

Rohilkhand University, Bareilly  
*Bachelor of Science in Agriculture*  
Four Year Degree Course

**ORDINANCE**

1. The Examination for the degree of bachelor of Science in Agriculture shall be open to any candidate who has passed the Intermediate Examination in Agriculture or Inter Science with Biology of the Board of High School & Intermediate Education, U.P. or any other Examination recognised by the University as equivalent thereto.
2. The Course of study for the Bachelor of Science in Agriculture degree shall extend over a period of four academic years with university examinations to be called First year, Second Year, Third Year and Final Examination at the end of first, second, third and fourth academic years respectively.
3. (a) A candidate who after passing the Intermediate Examination in Agriculture or Inter Science with Biology of the Board of High School and Intermediate Education, U.P. or equivalent thereto, may be admitted to B.Sc.(Ag.)-First Year Examination.  
(b) A candidate who after passing the B.Sc. (Ag.)-First Year Examination of the university has attended a regular course of study in Agriculture for one academic year in an affiliated college may be admitted to B.Sc. (Ag.)-Second Year Examination.  
(c) A candidate who after passing the B.Sc. (Ag.)-Second Year Examination of the university has attended a regular course of study in Agriculture for one academic year in an affiliated college may be admitted to B.Sc. (Ag.)-Third Year Examination.

- (d) A candidate who after passing the B.Sc. (Ag.)-Third Year Examination of the University has attended a regular course of study in Agriculture for one academic year in an affiliated college may be admitted to B.Sc. (Ag.)-Final Examination.
- (e) A candidate who after passing the B.Sc. (Ag.)-Final Examination and fulfilling all other requirements including individual practical crop production (Farm Internship) may be awarded the degree of Bachelor of Science in Agriculture.
4. Every candidate for the B.Sc. (Ag.) degree shall be required to pass in the following subjects: -
- a. Agronomy
  - b. Agricultural Economics
  - c. Agricultural Extension
  - d. Animal Husbandry and Dairying
  - e. Agricultural Chemistry
  - f. Agricultural Biochemistry
  - g. Agricultural Engineering and Soil Conservation
  - h. Agricultural Botany
  - i. Horticulture
  - j. Zoology – Entomology
  - k. Plant Pathology
  - l. Mathematics and Statistics



**B.Sc. Ag. Part II**

| Paper | Subject                       | Theory Marks | Practical Marks |
|-------|-------------------------------|--------------|-----------------|
| I     | Soil and Water Conservation   | 50           | 50              |
| II    | Agronomy                      | 50           | 50              |
| III   | Agricultural Biochemistry     | 50           | 50              |
| IV    | Animal Husbandry & Vet. Sc.   | 50           | 50              |
| V     | Genetics and Plant Breeding   | 50           | 50              |
| VI    | Olericulture and Floriculture | 50           | 50              |
|       | <b>Total</b>                  | <b>300</b>   | <b>300</b>      |

**B.Sc. Ag. Part III**

| Paper | Subject                              | Theory Marks | Practical Marks |
|-------|--------------------------------------|--------------|-----------------|
| I     | Agri. Zoology Entomology             | 50           | 50              |
| II    | Plant Pathology                      | 50           | 50              |
| III   | Agri-Extension & Rural Development   | 50           | 50              |
| IV    | Dairying                             | 50           | 50              |
| V     | Pomology                             | 50           | 50              |
| VI    | Dairy Chemistry and Animal nutrition | 50           | 50              |
|       | <b>Total</b>                         | <b>300</b>   | <b>300</b>      |

**B.Sc. Ag. Part IV**

| Paper | Subject                                 | Theory Marks | Practical Marks |
|-------|---|--------------|-----------------|
| I     | Beneficial insect & Fisheries           | 50           | 50              |
| II    | Seed Technology                         | 50           | 50              |
| III   | Microbiology                            | 50           | 50              |
| IV    | Production Economics & Farm Management  | 50           | 50              |
| V     | Rural Sociology & Behavioral Psychology | 50           | 50              |
|       | <b>Total</b>                            | <b>250</b>   | <b>250</b>      |

**B.Sc. Ag. First Year**  
**Paper – I Mathematics and Statistics**

**A- Mathematics**

1. **Algebra:** - Binomial theorem (for positives internal index only) Partial fractions, Determinants of three orders, Bet theory Operations on sets (Union, intersection and difference of sets).

2. **Calculus:** -

(i) **Differential calculus:** - Definition (Variable, constant, function explicit and implicit and implicit function, limit), Derivatives of algebraic and trigonometrical functions (excluding inverse functions), Derivative of product of several functions and quotient of two functions, Differentiation of function of a function, Logarithmic differentiation, Differentiation of implicit functions and parametric equations.

(ii) **Integral Calculus:** - Integral of standard forms, Integral of a sum, Integral with substitution and Integration by parts.

**B: - Statistics**

(I) **Measures of Central tendency:** - (Mean, Mode and Median).

(II) **Measures of Dispersion:** - (Quartile Deviation, Standard Deviation, Variance, Coefficient of variation, Standard error of mean).

(III) **Correlation:** - (Karl Pearson's coefficient of Correlation and Spearman's Rank difference method).

(IV) **Sampling:** - (Population and Sample survey, simple Random sampling, stratified random sampling).

(V) **Normal Distribution:** - (Properties of Normal curve and their used).

(VI) **Tests of significance:** - (Chi-Square test: definition and its application in 2 X 2 contingency table, Z, t and F test).

(VII) **Designs of Experiment:** - (Basic principles of fields experimentation, completely randomized design, Randomized Block Design, Latin square Design).

**PRACTICAL**

Practical based on topics mentioned in section "B" i.e. Statistics with the help of statistical tables and Calculating Machines.

B.Sc. Ag. First Year

*Paper – II – Soil, Fertilizer and Manures*

1. An introductory knowledge of soil body, Definition of Soil, Methods of study of soil Profiles, eluviations, and alleviation.
2. Soil forming rocks and minerals, weathering of rocks and wineries, Type of weathering Chemicals, Physical and Biological, Profile developments, pedogein of actors and soil forming processes.
3. Classification of soils in India with special reference to U.P.
4. Physic-Chemical properties of soils-soil texture and structure, granulation and factors effecting its promotion in cultivated soil.
5. Chemical Equilibrium, reversible and irregorabile reactions. Characteristics of chemical equilibrium, law of mass action.
6. Colloids-Definition and properties, soil colloids, slay minerals and its effect an availability of plant nutrients.
7. Soil-organic matter, sources and decomposition, humus base exchange, its effect on soil and plant growth.
8. Theory of Acid and Base, Ionic product of water, relation of  $H^+$  and  $OH$  ions in solution,  $p^{H\text{ and}}$  its determination, buffering action of soil.
9. *Importance of soil water, air and temperatures in relation to plant growth.*
10. Saline and Alkali soils, their formation and reclamations.
11. Factors effecting growth and activity of soil microorganisms and their impact on soil fertility.
12. Mineraliuetion of Nitrogen, immobilization, Nitrification and identification, Symbiotic and Non-symbiotic nitrogenous fixation in soils.
13. Chemical analysis of soil Determination of Total Nitrogen and organic matter in soil.

14. Mechanical analysis of soil-Outermination of coarse and fine sand wilt and clay.
15. Essential elements, their functions and deficiency symptoms in plants, forms and behavior of micro and microelements in soil, factors affecting their availability.
16. Classification of Manures and Fertilizers, study of fertilizers of .M.P.K. with special reference to their manufacture, storage, properties, mode of action and utilization, fertilizer mixtures compound fertilizers, quality control of fertilizers, and recommendation of fertilizers in nutrients deficient soil.

**Practical: -**

1. Examination of soil Profiles.
2. To find out moisture percentage in the given soil sample.
3. Preparation of HCL extract of soil and determination of Ca as CaO by Volumetric method.
4. To determine organic Carbon Content of soil sample.
5. Analysis of irrigation water determination of  $\text{CO}_3$   $\text{HCO}_3$  and chloride Volumetrically.
6. Determination of ferrous iron by  $\text{K}_2 \text{C}_2 \text{O}_7$  (Internal and external indicator Methods)
7. To find out the pH of the soil sample.
8. Determination of Cation requirements of saline and alkali soils.
9. Demonstration of Mechanical analysis of soil.

**B.Sc. (Ag.) – First Year**

**Paper – III Ag. Botany (Internal Morphology, Crop Systematic & Physiology)**

**A- Internal Morphology: -**

- 1- Internal Morphology of a typical monocot and dicot stem, root & leaf.
- 2- Secondary growth in typical dicot stem and root.
- 3- Morphological and anatomical features of Hydrophytes and Xerophytes.

**B- Crop Systematic: -**

Systematic study of the following families with special reference to the genes a mentioned-

- 1- Grami Neal - Triticum, Hosdeum, Arena, Oryza, Zea, Sorghum
- 2- Papilionaleae - Pisum, Cicar, Cajanus, Critabria, Arachis
- 3- Cruciferous - Parasosica
- 4- Solanaceal - Solomon, Nicotine
- 5- Cucucrbitalcene - Cucurbita, Luffa, Lagenaria
- 6- Malvaceal - Gossypium, Hibiscus.
- 7- Rascal - Prunes, Eriobotrya
- 8- Linaceal - Linum
- 9- Pedaliaceal - Sesanum.
- 10- Convolvubceal- Convolvulus, Spomaca
- 11-Euphosbiaceal - Ricinus.
- 12- Composite - Carthamus.



**C- Physiology:-**

- 1- Plant physiology and its relation to Agriculture.
- 2- Water relation of plant – permeability, Diffusion, Imbibition and osmosis.
- 3- Clechenuisim of water and mineral absorption.
- 4- Transpiration it mechanism and significance for plants.
- 5- Photosynthesis – light and dark section carbon pathway, photo phosphorylation, law of limiting factor.
- 6- Respiration- Aerobic and anaerobic respired, Mechanism and factor affecting respiration.
- 7- Growth and development elementary knowledge of photoperiodism and vernalization.

**Practical: -**

- 1- Free hand section cutting with staining practice of roots stems and leaves of typical dicots and monocots.
- 2- Systematic study of the genera prescribed for the theory.
- 3- Physiological experiments based on absorption of water respiration.
- 4- Spotting.
- 5- Presentation of practical record & Vice Voce.

B.Sc. Ag. First Year

*Paper – IV – AGRONOMY*

A- *Crops: - Study of the crops mentioned below under the following heads: -*

1. Origin
2. Distribution with special reference to U.P.
3. Soil requirements.
4. Crop rotations.
5. Preparation of seed bed
6. Recommended Varieties
7. Sowing time
8. Seed rate
9. Spacing
10. Manuring
11. Irrigation
12. Intercultural operations
13. Harvesting
14. Threshing
15. Yield
16. Control Measures *Of important insect pests and diseases.*

Cereals – Wheat, Bajra, Barley

Pulses – Arhar, Urd, Moong

Fiber Crops – Jute, Sunnhemp

Oil seeds – Groundnut, Til, Castor

Forage crops- Jawar, Cowpea, Guar, Makchari and Elephant grass.

Commercial crops – Sugarcane and sugarbeet.

- B- Classification of crops and General principles of crop production.
- C- Crop Rotation-Definition, Principles, and Advantage and rotation practices in U.P.
- D- Cropping System-Definition, factors affecting them and their different types.
- E- Cropping Scheme- Definition, qualities of a good cropping scheme and factors affecting cropping scheme.
- F- Soil fertility and Productivity- Definition, difference between soil fertility and soil productivity and factors affecting them.

### PRACTICAL:-

1. Practical study of the techniques of production of crops studied in theory, in all its
2. Phases. All the operations like preparation of seed bed, application of fertilizer/ manures, sowing /transplanting, weeding, hoeing, threshing, etc are to be done as farm operations at appropriate times on the college farm, study of the cost of production.
3. Placing fertilizers working out the menorial schedule for different crops, calculation of the cost of fertilizers, proportion of fertilizer mixtures unit value of fertilizers.
4. Study of the germination, plant growth and development, growth ratio.
5. Preparation of cropping scheme for different regions.
6. Identification of seeds, seedlings, fertilizers, manures and common weeds.
7. Visit to private, Commercial, Govt., Demonstration and experimental farms.

B.Sc. Ag. First Year

*Paper – V – AGRICULTUE ENGINEERING*

*(Farm-Machinery, Farm-Power, Irrigation & Drainage)*

**A. FARM-POWER: -**

1. Source of power on the farm and their relative advantage and disadvantage, Simple calculation.
2. Construction and principles of operation of an internal combustion engine. Two stroke and four stroke engines.
3. Auto and Diesel Engines, Carburetor and fuel injection system.
4. Brief study of valve-system, ignition-system, Lubrication system, Fuel-supply-system, Cooling-system and governing-system.
5. Classification and selection of farm-tractor. Ploughing methods and functions of different parts. Power-transmission in modern tractor. General troubles and adjustment. Simple calculation of H.P. developed in a tractor.
6. Study of simple-parts and operation of an electric motor, calculation of H.P. and unit consumed. Role of switches and fuses.

**B: - FARM-MACHINERY: -**

- 1- Study of construction, working trouble and adjustment of following power and bullock drawn machines, plough, Harrow, Cultivators, Seed-Drills, Reaper, Mower, Thresher, and Concentrate grinder, Chaffcutter.

**C: - FARM-STRUCTURES: -**

- 1- **Building-Materials:** - Soil, Brick, Tile, Lime-Cement, G.I.Sheet, Aluminum-Sheet, Mortar and Concrete, their proper use and adoptability.
- 2- Planning and layout of Housing, in rural-areas. Selection of site, farmhouse, polling-house and barns.

- 3- Storage-Structure of grams and fodders.
- 4- Rural water Supply, System of water supply, Purification of drinking water.

**D- IRRIGATION AND DRAINAGE ENGINEERING: -**

- 1- Source of Water on the farm and their relative advantages and disadvantages. Construction of Masonry-Wells and Tube Wells, Improvement of Well by boring.
- 2- Study of parts and simple principles of operation of a centrifugal – pumps, their installation and limitation.
- 3- Measurements of Irrigation-Water, Simple calculations.
- 4- Simple design and layout of irrigation and drainage-channels.

**PRACTICAL: -**

1. **Farm Power:** - (1) Study of power, chain and value system, cooling system and lubricating system, ignition system and fuel supply system. (2) Dismantling and reassembling of Internal combustion engine, starting and stopping of diesel engine, (3) Study of tractor parts and its operation.
2. **Farm-Machinery:** - (1) Study of methods of power transmission (2) Study of construction and working of ploughs, harrows cultivators, roller, Seed drill, planter, mover, reaper and thresher. (3) Study of construction of manually operated sprayer, duster and thresher, determination cost of operation.
3. **Irrigation & Drainage :-** (1) Dismantling and reassembling of electric motor and centrifugal pump. Measurement of irrigation water in various hydraulic structures. Study of tub-well.
4. **Workshop practice:** - Sharpening of plough shovel and cutting methods of machine, welding of joints-electric & gas welding, Threads in bolts & nuts, Grinding test, Hard facing of plough, shaft and shovels of cultivators.

B.Sc. Ag. First Year

*Paper – VI – AGRICULTURAL ECONOMICS*

**INTROCUCTION –**

Definition, nature, scope and subject matter of Agricultural Economics, Question between Agricultural Economics and Industrial Economics, Role of Agricultural in National Economy

**LAND ECONOMICS –**

Land utilization, Land Tenures Land Reforms, Problems of land holdings, Land legislation in U.P.

**POPULATION AND FOOD–** Theories of population, Growth of Population and supply of good, population problem and its control, Food problem and measures to solve it.

**AGRICULTURAL LABOUR–** Concept of Agricultural labour and its peculiarities. Types of Agricultural wages and methods of wage payment, Efficiency of labours in Agriculture, Idleness in agriculture, Problems of Agricultural labour and their solution, Measures to increase gainfull employment for farm workers with special reference to NREP and TRYSEM etc.

**AGRICULTURAL FINANCE** Nature and extent of requirement of Agricultural credit, sources of Agricultural credit, sound of system of Agricultural credit, Role of Institutional financing in Agricultural Review of Agricultural credit policies.

**AGRICULTURAL COOPERATION-** Concept and Principles of cooperation, Cooperative movement in India, Cooperative credit, Cooperative Marketing and Cooperative forming.

**AGRICULTURAL MARKETING** Definition, Classification of Agricultural Market, Functions and services, Marketing cost, Effect and Problems of Agricultural marketing and remedial measures,

**AGRICULTURAL PRICES** Concept of price and its determination, Price stabilisation, Review of Agricultural Price Policy in India.

**PRACTICAL: -**

**VILLAGE SURVEY** Survey of a selected village to acquaint with infrastructure.

**FAMILY BUDGET** Family budgets of different straits of a village society.

**MARKET SURVEY** A case study of one important commodity in the local mandi to acquaint with the main problems of agricultural marketing.

**INSTITUTIONAL SURVEY** A study of anyone of the following to acquaint with the working and achievements:

- 1- *Cooperative credit Institution*
- 2- *Cooperative Marketing Society*
- 3- *Consumers cooperative store*
- 4- *Cooperative farming society*

**REFRACTION** Refraction of grain samples of grain Analysis to determine grades of wheat or rice.

**B.Sc. Ag. Second Year**

***Paper – I – Soil and Water Conservation***

**Theory**

1. **Precipitation and Hydrology:** - Precipitation, storms, their forms and measurement. Hydrological cycle, its importance and effects, Measurement and characteristics of Meteorological factor like rainfall, temperature, humidity and wind. Evaporation and transpiration. Estimation of evaporation and transpiration and evapo-transpiration with the help of empirical equation and soil moisture measurement. Infiltration and permeability. Factor affecting Run-off, Run-off phenomena, factor affecting and measurement. Time of concentration and its impact on run-off. Rational equation for measurement of run-off.
2. **Erosion :-** Soil erosion, factor affecting. Types of water and wind erosion. Geological and accelerated erosion. Erosion Control. Control of erosion by vegetation and afforestation Engineering practices for erosion control like contouring, field bunding, contour bunding and gully control structure. Soil survey and land use classification.  
**Soil Water:** - Forms of soil water, soil moisture, and movement within the soil. Soil moisture stress. Field capacity. Wilting point and available moisture range.
3. **Irrigation:** - Irrigation requirement, crop factor, Delta, duty of water, when to irrigate. Method of irrigation, surface sub-surface and sprinkler method and drip irrigation. Comparison between flooding. Check flooding. Furrow and border irrigation method.
4. **Drainage :-** Drainage characteristics of various soils. Surface and sub-surface drainage system, their types, planning and layout.



## PRACTICAL

### SURVEYING

- 1- Chain survey of small farm showing field boundaries road and buildings.
- 2- Compass survey (a) Locating simple closed Travers. (b) Locating of an open Travers. (c) Filling of various details inside the Travers.
- 3- Plane Table survey: - Locating of farm boundaries of various details by (a) Radiation (b) Intersection.
- 4- Leveling: - (a) Various adjustments in dumpy and I.O.P. level and study of their parts. (b) Differential and Profile leveling. (c) Contouring (d) Lay out of contour and graded bounds.
- 5- Layout strips for strip cropping, terrace planning contour mapping Estimating cut and fill along a terrace system, Layout of drainage channels.

**B.Sc. Ag. Second Year**  
***Paper – II – AGRONOMY***

**A- Crops: - Study of the crops mentioned below under the following heads: -**

- |  |  |
|--|--|
| 1. Origin  | 2. Distribution with special reference to U.P. |
| 2. Soil requirements.  | 4. Crop rotations.                             |
| 5. Preparation of seed bed                                   | 6. Recommended Varieties                       |
| 7. Sowing time   | 8. Seed rate                                   |
| 9. Spacing   | 10. Manuring                                   |
| 11. Irrigation   | 12. Intercultural operations                   |
| 13. Harvesting   | 14. Threshing                                  |
| 15. Yield  |  |
| 16. Control Measures Of important insect pests and diseases. |  |

***Cereals:*** - Paddy, Maize.

***Smaller miltece :*** - Mandua , Sanwan, Choena, Kodo, Kakum.

***Pulses:*** - Gram, Lentil, and Pone.

***Fibro Crops:*** - Cotton

***Oil Seeds:*** - Rope and Mustard, Linseed, Sunflower.

***Forage Corps:*** - Burnoose, Lucerne, and Jute.

***Commercial Crops:*** - Potato, Tobacco.

**B- Weeds and weed Control:** - Definition of weed, Characteristics of weeds Crop, weed, competition, Benefits from weeds, Lasses caused by weeds, Multiplication and dissemination of weeds, Common weeds of U.P., their injurious effects, habits of growth and simples methods of control.

The study will be limited to the following weeds: -

1. *Asphodalus tenuifolius* (Piazi)
2. *Convolvulus arvensis* (Hirankhuri)
3. *Piucea Innceolate* (Bnisuri)
4. *Alhagi camelorum* (Jawasa)
5. *Chemopodium album* (Bathwa)
6. *Digera arvensis* (Lahsua)
7. *Phyllanthus niruri* (Hezardana)
8. *Trinnthama monugyna* (Patharchata)
9. *Luphorbis hirta* (Badi Duddi)
10. *Cyporus rotundus* (Motha)
11. *Cynodon dautylong* (Dub)
12. *Saccharum spontanoum* (Kans)

**PRACTICAL: -**

- a. Practical study of the techniques of production of crops studied in theory, in all its phases. All the operations like preparation of seed bed, application of fertilizers / manures, sowing/transplanting weeding, holing, threshing, etc. are to be done as farm separation at appropriate time on the college farm, study of the cost of production.
- b. Pinching fertilizers, working out the manorial schedule for different crops studied in theory, calculation of the cost of fertilizers, preparation of fertilizer mixture using Pearson's square.
- c. Seed testing, real value of seed, preparation of seed material for sowing including pro-sowing seed treatment.
- d. Preparation of cropping scheme for different regions.
- e. Working out of weed count, weed density and requirement of herbicides.
- f. Identification of seeds, seedlings, fertilizers, manures and common weeds.

B.Sc. Ag. Second Year

Paper – III – AGRICULTURE BIOCHEMISTRY

SYLLABUS: -

- 1- Living System: - Characteristics of life, Chemical composition of living system, water and its properties, ionization, acid & bases,  $P^H$  & buffers, colligative properties, osmosis and diffusion, their importance to the living system.
- 2- Biological transport processes:- Membrane structure movement of molecules and ions across membrane and their regulation.
- 3- Biochemical Energetics:- Biological oxidation-reduction, concept of free energy, relationship between free energy and equilibrium constant, redox potential, energy rich compound, coupled reactions, electron transport chain and oxidative phosphorylation.
- 4- Carbohydrates:- Characteristics, nomenclature and classification of carbohydrates, general reactions of mono saccharides, Chemistry of important monosaccharides (glucose, fructose), disaccharides (starch & cellulose), Structure of glucose & fructose, elementary idea of mutarotation and stereoisomerism in sugars.
- 5- Amino acids and proteins:- Introduction, classification and properties of amino acids, polypeptides, Characteristics and classification of proteins, structural levels of proteins, synthesis of amino acids & proteins in plants.
- 6- Enzymes:- Characteristic, nomenclature and classification of enzymes, kinetics and mode of action of enzymes, allosteric enzymes, isozymes, factors affecting the rate of enzymic reactions, types of enzymic inhibitors.
- 7- Lipids: - General characteristics and classification of lipids, properties of fats & oil, classification and general properties of fatty acids, synthesis of simple lipids in plants.

- 8- **Nucleic Acids:-** Nucleic acids and their components, general chemistry & structure of nucleic acids, Watson & Crick model of DNA structure, Structure of RNA, type of RNA and their functions.
- 9- **Vitamins:-** Introduction and classification of vitamins, Sources, chemistry, physiological functions & deficiency symptoms of water soluble vitamins.
- 10- **Photosynthesis and photorespiration:-** Light & dark reactions, cyclic and non-cyclic photophosphorylation, regulation of photosynthesis, carbon reduction in C<sub>3</sub> & C<sub>4</sub> plants, carbon reduction in CAM plants, photorespiration, relationship between photosynthesis, photorespiration and crop productivity.
- 11- **Plant Hormones:-** Elementary idea of plant hormones, classification, Chemistry and their mode of action. Application in Agriculture.
- 12- **Germination:-** Biochemical changes during germination of seeds, elementary idea of intermediary metabolism of proteins, lipids and carbohydrates.

**Practical Biochemistry: -**

- 1- Identification of the functional groups of following classes: -  
Carboxylic, Phenol, Alcohol, Ester, Amide, Aldehyde & Ketone.
- 2- Preparation of a buffer solution and determination of its P<sup>H</sup> by using indicators of P<sup>H</sup> paper.
- 3- Acid-Base titration.
- 4- Qualitative analysis of carbohydrates.
- 5- Qualitative & quantitative-test for amino acids and proteins.
- 6- Qualitative & quantitative analysis of fats & oils viz, Solubility, saponification, unsaturation etc.
- 7- Quantitative determination of sugar or proteins in a given sample.
- 8- Demonstration of
  - (a) Some physio-chemical phenomena viz, osmosis, diffusion, plasmolysis etc.
  - (b) enzyme action and effects of various factors on its activity.
  - (c) Chromatographic techniques.
  - (d) Mutarotation of Sugars.
- 9- Biochemical calculation based of syllabus.
- 10- A visit to Dhampur Sugar Mill & Distillery Unit.
- 11- Practical record
- 12- Viva Voce

B.Sc. Ag. Second Year

*Paper – IV – ANIMAL HUSBANDRY & VETERINARY SCIENCE*

**THEORY:** - Examiner will have to set two questions & the student will have to answer one question from each group.

**GROUP- I LIVE STOCK & HOUSING:**- Place of Dairy Cattle in Indian Economy, Live stock improvement programmes & schemes, Key village scheme, Shelter Engineering for live stock – site, direction, cattle sheds, floor space & other constructional details.

**GROUP- II FEEDING:** - Classification & Evaluation of feeds & fodder, Principle of feeding animals, special feeding requirements for bulls, pregnant and lactating cows. Nutritive values of feeds. Feeding standards and their importance. Computation of Balance Rations for different livestock. Scheme for production of green fodder throughout year. Conservation of green fodders.

**GROUP-III BREEDING & PHYSIOLOGY & ANATOMY:** - National breeding policy of cattle and buffaloes. Cattle breeding problems in India and suitable measures for their improvement. Methods & systems of breeding animals. Selection, variation, application and importance of mandlism in breeding progeny testing & sire index. Artificial, insemination- semen collection, examination, dilution and preservation of semen. Insemination of cow and pregnancy diagnosis. Importance and role of hormones in digestion, milk secretion and reproduction. Physiology of Reproduction, Digestion and Milk secretion in cow.

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**GROUP- IV**      **HEALTH CARE:** -      General care of live stock- sanitation, segregation drying of the cows care of pregnant cows before and at calving. Immunity – definition & types. Classification of contagious and infectious diseases. Mode of infection, causes, symptoms, diagnosis, treatment and control of Anthrax, Haemorrhagic septicaemia, Tuberculosis, Rinder Pest, Foot and Mouth disease, Mastitis, Milk fever, Skin Diseases Mange & Warble disease. Diseases of New born calf, genital diseases of cow causes of sterility in cow. Economic importance of parasites.

**GROUP- V POULTRY:** -      Economic importance of poultry production. Production housing, management, practices. Digestive system and reproduction in poultry

**PRACTICAL: -**

1. External Anatomy of cow and poultry.
2. Milking of Dairy cows.
3. Judging of Dairy Animals
4. Familiarity with Dairy Records.
5. Computation of Balance Ration of Dairy Animals and Poultry.
6. Calculation of D.C.P., T.D.N., N.R. & Digestive Co-efficient and stract equivalent.
7. Identification of Vet. Tools, drugs and parasites.
8. Medication of live stock and first aid of wounds, fractures etc.
9. Castration, dehorning, marking and docking.
10. Drawing on scale plans for housing of dairy cattle.
11. Assembling of A.V and semel collection.

B.Sc. Ag. Second Year

Paper – V – GENETICE AND PLANT BREEDING

A: - Genetic: -

Early notions of heredity, mendallist laws of in heritance.

1. Later development of mendalism, modification of mendalin factions, multiple, lethal and interaction of footers.
2. Multiple alleles, Blood groups, Position effect, plfiotropies and peau-do-alleliem.
3. Cell structures, Cell division (mitosis and meiosis) and morphology of chromosomes.
4. Linkages and crossing over, automation of linkage in back cross data.
5. Sex linked, sex-limited and sex-influenced characters.
6. Chromosomal aberrations, Polyploidy and Mutation.
7. Variation, kindly and causes. Cytoplasmic inheritance.
8. Biotechnology-Nature of genetic material, D.N.A. & R.N.A. genetic regulation of protein synthesis, Elementary knowledge of Biochemical and Bacterial Genetics, Conjugation, Transformation and Transudation.

B: - Plant Breeding: -

1. Definition, limitations, role and short history of plant breeding.
2. Modes of reproduction in crop plants in relation to breeding techniques, apomixes, polyombryomy, parthenocorpy, etc.
3. Knowledge of methods of crop improvement including (a) Introduction (b) Selection (c) Hybridizations.



4. Hybrid vigour, its utility in crop improvement. Use of self incompatibility and male-sterility in plant Breeding.
5. Mutation and polyploidy in relation to crop improvement.
6. Role of interapecific and intergeneric Hybridization in crop improvement.

**PRACTICAL:-**

1. Determination of goodness of fit of mandolin ratios.
2. Preparation of temporary cytological slides for mitosis and meiosis by smear method.
3. Techniques of hybridization and selection in important crops.
4. Knowledge of design layouts of veritable trials.
5. Collection of Herbarium and presentation of practical records.

**Paper – VI – OLERICULTURE AND FLORICULTURE**

**A – Olericulture: -**

- 1- Importance of vegetables in human diet and agricultural economy.
- 2- Classification of vegetable crops.
- 3- Types of vegetables growing.
- 4- Cultivation of following vegetables with special reference to soil, climate, manurial requirement, varieties and common insect pests and diseases, Tomato, Chilies, Brinjal, Radish, Turnip, Cauliflower, Cabbage, Pea, Carrot, Onion, Okra, Gourds (Bottle-gourds, Pumpkin, Ridge gourd & Bitter gourd) and sweet potato.
- 5- Harvesting, Packing & disposal of vegetables.

**B:- Floriculture :-**

1. Definition and scope of ornamental gardening.
2. Making and Management of lawn.
3. Classification of hedges.
4. Shrubs & Shrubberies.
5. Cultivation of summer, rainy & winter season annuals.
6. Cultivation of Rose, Canna, Chrysanthemum & Jasmines.
7. Plants Suited for edging.
8. Layout of Bungalow Compounds, Herbaceous border, Shrubbery border and public parks.
9. Study of flowering and shade trees for roadside avenues.

## PRACTICAL: -

### A-Vegetable Crops: -

- 1- Cultivation of different vegetables.
- 2- Judging and inspection of vegetable seeds.
- 3- Preparation of Rabi, Kharif & Zaid Nurseries.
- 4- Seed raising of vegetables.
- 5- Cultivation of the following crops in a demonstration plot :  
Cole crops, Spinach, Beans, Radish, Turnip, Beets, Sweet Potato, Garlic, Dhania. etc.

### B - Ornamental Gardening: -

- 1- Important methods of propagation of garden plants.
- 2- Identification of hedge plants, Flowering & Ornamental trees, Shrubs, Creepers, Climbers & Edging Plants.
- 3- Layout of Herbaceous & Shrubbery borders and Bungalow Compounds.
- 4 Maintenance of hedges & upkeep of Lawns.
- 5 Maintenance of winter, Summer & rainy season and Bungalow compounds.
- 6 Maintenance of Proper record of Laboratory and field work by individual students.
- 7- Visit of various important gardens.

**B.Sc. (Ag.) IIIrd Year**  
**Paper I – Agricultural Zoology Entomology**  
**Theory**

**Note:- Examiner will have to set two questions & the student will have to answer one question from each group.**

**GROUP-I**

1. General Introduction to animal kingdom & various Phyla
2. Elementary knowledge of the following –  
Protozoa with special reference to species causing disease in silkworm; Nematodes with special reference to parasites; Arthropod and Molluscs as pest of crops.
3. A study of Pisces; Amphibians and Reptiles as friends at farmer.
4. Importance of birds to agriculture and encouragement of beneficial birds.
5. Rats and their Management.

**GROUP-II**

- 6- General introduction to phylum Arthropoda, various classes and distinguishing Characters with examples. Position of Insects in Animal kingdom.
- 7- Classification of class insects into various orders of economic importance and their main families with examples (Restricted to the order and families of crop pests mentioned under item No. 10)

### GRUOP-III

- 8- Insect Morphology-Body regions; Head and its appendages; structure; functions and modifications of antenna and mouth parts; Thorax and its appendages-structure, modifications and functions of legs and wings, with venation wing coupling, apparatus, Basal, Sclerites, Abdomen and its structure, external genitalia (grasshopper) Digestive, Excretory, Respiratory, Circulatory, Reproductive and Nervous systems of grasshopper, Sense organs in insects.
- 9- Post-embryonic development-grasshopper and butterfly.

### GRUOP-IV

- 10- Crop pests-detailed account of their occurrence, nature and extent of damage, life history, seasonal incidence and management of the major crop pests of the following order in U.P.

**Orthoptera:** Hieroglyphus species and locusts.

**Isoptera :-** Termites.

**Hemiptera:** - *Bagrada Cruciferarum*, Kirk. *Laptocorisa Varicornis*, Fabr, *Idiocerus* spp. *Pyrilla Perpusilla*, Walker. *Aleurolobus*, Barodensis, Mask. *Drosicha mangiferae*, Green. *Lopaphis Pseudobrassicae*, Davies.

**Lepidoptera :-** *Heliothis* spp. *Agrotis* spp. *Earias* spp. *Pectinophora gossypiella*, Saund *Chilo* spp. *Emmalocera depressella*, Swinh. *Tryporyna nivella*, Fabr. *Papillio demoleus*. Linn. Fruit sucking moths and hairy caterpillars. *Sitotroga Cerealella*, Oliv. *Gnorimoschema operculella*, Zaller, *Sylepta derogata*, Fabr. *Pieris brassicae*, Fabr.

**Coleoptera :-** *Raphidopalpa faveicollis*, Lucas, *Callosobruchus* spp. *Sitophilus* spp. *Trogoderma granarium*, Evert. *Rhizopertha dominica*, Fabr. *Tribolium castaneum*, Herbst. White grubs.

**Hymenoptera :-** *Athalia proxima*, Klug.

:- *Dacus* species.

### GROUP – V

**11.a - Importance and history of plant protection in India & U.P.**

**b-** Working of the plant protection and quarantine for the found warning and its control in the centre and state.

**12-** Principles & methods of insect pest management :-

i) Physical & Mechanical control.

ii) Cultural control.

iii) Chemical Control – Stomach and contact insecticides, fumigants, repellants, attractants and synergists insecticides; Their formulations and applications (stress must be laid on the modern insecticides.)

iv) Biological control.

v) Legal control.

### **PRACTICAL –**

1. Field & laboratory acquaintance with fishes, birds, fields rats, insect pests and their stages as given in the theory courses.
2. Study of the external characters & anatomy (Digestive, reproductive & nervous system only) of grasshopper or cockroach.
3. Study of the different types of antenna mouth parts, wing, leg of insects and external genitalia of grasshopper.

**NOTE:** - Student should be taught dissection of the grasshopper or cockroach for the study of anatomy and they should be able to prepare temporary slides of the mouth parts, antennae and legs.

4. Insecticides :- Identification, formulation and application of modern insecticides in the field.
5. Familiarity with plant protection appliances.
6. Pests Collection.
7. Class Record.
8. Viva-Voce.

B.Sc. (Ag.) IIIrd Year  
Paper II – PLANT PATHOLOGY

Theory

A- MYCOLOGY

- 1- History of plant pathology and its importance in Agricultures.
- 2- Knowledge of common terms related to fungi structure, General classification of fungi with diseases of important crops of U.P.
- 3- Study of life cycle of following general & their economic importance:-
  1. Pythium, Phytophthora, Albugo, Scleroapora, Peronospora
  2. Erysiphe, Morchella
  3. Ustilago, Sphacelotheca, Tolyposporium, Uromyces, Puccinia, Melampsora, Agaricus.

B- PLANT PATHOLOGY

- 1 Fungal Diseases: - Study of following plant diseases with their symptom, Etiology & Control.
- (I) Late Blight of Potato, White Rust of crucifers, Green ear disease of Bajra.
  - (II) Powdery Mildew of wheat, Smut of Bajra, Grain Sumt of Jowar, Loose smut of wheat, yellow, Brown and Black Rust of Wheat, Rust of Pea, Rust of Lin-seed.
  - (III) Red Rot of Sugarcane, Wilt of Arhar, Early Blight of Potato, Stripe disease of barley and Tikka disease of groundnut.

2- Physiological diseases: - Khaira disease of paddy and Black Tip of Hange.

3- Phanerogamic Pargcites: - Cuscuta, Loranothus and their control measures.

4- Plant Disease Control :-

- i. Exclusion of parasite from host.
- ii. Biological control
- iii. Cultural practices
- iv. Strengthening of host
- v. Use of fungicides

### PRACTICAL

- 1- Practical based on topics mentioned in Theory.
- 2- Identification of diseased specimens and Herbarium collection
- 3- Section cutting and Scrapping etc.
- 4- Record of Practical class work.



**B.Sc. (Ag.) IIIrd Year**

**Paper III – Agricultural Extension & Rural Development**

**Theory**

- 1-** Extension Education – Meaning, Objectives, Principles, Philosophy and Scope
- 2-** Extension Teaching & Learning – Meaning and Principles of Teaching and Learning, Important facts associated with adults as learners, Important principles of teaching adults.
- 3-** Extension Teaching Methods – Classification and use of various Extension Teaching Methods relevant under Indian Conditions
- 4-** Extension Teaching Aids. – Classification and use of various Extension Teaching Aids suited to Indian Conditions.
- 5-** Extension Worker. – Duties and qualities of Extension worker.
- 6-** Extension Programme Planning – Meaning, Definition, Principles, Steps in Programme Planning, Teaching plan of work, Implementation of the planned programme
- 7-** Evaluation of Extension Programme – Meaning, Definition of evaluation in Extension Education Principles of evaluation, Steps in evaluation of Extension program.
- 8-** Community Development and National Extension Service – Meaning, Definition, Objectives and Philosophy, Relationship of Community Development with Extension Education, Brief history of past attempts at Rural Development, Development after Independence leading to Etawah pilot project, Community Development projects and National Extension Service Blocks. Comparison of Community Development with cooperative Extension Service of U.S.A.

9. **Some Recent Rural Development Projects – Integrated Rural Development project, Training and visit system, BAIF, Adult Education programme and Anganwari Programme etc.**
- 10- **Rural Development – Meaning, Concept and Prerequisites for rural development. A review of the recent rural development projects to pin point their strengths and weaknesses, strategy for rural development.**

### **PRACTICAL –**

- 1- Preparation and use of some important teaching aids like-poster, Charts, Flash Cards, Flannel graph, Folder, Wallpaper and hand made slides etc.
- 2- Handling and use of Audio-visual Equipments like Movie projector, Slide projector, Kerosene oil projector, overhead projector and tape recorder.
- 3- Village visits to study the Block, Village panchayats and cooperatives.
- 4- A simple village survey to plan a programme for village development.
- 5- Organization and conduct of Method and result Demonstration.

B.Sc. (Ag.) IIIrd Year

Paper IV – Dairying

- 1- Milk Production, Type of milk animal, Milk production in rural and urban areas, their drawback deficiencies, Sanitary production of milk production of milk on dairy farms, cost of milk production, factors influencing, cost of milk production, methods for determining cost, handing and disposal of milk produced.
- 2- Marketing of milk: Marketing agencies including co-operative milk union and other dairy schemes. Methods of transportation and distribution of milk. Processing of market milks tenderization, homogenization pasteurization sterilization, uparization, cooling and botting of milk, cold storage of milk. Distribution of market milk equipment used, methods of delivery window, door or depot delivery. Advertising legal standards for market milk. Adulteration of market milk. Adulteration of market milk and its detection.
- 3- Milk and micro organisms: - Sources of contamination of milk. Types of microorganisms and the changes they bring about in milk, quality control of milk, platform and laboratory tests.
- 4- Milk products manufacture: (a) Cream centrifugal cream separation and its advantages over gravity methods efficiency and capacity of cream separators, factors effecting richness of cream. Types of cream separators. (b) Butter Procurement, grading and neutralization, and ripening of cream, Starters for cream ripening. Cooling of cream for earthier making, General procedure for butter making factors influencing chumming and body of butter, common defects of butter. Judging of butter. (c) Ghee-manufacture of ghee by indigenous and improved methods, factors affecting the marketable and keeping quality of ghee legal standards for ghee constants. (d) General

producer of the manufacture of other milk products, Khoa, Dahi, Chaddar-chees, Ice Cream.

- 5- Refrigeration of dairy products-Importance of refrigeration. Systems of refrigeration natural and mechanical Compression refrigeration system, principle and ways of utilisation such as brine circulation system including cold air blast system and direct expansion system, Type of refrigerants used for dairy products Brine corrosion and how to check it.

### PRACTICAL

- 1- Cleaning and sterilization of Dairy Appliances; General principal: Cleaning of dairy utensils and butter making appliance and their sterilination.
- 2- Pitting of creams separate, separation of cream.
- 3- Testing of milk sampling, Determination of gravity by lactometer, fat by Gender's method and S.N.B. with the help of formula with Richmond's scales. Acidity of milk and Cream.
- 4- Demonstration of: - (a) Sediment test (b) M.B.R. test, one-hour rusazurine test. (c) Counting of microorganism in milk by plate colony counts method. (d) Simple platform test like alcohol test, C.O.B. test B.C.R. and resnzurin rennet test etc.
- 5- Preparation of: - (a) Creamery butter. (b) Dahi (c) Khoa (d) Ghee: (i) Cream method (b) Cream butter method (c) Ice-Cream.
- 6- Dairy Arithmetic: - General Dairy calculation with special reference to: - (a) Problems on standertion of Milk and Cream. (b) Problems on adulteration of milk. (c) Problems on Neutralisation of cream. (d) Problems of over run in butter. (e) Problems on cost studies of Milk products.
- 7- Visits to dairy farms

## B.Sc. (Ag.) IIIrd Year

### Paper V – POMOLOGY

- 1- Scope of fruit growing as an industry.
- 2- General survey of fruits grown in U.P. with special reference to climate.
- 3- Culture of the following fruit crops :- Mango, Papayas, Guava, Banana, Litchi, Loquat, Jackfruit, Ber, Anole, Pales, Apple, Peach, pees & Plum, Oranges, Limes & Lemon and Grapefruits.
- 4- Propagation and purchases of plants and their planting
- 5- Now plantation, Selection of site of an orchard, layout of wind breaks.
- 6- Rejuvenation of old orchards.
- 7- Principles of manures & menu ring. Sod and clean cultivation. Management of established orchards.
- 8- Irrigation systems, Training & Pruning of Plants, Top working, Inter cropping and cover cropping in the orchards. Causes of unfruitfulness and remedies.
- 9- Disposal of orchard produce.
- 10- Principles of fruit preservation, Preparation of Jam, Jelly and Squash.

#### PRACTICAL :-

- 1- Important methods of propagation of fruit plants lifting, packing & disposal of plants.
- 2- Acquaintance with the method of layout of orchards.
- 3- Identification of the crops with the help of leaves, flowers, fruits and seeds.
- 4- Acquaintance with the common cultural operation practiced in orchards.
- 5- Practical atone for the preparation of Jelly & Squash.
- 6- Maintenance of proper records of laboratory & field work by individual students.
- 7- Visit to important commercial fruit orchards, Nurseries & Govt. gardens.

B.Sc. (Ag.) IIIrd Year

Paper VI – Dairy Chemistry and Animal Nutrition

**A- Dairy Chemistry**

Composition of Milk- General knowledge of the composition of important milk products, viz, butter, Ghee, evaporated milk and milk product. Chemistry of milk constituents, viz, proteins, Carbohydrates, Fats and ether lipids and minerals. Chemical changes during storage of milk and ghee. Adulteration of milk and ghee and its detection. Common preservatives used in milk and simple chemical tests for their detection.

**B- Animal Nutrition: -**

The chief constituents of animal body, digestion, absorption and metabolism. Functions of various nutrients in the body. Starch equivalent and albuminoid ratio. Composition and significance of feeding and their relative importance, Analysis of feeding stuff.

**PRACTICAL: -**

- 1- Practice in the use of chemical balance preparation of standard solution.
- 2- Milk analysis- Estimation of (a) Sugar (b) Total solid (c) S.N.F. (d) Mineral matter (e) proteins (f) Fats and (g) Lactose by falling solution and iodometrically.
- 3- Feeding stuff analysis by ashing (a) total (b) CaO (c)  $P_2O_5$  and (d) Crude Protein.
- 4- Estimation of Acid value and saponification value of fat.
- 5- Dung analysis (a) Total Nitrogen (b) CaO (c)  $P_2O_5$
- 6- Iodometry- Titration of  $K_2Cr_2O_7$ ,  $CuSO_4$  against medium this sulphate solution.

**B.Sc. (Ag.) FINAL Year**  
**Paper I – BENEFICIAL INSECTS AND FISHERIES**  
***THEORY***

*Note :- Examiner will have to set two questions & the student will have to answer one question from each group.*

**GROUP – I**

**APICULTURE** : Brief history of Bee-keeping in India. Primary knowledge of Honey bee; Kinds, habit, hebetate and life history. Indigenous & modern methods of Bee-Keeping; their merits & demerits. Bees enemies and their control. Important of Apiculture & its scope in U.P. & India.

**GROUP – II**

**SERCULTURE** : Brief history of sericulture in India, Kinds of Silkworm, Indigenous & modern method of Sericulture; their merits & demerits. Silk worm enemies & their control. Importance of Sericulture & its scope in U.P. & India.

**GROUP – III**

**LACCULTURE** : History of Lacculture in India. Indigenous and modern methods of Lacculture their merit & demerits. Lac insect enemies & their control. Importance of Lacculture & its scope in U.P. & India.

**GROUP – IV**

**INSECT PARASITES & PREDATORS**: Elementary knowledge of insect parasites & predators of harmful insects of Crops.

## GROUP – V

**FISHERIES** :- Elementary knowledge of fish. Kinds of fishes; Fresh water fishes of U.P. , their habit, hebitate and life history. Scientific method of fish culture. Enemies of fishes & their control. Fishery & Agriculture. Importance & Scope of fisheries in U.P. & India.

## PRACTICAL

- 1- Identification & comment upon the different kinds of Honey-bees, silk worms, fresh water fishes & other beneficial insects in Agriculture.
- 2- Familiarity with the appliances used in Apiculture, Sericulture and pisciculture.
- 3- Rearing of Honey bee, silk worm & fishes.
- 4- Visits of the Important places regarding Apiculture, Sericulture & Pisciculture
- 5- Practical Record
- 6- Viva-Voce.



**B.Sc. (Ag.) FINAL Year**  
**Paper II – SEED TECHNOLOGY**

- 1- **Introduction:** - Definition and types of seeds, utility of seeds, Longevity of seeds, characteristics of good seed, significance of good seeds in modern agriculture. History of seed technology in India.
- 2- **Seed Testing:** - Seed sampling, purity analysis, germination test, moisture test, viability test, seed health test and real value of seed.
- 3- **Seed Production:** - General methods of seed production with special reference to seed selection, isolation, rouging, inspection, harvesting and threshing, etc. Seed plot techniques of major field and vegetable crops.
- 4- **Seed processing:** - Drying, cleaning & grading, bagging, etc.
- 5- **Seed treatment:** - Seed treatment for control of insects pests and diseases, treatment for breaking dormancy in seeds, chilling treatment for vernalization and bacterium culture.
- 6- **Seed Certification:** - Seed certification methods, minimum seed standards and role of National seeds Corporation and state seed certification agencies.
- 7- **Seed legislation:** - Indian seed Act and Seed control order.

**PRACTICAL –**

- 1- Various tests prescribed in theory course.
- 2- Computation of seed requirement of various crops based on test values and real value of seeds
- 3- Visit to seed farms, seed testing laboratories and seed processing and seed treating units.

**B.Sc. (Ag.) FINAL Year**  
**Paper III – MICROBIOLOGY**                      **THEORY**

- 1- History and scope of Microbiology
- 2- Classification of Microorganisms, Culture of Microbes
- 3- Bacteria: - Morphology, Cellular Structures, Reproduction, Nutrition and Economic Importance of Bacteria. Bacterial diseases. Citrus Canker, Bacterial Blight of paddy
- 4- Yeast & Molds:- Morphology, Cellular structure, Reproduction and economic importance of saccharomyces, Mucor, Aspergillus & Penicillium
- 5- Viruses: - Nature, Structure, Mode of transmission and symptoms produced by plant viruses. A study of disease caused by Tobacco Mosaic virus.
- 6- Effect of Physical and chemical agents on Microorganisms
- 7- Elementary Knowledge of Bacterial genetics: - Variation, Dissociation, Mutation, Transformation, Transduction, and Biotechnology etc.
- 8- Soil Microbiology: - Functions of Micro-organisms in soil. The Carbon Cycle. The Nitrogen Cycle, Symbiotic, Nitrogen fixation, Non-Symbiotic Nitrogen fixation
- 9- Industrial Microbiology: - Fermentation, Production of Beverages, Microbial enzymes used in Industry. Microbial degradation of Industrial wastes.
- 10- Water Microbiology: - Microorganisms in fresh and methane waters. Microbial examination of domestic water. Purification of water
- 11- Air Microbiology: - Micro-organism found in air, Role of Micro-organisms in air, Methods of purification of air (Radiation, Physical and Chemical Methods.)

- 12- **Milk Microbiology:** - Sources of Micro-organisms in milk. Diseases transmitted in Milk. Methods of testing and graded of Milk. Fermented milk products.
- 13- **Food Microbiology:** - Food infections and food poisoning, Microbial examination of foods, sampling, Analysis, Bacterial number in foods, causative agents.

#### **PRACTICAL -**

- 1- Practical based on topics mentioned in Theory.
- 2- Familiarity with apparatus and equipments .
- 3- Preparation of common culture media.
- 4- Isolation of pure culture.
- 5- Simple and gram staining.
- 6- Record of practical calls-work.

**B.Sc. (Ag.) FINAL Year**

**Paper IV – PRODUCTION ECONOMICS AND FARM MANAGEMENT**

**Agriculture Production Economics:** - Meaning of Agricultural Production Economics, Subject matter, Definition, Objectives and scope of Agricultural Production Economics. Factor – Factor relationship, Factor- product relationship, Product- Product relationship, Concept of production Function cost concept, Cost and Returns.

**Farm Management:** - It meaning, Scope and nature, Relationship with other subjects, Principals of farm management.

**Farm Planning and Budgeting:** - Basic concept in Farm planning, Definitions, approach, steps. Farm budgeting, partial and complete budgeting.

**Farm Records and Accounts:** - Importance of farm records, Types of farm records Analysis of farm records.

**Farm Business Analysis:** - Farm as a firm, structure of a farm business, characteristics of farm business and comparison with other business. Problems of Agricultural business. Systems and Types of forming, Measures of farm income, Measures of farm ABC and farm efficiency

**PRACTICAL**

**FARM SURVEY:** - To acquaint with the structure of different size of farms and laved utilization in a detected village.

**FARM BUDGET:-** To study cropping pattern and farm budget of Institutional and individual farm.

**PRODUCTION ECONOMICS:** - Cost of cultivation studies and farm business analysis.

**FARM RECORDS:** - Acquaintance with farm records and accounts maintained on Intuitional farm Research farm and commercial farm.

**B.Sc. (Ag.) FINAL Year**  
**Paper V – Rural Sociology and Behavioral Psychology**

**A- Rural Sociology –**

- 1- **Introduction:** - Meaning, definition and relation to sociology and other important social sciences like Psychology, Anthropology and economics.
- 2- **Rural Life:** - Important characteristics of rural life and its comparison with urban life.
- 3- **Important Concept:** - Culture, Status, role, personality, social system community, neighborhood reference group, rank-power, and social change.
- 4- **Physical Structure:** - Patterns of settlement, social grouping, rural resources natural and man-made.
- 5- **Social Structure:** - Five universal social institutions: Government, Family, education, economics and religion, patterns of influence, organization, groups.
- 6- **Social System:** - Elements of social system, analysis of a social system to determine its health, vitality and dynamism.
- 7- **Ecological Structure:** - Community and neighborhood.
- 8- **Media of communication in village and their use in extension work.**
- 9- **Role of traditional festivals and 'Melas' in rural extension work.**
- 10- **Important social problems and the role of Rural Sociology in solving these problems.**

## B- Behavioral Psychology:-

- 1- **Educational Psychology:** - Its relation with psychology. Definition and meaning. The role of educational psychology in rural extension work.
- 2- **Intelligence in Relation to extension work:-** Factors affecting intelligence, measurement of intelligence through the use of Binet-Simon scales of intelligence. Intelligent quotient and its characteristics.
- 3- **Motivation in relation to extension work:** - Meaning and definition, Kind of motivation, the place of motivation in adoption of agricultural innovations
- 4- **psychological foundations of teaching:** - Basic needs of human beings, steps in Extension Teaching- attention, interest, desire conversion, action and satisfaction.
- 5- **Adoption and diffusion** - Meaning and definition, Stages in adoption, Communication in relation to diffusion and adoption processes.

### PRACTICAL:

- 1- Sociological study of a typical village with a view to find out the behavior and value patterns of villagers.
- 2- Use of sociogram and other techniques to locate the existing village leadership.
- 3- Construction & use of simple scale find out the attitude of rural people toward burning social problem.
- 4- Construction and use of simple schedules to conduct social surveys regarding existing social conditions.
- 5- Use of Binet-Simon scale or measure intelligence quotient.