+1**

COMMUNICATION, DIFFUSION OF AGRICULTURE INNOVATION

Meaning and definition of communication. Communication process, elements and models of communication. Types of communication. Key communicator Audio visual aids, their use and effectiveness.

Extension teaching methods- classification, merits and demerits, factors affecting selection and use of extension teaching methods, Mass Media in Extension.

Differences between interpersonal and Mass Communication.

Meaning and definition of innovation, diffusion, adoption, diffusion effect and rate of adoption, stages of adoption, factors affecting adoption, elements of difference between diffusion and communication. Innovation decision process, categories of adopters, characteristics of innovations.

Practical

1. Preparation and handling of audio-visual aids.
2. Organizing group discussion, campaign, seminar, exhibition and demonstration.
3. Practices in writing news letter, circular letter, radio and television scripts on different farm practices.
4. Identification of farmers under different adopter's categories.
5. Collection of information from farmers to determine extent of adoption of a particular farm practice.

6. Educational tour to give exposure of selected ICAR & SAU Institutes to all students.

7. Practical record

8. Viva Voce

Course-VII

Semester- VII **0+1**

PLANT PATHOLOGY: MUSHROOM CULTIVATION MUSHROOM CULTURE AND ELEMENTARY PLANT NEMETOLOGY

Practical

Morphology of edible mushrooms and their classification. Swawn and its preparation. Methods of Cultivation of different types of edible mushrooms. Mushroom diseases and ests. Mushroom recipies.

(i) Practical record

(ii) Viva voce

Course- VIII

Semester- VII **2+1**

ORNAMENTAL HORTICULTURE

Importance and scope of ornamental horticulture in India. Cultivation of annuals, cannas, jasmines, roses, chrysanthemum, marigold and gladiolus. Making and maintenance of Lawn, Hedge and Edging; Elementary knowledge of common shrubs, climbers, trees green house plants and their various uses. Indoor gardening; Styles of gardens with special reference to Mughal and Japanese gardens. Floristry and Flower arrangement. Techniques to prolong vase life of flowers. Protected cultivation of cut flowers.

Practical

1. Identification of ornamental plants.
2. Preparation of herbaceous and shrubbery border.
3. Practice of making garlands, Bouquet and flower arrangements in vases.
4. Propagation of ornamental plants.
5. Practice of potting and repotting of plants.
6. Visit to ornamental gardens, green houses and research stations.
7. Practical record and posters
8. Viva voce

B.Sc. Ag., SEMESTER-VIII

(2+11)

S. No.	Department	Credit Hours	Title
1.	Agriculture Extension	1+1	Rural agricultural work experience in all departments related to field work
2	Agriculture Economic	1+1	
3	Plant Breeding & Genetics **(Visit to crop improvement centres, seed processing units and seed production farms – Govt. and Private).**	0+1	
4	Agriculture Chemistry & Soil Sc.	0+1	
5	A.H. & Dairying	0+1	
6	Agriculture Engineering	0+1	
7	Horticulture	0+1	
8	Soil conservation	0+1	
9	Agronomy	0+1	
10-	Paint Pathology	0+1	
11	Agriculture Zoology & Entomology	0+1	

Semester- VIII

RURAL AGRICULTURAL WORK EXPERIENCE

It is often complained that the agricultural graduates lack professional competence and cut a fury figure in facing farmers. Keeping this in view the rural agricultural work experience (RAWE) is included in the programme, in which students will be exposed to rural (Village) environment for obtaining real life experience on farms. For this groups of students will be associated with farmers. Agro- industrial units and agricultural research stations for a period of 3-4 months to work with them on farm, machines, labs, etc. They will be constantly supervised and evaluated by the faculty and a detailed report works done by the students during the period will be submitted in the department for evaluation and rating.