

Faculty of Agriculture

Mahatma Gandhi Kashi Vidyapith, Varanasi

SYLLABUS- B.Sc. (Ag.) –Part –I, II, III, IV

SYLLABUS- B.Sc.(Ag.) –Part -I

PAPER –I- AGRICULTURAL STATISTICS AND MATHEMATICS

STATISTICS

1. FREQUENCY DISTRIBUTION:- Classification; Tabulation; Diagrammatic Representation and Graphic Representation of data: Histogram Frequency, Polygon, curve and ogive.
2. MEASURES OF CENTRAL TENDENCY: Mean Median, Mode, Measures of dispersion; Range, Mean deviation; variance, Coefficient of variation and standard error of mean.
3. CORRELATION AND REGRESSION: Meaning of correlation types of correlation, Karl Pearson's Coefficient of correlation.

LIMITS OF CORRELATION COEFFICIENT, Rank Correlation, Regression, Linear of regression, Regression coefficient, Properties of regression coefficient, Angle between two lines of regression.

4. TEST OF SIGNIFICANCE: Concept of random sample and Statistics; Test of Significance based on Z.T.F. and chi Square Statistics.
5. ANALYSIS OF VARIANCE: Analysis of variance with equal number of observations per cell in one and two way classification; General and Basic Principles of Experimental Design: C.R.K., R.S.D. and L.S.D.

MATHEMATICS

1. ALGEBRA OF MATRICES: Elementary concept of determinants, Minor and Co-factor of determinates, Properties of determinants Definition of Matrices, Types of Matrices and Properties, Addition, Subtraction, Multiplication and inverse of a matrix.
2. DIFFERENTIAL CALCULUS: Definition of variable and constant Limits, Differentia of simple functions Product and division of two functional function of function.
3. INTEGRAL CALCULUS: Integration of Standard Forms Integration of Substitution in simple cases, integration by parts and concept of Definite Integrals Simple Cases.

PARCTICALS

1. Construction of Frequency table and Cumulative Frequency.
2. Construction of Histogram, Frequency Polygons, Frequency curve and ogive.
3. Calculation of A.M. Median and C.K.
4. Calculation of Mean deviation and Standard deviation.
5. Calculation of coefficient of correlation and rank correlation.
6. Calculation of regression coefficients.
7. Determination of regression lines.
8. Test of significance, viz., t, f, Z.S.K.
9. Exercises on CRD, RBD and LSD.

Paper II. PLANT STRUCTURE, FUNCTION AND CROP SYSTEMATICS

AGRICULTURAL BOTANY

1. Plant Cell, Structure and Function.
2. Tissues and Tissue Systems.
3. Internal Anatomy of Roots, Stems and Leaves.
4. Secondary growth, Secondary growth in dicot-roots, dicot-stems and monocot stem.
5. Osmosis, diffusion, absorption and loss of water in plant.
6. Plant nutrients and their deficiency symptoms.
7. Respiration; Aerobic and anaerobic respiration: factors affecting respiration.
8. Photosynthesis: Mechanisms and factors affecting photo-synthesis.
9. Plant hormones, Dormancy, Vernalization and photo-permdisters.
10. Distinguishing features of the following families with special reference to the general mentioned against them.

A. FAMILIES OF MONOCOT:

- (i) Araceae; Colocasia.
- (ii) Graminae; Triticum, Hordeum, Oryza, Zea, Pennisetum, Sorghum.

B. FAMILIES OF DICOT:

- (i) Leguminosae, Pisum, Cicer, Croton, Arachis.
- (ii) Cucurbitaceae, Luffa, Lagenaria.
- (iii) Convolvulaceae, Ipomoea, Cuscuta.
- (iv) Solanaceae, Solanum, Nicotiana.
- (v) Euphorbiaceae, Ricinus.
- (vi) Linaceae, Linum.
- (vii) Pedaliaceae, Sesamum.
- (viii) Compositae, Carthamus.
- (ix) Tiliaceae, Carchorus.
- (x) Malvaceae, Hibiscus, Gossypium.

PRACTICALS:

1. Free hand section cutting, staining, mounting and study of internal structure of roots, stems and leaves.
2. Experiments on endosmosis and exosmosis.
3. Study of plasmolysis and deplasmolysis in the peelings of Tredescantia leaves.
4. Comparison of cuticular and stomatal transpiration by cobalt chloride paper method.
5. Measurement of transpiration by photometers.
6. To demonstrate the separation of chloroplasts by Thin Layer Chromatography.
7. To study the effects of light and darkness on starch formation.
8. To study the necessity of CO_2 during photosynthesis by Moll's experiment.
9. Demonstration of oxygen evolution during photosynthesis in Hydrilla plant.
10. To study the effect of quality and intensity of light on rate of photosynthesis by counting bubbles in Hydrilla plant.
11. The measurement of R.Q. by Ganong's Respirometer.
12. Plants and flowers description and identification of the genera mentioned in theory paper.

Paper III. LIVE STOCK PRODUCTION AND MANAGEMENT

BREEDING: Aims of breeder, Mendellun rules and its importance in live stock improvement, Heredity and variation, Elementary idea of essential and accessory organs of male and female reproductive system in different farm animals, Mechanism of gametogenesis and oestrus in farm animals, Methods and system of breeding in farm animals, their merits and demerits, A, I and its importance in improvement of farm animals, Selection Methods, Sire indexing cattle breeding problems in India and work so far done in this direction.

FEEDING: Elementary idea of digestive system of ruminant and non ruminant farm animals, Animal feeds & their classification Evolution of feeding standards, Modern feeding standards, their merits and demerits and applicability under Indian conditions, Ration and its kind, principles of rationing, characteristics of ideal ration, food requirements for growth, reproduction, pregnancy, milk, work and wool production in farm animals, Calf feeding schedule and feeding of crossbred cows, Principles and methods of fodder preservation Hay and silage making.

MANAGEMENT

- (a) Building: Location and grouping of different darry farm buildings and sheds Requirement and arrangement of floor space in various dairy farm buildings.
- (b) Fodder requirement: of a dairy farm and cropping scheme for the supply of succulent foddors through out the year, Pasture land and their management Land & labour requirements for a dairy farm, maintenance of different essential dairy farm registers, purchase and culling of dairy cattle.
- (c) Animal Health & Hygiene: Symptoms of ill health principles of immunication, first aid in farm animals. Sterility in farm animals simple obstetrics in farm animals such as abonormal pasturisation Retention of placenta, prolap;se of uteeus, milk fever tympanition, impaction of rumon Elementary idea about poisoning in farm animals. General measure for prevention and control of infections and contagious diseases, care of down calvers and newly born calf.

PRACTICAL

1. Cleaning and disinfection of cattle, sheds.
2. Judging of cow buffalo.
3. Numerical problems on mixing of concentrate and computation of balance ration, (DCP and TDN Method) for dairy cattle.
4. Numerical problems relationship in farm animals.
5. Recording of pulse rate, Body temperature and respiration rate in farm animals.

6. Identification and use of A.I. equipments and some common medicines and instruments.
7. Demonstration of collection and evaluation of semen.
8. Visits of dairy farm and veterinary hospitals.
9. Record and viva.

Paper IV. PRINCIPLES OF CROP PRODUCTION

Scientific principles involve in adoption and distribution of crops, classification of crops, cropping system and cropping pattern, crop rotation and cropping scheme harvest and post-harvest technology and crop production. In dryland and other problematic areas, Scientific principles, involved in plant growth and development the environment, tillage, seed and growing, plant population, nutrition, fertilizers and manures, irrigation and drainage Principles of soil management, irrigation and drainage, Plant nutrients criber. of essentiality essential nutrients and their roles, classification of manures and fertilizers, principles of manuring, time and method of fertilizer application, valuation, fertilizer use efficiency and factors affecting it.

Weed definition, menace and utility, crop weed completion, weed ecology, prevention, eradication and control of weeds, important weeds and their control herbicides and factors influencing their use.

Seed production, its importance and concept, characteristics of good quality seed, stages of seed production, principles and methods of seed production and their processing, seed testing and certification, purity and generalization tests.

PRACTICAL

1. Seed bed preparation of various field crops.
2. Lay out for different methods of irrigation.
3. Calculation of fertilizer doses on various crops.
4. Practical study of different methods of application of manures and fertilisers.
5. Preparation of cropping scheme for different types of farm.
6. Identification of seeds and preparation of herbarium.
7. Purity and germination tests of seeds.

PAPER V. AGRICULTURAL ENGINEERING

Definition branches and object of Agricultural Engineering.

SURVEYING: Objectives and types of Surveying, Methods of Measuring distances, Errors chaining and their corrections, Laying out right angles with chain, or tape, cross staff and optical square, Surveying with chain, obstacles in chaining, Prismatic compass survey, plane table survey, Booking field notes and their plotting with different methods of surveying, Calculating of areas.

LEVELLING: Definition of different leveling terms, kind of levels & their parts, Dumpy level, principles of operations and its various adjustments survey of leveling Differential leveling, profile leveling and Contour mapping.

FARM LAYOUT: General Survey of Land, layout of field roads, building, irrigation and drainage channel and fencing.

IRRIGATION: Source of irrigation water, measurement of irrigation water, method of water application on the field, An elementary knowledge about border, check basin, furrow, sprinkler and drip method of irrigation, Irrigation frequency and Efficiency of irrigation, evaporation, transpiration, consumptive use, water requirements of crops Soil moisture measurement.

DRAINAGE: Necessity and scope of drainage, Benefits of drainage and types of land requiring drainage, drainage requirements and method of drainage.

PUMPS: Pumps classification, A detailed study of centrifugal pump with particular reference to their performance characteristics, Selection, Installation and maintenance Discharge and power requirement in relation to a particular crop and area.

PRACTICAL (A) SURVEYING

1. Study of chain, types, cross staff, optical square and ranging instruments.
2. Ranging chain line and reciprocal ranging table offset on chain line and recording on field book.
3. Triangulation survey by chain traversing of a small farm, booking field notes plotting, results and making maps or plan of fields, determining areas.
4. Study of prismatic compass and surveyor's Compass.
5. Find out angles between two lines with the help of Prismatic Compass.
6. Plotting of field boundaries by Compass Traversing.
7. Study of plane table & accessories.
8. Plotting and making maps of farm boundaries buildings by plane table survey methods.

(B) LEVELLING

1. Study of dumpy level.
2. Simple, Differential, Profile leveling by dumpy level.
3. Determination of percent and degree of slope.

(C) FARM LAYOUT

1. Laying out contour lines and drawing contour maps.
2. Laying out field boundaries, Farm Roads, Farm Buildings Farm Fencing, Irrigation, Channels and drainage channels.

(D) IRRIGATION & DRAINAGE

1. Measurement of irrigation water.
2. Determination of Cross-section, dimensions; design and layout of irrigation and drainage channels and outlets.
3. Planning and layout of irrigation and drainage systems.
4. Determination of irrigation application efficiency.
5. Soil Moisture measurement by over method.

(E) PUMPS

1. Practical working with centrifugal pump driven by electric motor or diesel engine.
2. Calculation of consumption of electricity, cost of pumping, H.P. Requirement and areas irrigated by Centrifugal pump.

NOTE: (i) Visit to places of Agricultural Engineering interest.

(ii) Practical record & Field trips report should be maintained and produced before the variner.

PAPER VI. SOIL SCIENCE, FERTILIZERS AND MANURES

Pedological and Edaphological concepts of soil, Soil forming Rocks and Minerals, weathering of Rocks, Factors of soil formation, soil profile.

Texture and structure of soil, soil components, soil colloids, Soil water, Soil organic matter, Humus and Humification, Nitrogen, Phosphorus and Potash transformations in soil, Exchange phenomenon.

Soil reaction Acid and Alkali soils, their formation and reclamation Indian soil U.P. Soils in particular, Soil Microorganisms and their role in soil fertility.

FERTILIZERS AND MANURES

Plant Nutrients and their role, Fertilizers their classification and principles of their application, Organic manures, Compost and composting, Radio Active Isotopes and their use in agriculture. Chemistry and use of common weedicides, insecticides, fungicides and Rodenticides.

PRACTICALS

1. Volumetric estimation of Ferrous Iron (Internal as well as external indicator method), Chloride with Silver Nitrate and Calcium by usual permanganate method.
2. Gravimetric estimation of iron.
3. Preparation of DCI extract of soil and determination of sesqui-oxide, phosphorus and potash.
4. Determination of total temporary and permanent hardness of water, Carbonates and bi-carbonates of irrigational water.
5. Determination of total Nitrogen of soil by (Kjeldahl method).

Paper VII. ESSENTIALS OF AGRICULTURAL ECONOMICS

1. Economic Consideration: Definition of economics, Definition and Scope of Agricultural Economics, Significance of Agricultural Economics in Economic Development.
2. Elements of Price Theory:
 - (a) Theory of Demand: Demand, Supply and Market Price; Price Elasticity, Utility Analysis of Demand, Indifference Curve Analysis.
 - (b) Theory of Firm: The Firm and its decision, Theory of Production, Choice of input and output, Cost Functions.
 - (c) Pricing of Output: Pricing of output under pure competition, Monopoly, Oligopoly and Monopolistic Competition.
 - (d) Theory of Distribution: Determination of Rent and Wages.
3. Money and Banking: Meaning and Significance of Money, Value of Money, Inflation and Deflationary Standards, Credit and credit instruments, Banks, their functions and Classifications, and Commercial Bank, Central Banking
4. Farm management: Field of farm management, Economic Principles of farm management, Farm planning and Budgeting, Farm Records and Accounts, Measures for Farm Income and Efficiency.

PRACTICAL

Numerical and problemic exercise:

1. Demand elasticity. 2. Law of Diminishing Return. 3. Cost principle. 4. Principle of Factor Substitution. 5. Law of Equimarginal return. 6. Opportunity Cost Principle. 7.

Principle of Combining enterpizes. 8. Evaluation and Apportionment of Costs. 9. Cost of Producton of Major Crops. 10. Preparation of Farm Budgets. 11. Determination of Various measures of farm income. 12. Survey of at least two agricultural holding to analyse the costs and returns.

B.S.c (Ag.) Part II

Paper I AGRICULTURAL BIOCHEMISTRY

M.M. 50

Scope of Biochemistry. Plant and Animal cells their composition & biochemical functions.

Colloidal state, Osmosis, Osmotic, Pressure and its determination. Membrane phenomenon, Acids, Bases, PH and buffers.

Carbohydrates- Classifications their Chemistry and Biosynthesis, Protein and Amino acids- Classifications their Chemistry and Bioynthesis in plants- Liquids and fatty acids classifications, chemistry and biosynthesis in plants. Biological Oxidation.

Harmones and phytohormones- Elementary knowledge of plant pigments. Enzymes- Classification, general properties, Mechanism of action, factors affecting their activities.

Vitamins- Classification, chemistry, biochemical functions, Physiological role, efficiency symptoms and requirements Biological changes during germination, growth and ripening fruits, Vegetables and crops.

PARCTICALS

1. Estimation of Starch in plants.
2. Estimation of reducing and non-reducing sugars in cane juice and jiggery.
3. Separation and identification of plant pigments by paper chromatography.
4. Detection and identification of organic compounds, Fructose, glucose, Starch, sucrose, acetic acid, oxalic acid, ethyl alcohol and proteins.
5. Iodimetric titration.
6. Estimations of diestase enzyme in biological materials.
7. Estimation of calcium by EDTA method.

PAPER-II FARM ENGINEERING

1. **Farm Mechanization-** Necessity, Scope and Importance of Mechanized forming in India.
2. **Source of Farm Power-** Various conventional and Non-con-ventional sources of farm Power their Utilization merite and demerit.

3. **I.C. Engines-** Classification important parts & their functions. Principles of operation of 4-Stroke and 2- Stroke cycle of I.C. Engines, their utility on farms comparison between compression ignition and spark ignition engines, value timing and Firing order Engine Terminology and calculation of stroke bore ratio compressor ratio piston displacement, Displacement volume, piston speed I.H.P.,B.H.P., D.B.HP. and Mechanical efficiency.

Brief study of the following different system of I.C. Engines-

- (i) Fuel injection, fuel supply and carburetion.
- (ii) Ignition (iii) Cooling (iv) Lubrication

Common engine troubles and their remedies.

4. **Tractors-** Classification, Selection Availability and purchase of Tractors, Periodical maintenance of tractors and their storage. Calculation of cost of operation of tractors.
5. **Farm Machinery-** Study of construction types, Working, Principles; Repairs and maintenance, Capacity and cost of Operation of the following farm equipments.

- (i) Sowing Equipments
- (ii) Planting Equipments (Excluding trans planters)
- (iii) Harvesting equipments.
- (iv) Threshing equipment including Paddy Threshers and com bines.
- (v) Winowing Equipments.
- (vi) Planning farm stead and study of septic tank.

PRACTICAL COURSE

- 1. Familiarisation with different sources of energy and farm power.
 - 2. Study and sketch of a form tractor.
 - 3. Experience of starting stopping & operating a tractor.
 - 4. Sources of availability of different form units.
 - 5. Practical working; repairs, maintenance of following farm equipments.
- (i) Seed bed preparation equipments.
 - (ii) Sowing equipments (iii) Planting equipments.
 - (iv) Harvesting equipments. (v) Threshing equipments.

(vi) Winnowing equipments.

6. Sources of availability cost and calculation of cost of working with different farm equipments under 5 above.

7. Identification of farm equipments parts, tractor parts and common workshop tools required for repair and maintenance of farm machinery and engines tractors.

8. Visit to place of farm engineering interest.

Note:- Records of Practical work and field trips be maintained properly and produced before examiner.

Paper III: POMOLOGY & SOCIAL FORESTRY A. POMOLOGY:

Role of fruits in human diet, and agricultural economy General survey of fruits grown in U.P. with special reference to climate, plant propagation technique- their merits and demerits, Nursery management and plant growing structures, Pruning and Training of Horticultural plants water requirement (Irrigation unfruitfulness and Remedies fruits set and fruit drop: Irregular and alternate bearing harvesting, grading packing transport marketing and storage of fruits.

Selection of site for and orchards Cultivation of importance fruit crops such as Mango, Banana, Citrus, Guava, Papaya, Litchi, Grape, Ber, Aonla Pineapples Jackfruit, Apple, Pear, Peach and plum concept of high density or charding.

B. SOCIAL FORESTRY:

Importance and scope of social and farm forestry; Crop growing under trees; Arboriculture in relation to climate and soil Trees for timbers, fuel, wind breaks and shelter belts.

Three suitable for planting in villages, high ways, Road sides, waste land and bunds; their planting and management. Vanamahotsava and its significance. Planting and after care of trees for different purpose.

PRACTICALS

A POMOLOGY:

1. Important methods of propagation of fruit plants.
2. Acquaintance with the methods of layout of orchards.
3. Classification and Identification of Fruit trees.
4. Acquaintance with the common cultural operations practiced in orchard

5. Maintenance of proper record. Laboratory and field works by individuals.
6. Visits of different horticultural Institutes and universities.

B SOCIAL FORESTRY:

1. Studies on botanical characteristics of species and varieties of different forestry plants.
2. Preparation of herbarium of these plants.
3. Study of the different methods of plant multiplication techniques.
4. Maintenance of proper records.
5. Visit to the Organisations/Institutions working in the forestry plants.

Paper IV: MICROBIOLOGY & VIROLOGY

Definition of Microbiology (Mycology, Bacteriology & Nematology). Study of Morphology and life history of the following General.

2. PYTHIUM

Phytophthora, albugo perdnospora, Sclerosora, mucor, Rhizopus A spergillus, Penicellium Erysiphy, Ustilage, Puccinia.

Melampsora, Alternaria, Helminthosporium, Cercospora, Pricularia, Colletotrichum and fusarium.

3. BACTERIOLOGY:

Distribution, Morphology and reproduction, Classification with reference to agricultural importance (causing disease in plants).

4. VIROLOGY:

Plant viruses, nature, properties and their transmission.

5. NEMATOLOGY:

Morphology of Phytonematods and their classification.

PRACTICAL

1. Handling of lab equipment.
2. Preparation of Potato-dextross-agar medium and Nutrient agar medium.

3. Preparation of temporary slides to show the morphological characters of Geneva given in para-2 their staining and mounting.

4. Simple and Gram staining of Rhizobium and Bascilli and their examination.

Paper V-MILK and MILK PRODUCTS

Elementary idea of milk secretion, colostrums its nature and properties, composition. Physical properties & food value of milk, factors influencing, the quality and quantity of milk produced, PFA Specifications for different milks production or clean milk, adulteration of milk and its detection.

MILK PROCESSING:

Receiving of milk in dairy, staining, filtration, classification, standardization, cooling, pasteurization, sterilization and homogenization, packaging and distribution of milk, Cleaning and sanitization of dairy equipments and Machinery.

MILK MICRO ORGANISM:

Types of micro organism in milk, sources of contamination tests employed to ascertain the quality of milk & various quality control measures. Fermentation in milk.

(i) MILK PRODUCTS:

Composition of cream, different methods of cream separation factors affecting the richness of cream and essentials of successful cream separation objects of ripening natural cream ripening and ripening with starters, neutralization of cream for butter making.

(ii) BUTTER:

Composition of butter, making of butter from ripened cream. Sweet cream and whole milk Factors influencing churning Judging of butter common defects of butter and their causes factors influencing the quality and composition of butter.

(iii) GHEE

Manufacture of ghee from cream and butter. Composition, factors affecting the quality of ghee, AG marking of ghee.

FROZEN & FERMENTED MILK PRODUCTS:

Classification of ice-cream, Role of ingredients, standardization and manufacture of ice-cream. Defects in ice-cream, Marketing of ice-cream. Manufactures of fermented milk products such as Dahi. Cultured butter milk and yoghurt.

INDIGENOUS MILK PRODUCTS:

Manufacturing techniques of various indigenous milk products such as Chenna & Paneer, Khoa, Rabbari.

PRACTICAL

1. Sampling of milk.

2. Testing of milk. for:
 - (a) Specific gravity by Lactometer.
 - (b) Fat by Garbers method.
 - (c) Solid not fat with the help of formula.
 - (d) Total Solid with the help of Richmond's scale and formula
3. Determination of Acidity in milk.
4. Deterction of Adulteration of milk.
 - (a) Extraction of fat or addition of separated milk.
 - (b) Addition of water.
 - (c) Addition of both separated milk and water.
5. Standardization of milk and cream.
6. Fitting and adjusting of cream separator.
7. Manufacture of dairy product such as butter. Ghee, dahi, Khoa chenna, rabbari and ice-cream.
8. Cream separation and neutralization.
9. Judging of milk products.
- 10 Record of practical work and the account of instructional tour during the year.

PAPER VI: CROP PROCUTION AND FARM MANAGEMENT

(A) Study of the following crops with special reference to U.P.

1. Cereals: Wheat, Paddy, Barley, Maize, Jowar, Bajra & Smaller millets.
2. Fodder crops: Oat, Burseem, Lucerne and Napier, Sudan grass & Dinanath grass.
3. Fibre crops: Cotton, Jute, Sunhemp.

(B) Farm Management:

1. Principle underlying successful management of farms maintained for profits, experiments, Demonstration.
2. Farm Layout & Cropping Scheme:

General survey of land, layout of fields, Roads, Building Irrigation & Drainage Channels & fencing, Cropping scheme for various agro climatic conditions.

PRACTICAL

1. Practical study of crops mentioned in theory course.
2. Planning of farm layouts.
3. Preparation of cropping scheme.
4. Working out the cost of fencing of different.
5. Working out the cost of seed and fertilizer.
6. Tours & visits.
7. Practical Record.
8. Viva-Voc.

PAPER VII: EXTENSION EDUCATION AND RURAL DEVELOPMENT

1. Extension Education:

Meaning Objectives Principles and Philosophy, A historical review of extension movement in India particularly sri Niketan. Sevagram, Etawath and Marthandam. A brief review of extension work in U.S.A.

2. (a) Extension Methods:

Definitions, importance and selection methods of approach individual, group community and mass.

(b) Extension Technique:

Demonstration particularly method demonstration, result demonstration, group discussion and audio-Visual Aids.

(d) Extension Teaching and Learning:

Meaning objective, principles, importance and factors affecting teaching and learning process, learning situation and experience, motivation.

3. The role qualifications, responsibilities and relationships of professional extension workers at various level

4. Community Development and Panchayati Raj:

Definition, objectives of community development, A brief study of panchayati raj, I.R.D.P. Trysem, T & V. System and transfer of technology (National demonstration. Operational research project K.V.K. and Land programme,

5. Programme planning.

Meaning, Importance, principles, steps and procedure in developing a sound extension programme, seeking cooperation of local lead ers.

6. Extension Evaluation:

Meaning, definition, purpose methods, types and steps in evaluation.

PRACTICAL

1. Handling of still projector, Epidioscope, Tape-recorder & P.A. Equipment set.
2. Handling group discussion and general meeting.
3. Conduct of method and result demonstration.

4. Preparation and use of visual-Aids, Flash cards. Flannel graph poster and charts.
5. Visit of community development block to collect information's regarding the recent Agricultural programme in action.

B.Sc.(Ag.)-Part – III

Paper 1- SOIL AND WATER CONSERVATION

- 1. Hydrology**-Rainfall and Runoff Hydrologic cycle, occurrence of precipitation ,storms ,measermnt of precipitation. Analysis and computation of precipitation data, kind of runoff,chara cteristicsof runoff Rational method of estimating runoff, Measurement of runoff, watershed management.
- 2. SOIL EROSION**-Mechanics and types of erosion, Factors affecting rate of erosion causes and effect of erosion, extent on erosion problems in Utter Pradesh.
- 3. SOIL AND WATER CONSERVTION**-Definition and aim of soil & water, conservation in agriculture. History of soil and water conservation in India & abroad. Soil conservation surveyand land use capability classification. Crop classification based on soil conservation value, controuring, strip cropping, conservation tillage, conservation farming, Mechanical practices of soil conservation such as terracing and bunding . Agricultural practices of soil conservation such as cover cropping conservation corporation. Lay farming. Monoculture. Role of grasses in soil and water conservation. Role of forestry in soil and water conservation. Wind erosion control, Elementry knowledge of gully control structures such as drop spillway drop inlet spillway chute spillway check dams, diversion bundds and dithes, grass waterways.
- 4. Land Grading and Reform**

Practical

M.M.50

- A. Differential, profile leveling and cross sectioning.
- B. Preparation of contour map.
- C. Study of rain gauges, Anemometer, Thermohy grometer, Wet and dry blub. Thermometer, evoporimeter, evaporation pan, infiltrometer & currentmeter.
- D. Measurement of temperature, Humidity, Rainfall, runoff, evaporation and infiltration.
- E. Computation of average rainfall depth over and area;
- F. Analysis of automatic rain gauges chart and plotting of mass rainfall curve and intensity.
- G. Preparation of soil conservation survey and I and capability classification map.
- H. Field study of different types of erosion and erosion control Structures.
- I. Laying out of contouring strip cropping, irrigation channel terrace graded bund and contour bands.
- J. Estimation of earth work quality and cost of earth work in leveling ferracing bunding, check dams irrigation & drainage channels.

Note:- (i) Visit to the soil and water conservation engineering projects research and training centres.

- (iii) Practical record and field trip report should be maintained and produce before the examiner.

Paper II-CROPPRODUCTION AND FIELD EXPERIMENTATION

(A) Study of the following crops with special reference to U.P.

1. Pulses : Arhar, Gram, Moong, Urd, Peas, Lentil Cowpea. Soyabean
2. Oil Seed: Mustard, Groundnut, Liseed, Sesame sunflower & Castor.
3. Special Crops: Sugarcane, Potato, Tobacco.

(B) Filed Experimentation: Objects & Principles of field experimentation study of C.R.D.; R.B.D.; L.S.D. & Split Plot Designs.

Practical

M.M.50

1. Practical study of crops mentioned in theory course.
2. Working out the cost of seed and fertilizer requirement of crops.
3. Testing of Maturity in sugarcane.
4. Determination of shelling percentage in groundnut.
5. Planning of field experiments.
6. Tour & visits.
7. Viva-Voce
8. Record

Paper III-OLERICULTURE AND FLORICULTURE

(A) Olericulture:

Importance of Vegetable in human nutrition and as a source of income to the farmer, Classifications of vegetable crops, Types of vegetable gardening, Role of plant nutrients and growth regulators in Vegetable production Nursery techniques, dormancy of seeds, Preparation of land Manures and fertilizers and methods of their application, Spacing transplanting irrigation, interculture mulching crop rotation, succession and intercropping, Harvesting grading packing transport marketing Hardening of seedlings. Cultivation of important Vegetables belonging to the different group of such as: Leafy vegetables (Palak, Amarantheeess, and Lettuce.) Root vegetables. (Radish, Carrot, Turnip, Beet Root). Solanaceous fruits (Tomato, Chilli, Brinjal), Cucurbits (Bottle gourd, Luffa, Bitter gourd, Pointed gourd cucumber, Muskmelon). Cole Crops-Cabbage cauliflower, Knol-Khol. Bulb Crops (Onion, garlic)

B. Floriculture:

Importance and scope of floriculture in India, importance, General description cultivation and uses of annuals, biennials perennials and bulbous plants, Classification and cultivation of Ornamental trees, Shrub succulents, Bonsai, flower shows, Judging and flower arrangements-Selection of site and layout for private and public Origin, Classification of following commercially important flower crops, like Rose, Canna chrysanthemum and Dahlia Making and maintenance of Lawns.

Practical

M.M.50

(A) Olericulture

1. Cultivation of different vegetables.
2. Judging and inspection of vegetable and vegetables seeds.
3. Study of the kitchen gardening.
4. Cost of cultivation of different vegetables crops.
5. Preparation of Rabi, Kharif and Zaid nurseries of vegetables.
6. Seed raising of different vegetables.
7. Visit of the different vegetables Research farm & Institutes.

(B) Floriculture

1. Important methods of propagation of garden Plants.
2. Identification of ornamental trees, Shrubs, creepers and climbers and foliage plants.
3. Layout of herbaceous and shrub borders.
4. Layout of private and public gardens.
5. Pruning of hedges and up keep of lawns.
6. Cultivation of winter, summer and rainy season annuals in pots and beds.
7. Layout of lawns and study of lawn grasses.
8. Visit to various important parks and gardens.

Paper-IV -Chemistry of Milk and Animal Nutrition

M.M.50

Chemistry of Milk

Milk constituents and their phasic distribution Milk Lipids and their chemistry, Milk fat saponifiable and non saponifiable, Fat constant, Rancidity and its control, Milk sugars and their chemistry, Milk proteins and their chemistry, Composition and separation Minerals and milk enzyme and other substance of Milk carboxylic acids esters and nonprotein nitrogenous substance Detection of adulteration in milk and Ghee. Use of preservatives and their direction, Chemical changes during preservation of milk and milk products.

Animal Nutrition:

Composition of animal body, Composition and classification of feeding stuffs, Digestion and absorption, Minerals and mineral metabolism, carbohydrate

metabolism, Hormonal control of carbohydrates metabolism Fat metabolism essential fatty acids, protein and amino acid metabolism Biological Value of Protein and energy values of feeds.

Practical

M.M.50

1. Estimation of milk acidity.
2. Estimation of milk and feed protein.
3. Determination of Lactose in milk.
4. Preparation of HCl extract and estimation of Ca and P₂O₅ in feed and feces.
5. Determination of other extract and crude fibre in feeds and dungs.
6. Estimation of Casein in milk.

Paper V- PLANT DISEASES AND THEIR CONTROL

M.M.50

1. Scope of Plant Pathology in Agriculture.
2. Plant diseases their causes and classification General Symptoms of Plant diseases.
3. Study of following plant diseases with reference to their symptoms etiology mode of perpetuation and control. I Damping-off of seedling Lateblight of Potato, White rust of crucifers, Green ear diseases of Bajra. Downy mildew of pea Powdery mildew of wheat, Covered smut of Barley, Grain smut of Jowar Smut of Bajra, Black Stem rust of wheat. Yellow or stripe Rust of Wheat, Brown of leaf rust of wheat, yellow or stripe Rust of Wheat, Brown of leaf rust of wheat Linseed Rust, Early blight of Potato, Tikka disease of ground nut, stripe disease of Barley Blast disease of Paddy Redrot of Sugarcane, Wilt of Arhar (Pigeon Pea) Bacterial blight or paddy-Citrus Canker (Bacterial) Tobacco & Potato Mosaic (Virus) Rootknot of Vegetable (name todes) Black tip of Mango (Physiological)
4. Phanerogamic Plant Parasites Cuscuta, Loranthus.
5. Deficiency diseases of Paddy.

Practical

M.M.50

1. Identification of Plant diseases from their symptoms (from para No. 3)
2. Preparation of temporary mounts of Plant disease materials and host parasite relationship.
3. Herbarium (Collection of Plant disease)
4. Viva & Class Record.

Paper VI AGRICULTURAL ENTOMOLOGY

M.M.50

A. General Entomology

1. General introduction to Phylum Arthropoda. Their Various Classes as distinguishing Character with particular reference of class insecta.
2. Insect Morphology:

- (a) Body Wall (b) Body Divisions
- (i) **Head:** Structure and their appendages structure functions and modifications of antenna, study of mouthpart and modification of antenna, study of mouthpart cutting and chewing, Piercing and sucking, sponging siphoning, Chewing and Lapping.
- (ii) **Thorax:** Its structure and appendages, Structure and function of legs, Wing coupling apparatus and wing venation.
- (iii) **Addomen:** Segmentation and external genitalia of male and female with special reference of grasshopper.
3. **Anatomy:-** Digestive excretory, respiratory, circulatory nervous and reproductive systems of grasshopper.
4. Post embryonic development of insects.
5. **Taxonomy:** Insect classification upto the level of families on agriculture importance.
- Orthoptera:** (Acrididae) (Termitidae)
- Hemiptera:** (Coreidar, Pyrrhocoreidae, Pentatomidao and Lygaeidae)
- Homoptera:** (Fuigoridae, Alcuroididae Jassidae, Aphididae, Coccidae and Lacciferidae)
- Coleptera:** (Dermestidae, Coccinellidae, Scarabidae and Cicindelidae)
- Hymenoptera:** (Apidea, Tenthredindaem Barconidate, Ichn cumonidate and Trichogrammatidae)
- Lepidoptera:** (Pyalidae, Noctuidae, Cymbidae and Bombycidae)
- Diptera:** Trypetidae and Tachnidae

B. Economic Importance of Insects:

Classification economic status, food plants damage, life history and pest management if the following insect pests in U.P.

Order-Orthoptera-Paddy grass hopper (*Hieroglyphus* spp).

Order-Isoptera-Termites (*cdontotems abesus*).

Order-Hemiptera-Bagrada, *Cruciderarum*. *Leptocorisa Varicornis*, *Indeocerus* spp, *Pyrill* spp *Aleurolobus besodensis* *Drosicha mangiferae*, *Lipaphis erasimi*, *Dysderous koengei*.

Order-Lepiddoteer-*Heliothis armigera*, *Agrotis Sppearias* spp, *Paplleo demoleus*, *Emmaloeera depressela*, *Tnyporizanivella*, *Sitotroga cerealella*, *Gnorimosehema aperculella*, *Sylepta derogate*, *Pectenophora gasspiella* *chillopartelius* *Mythimna Seperata*, *Euzophera pertiella*.

Order- Coleoptera- *Raphidopula (Aulacophora) foveicollis*, *Bruchus* spp, *Sitoppilus oraze*, *Trogodenagrananriym*.

Order- Dipt, (Strumata) *Dacus cucurbitae*, *Agremyzae btusa*.

Order- Hymenoptera-*Athalia proxima*.

Practical-**M.M.50**

1. Study of an insect,
2. Study of various of mouth parts, Antennae and legs.
3. Dissection of grass hopper/Cockroach to study digestive nervous and reproductive system.
Identification crop pests.
Insect collection and preservation.
Viva-Voce
4. Visit of Research centres dealing with pest protection in India.

Paper VII PRINCIPLES OF GENETICS**M.M.50**

1. **Genetics:-** A brief history sexuality in plants and micro organisms.
2. **Cell division:-** Mitosis and Meiosis
3. Nucleus and nucleolus, Structure and function Prokaryotic Nucleoids, Chromosome structure and function.
4. Mendel's Laws of inheritance, Mendel's Method. Law of segregation and independent Assortment, Modification of mendelian ratio Lethal factors.
5. Multiple factor inheritance multiple alleles, cytoplasmic inheritance.
6. Linkage and crossing over, Sex determination and sex linkage sex limited and sex-influenced characters.
Synthesis and protein and gene, Gene code.
Mutation and chromosomal aberration role of chromosomal aberration.

Practical**M.M.50**

1. Preparation of onion root tip smear and study of mitosis.
2. Preparation of anther squash and study of mitosis.
3. Calculation of linkage and chromosome mapping.
4. Field trips class record and viva-voce.

B.Sc.(Ag.)-Part – IV

Paper 1- ENVIROMENTAL STUDIES

M.M.50

Section ‘A’

Ag. Chemistry & Soil Science

Environmental Studies, Meaning and scope, environmental segments, atmosphere, lithosphere, hydrosphere and Biosphere Soil environment and its pollution, Soil ecology and environmental quality, Soil reaction, Acidity and alkalinity, Diagnosis and improvement of problematic soils, Behavior of pesticides in soil, Geo-organic contaminants of soil, use of sewage sludge and industrial wastes for crop production, water environment and its pollution Biochemical effect of toxic chemicals with particular reference to Water soil, plants & animals.

Section ‘B’

Agriculture Botany

Aquatic Ecosystem marine ecosystem-ocean & marine environment Zonations in marine ecosystem, marine life, pollution and management of marine ecosystem, Fresh water ecosystem specific organisms as indicators of pollution of an aquatic environment Air environment air pollution-green house effect, nature extent and variation of plant response to air pollution, conservation of Flora & Fauna Managing Biomass energy flow and cycling of essential elements.

PRACTICAL

M.M.50

Section ‘A’

Ag. Chemistry & Soil Science

- (i) Diagnosis of polluted Soil-Determination of Physicochemical soil parameters e.g. pH, E.c. soluble cations anions.\
- (ii) Determination of Potable and irrigation water quality Dissolved oxygen B.O.D. pH and E.c.
- (iii) Determination of hardness of water.

Section ‘B’

Ag. Botany

- (i) Bacteria (Pathogenic-coliform and other Bacteria, algae)

- (ii) Study of adaptation features of plants.
- (iii) Survey of natural resources in relation to pollution and suggestion to control them.

N.B. (i) The internal and external examiners will be appointed from respective departments alternatively.

(ii) Two questions shall be compulsory from each group. It is desired that there will be equal number of questions from each group.

Paper II- PROBLEMS OF INDIAN AGRICULTURE COOPERATION AND MARKETING **M.M.50**

I. Problems of Indian Agriculture:

1. Importance of agriculture in national economy, Agricultural regions, agricultural production and productivity trend, causes of low productivity.
2. Land problems of Land holdings, Land tenures and land reform measures with special reference to U.P.
3. Labour problems of Agricultural credit requirement types of agricultural credit and credit sources, problems of institutional credit.
4. Organisation-Economics of small and large scale farming, systems and types of farming.

II. Agricultural cooperation:

1. Principles of cooperation
2. Credit Cooperatives primary, Centra, Apex, Land Development Bank.
3. Agricultural Marketing cooperatives
4. Process cooperative
5. Service cooperatives

III. Agricultural Marketing:

1. Marketing defined, Types of markets.
2. Marketing and marketable surplus.
3. Marketing services and functions assembling Transportation grading and standardization storage, financing, risk bearing, demand creation and price discovery.
4. Marketing channels and organizations intermediary & other functionaries.
5. Marketing margin and costs.
6. Marketing efficiency
7. Regulation of markets
8. Elementary study of agricultural prices-fluctuations and Measures taken to stabilise agricultural marketing.
9. Problem of Agricultural marketing.
10. Measures taken by the Govt. for the improvement of marketing.

PRACTICAL

M.M.50

1. Preparations of schedules and questionnaires for collection data.

2. Comparative economic study of large size mechanized farm and small size farm.
3. Study of seasonal and under employment of farm labour.
4. Study of trade quality and refraction of atleast two agricultural commodities.
5. Study of Marketing Channels, Marketing marging and costs.
6. Comparative study of regulated market.
7. Financial Institution:
Personal visit and detailed study of atleast on of the following:
 - a. Primary cooperative
 - b. Cooperative marketing society
 - c. Study of working of warehouse
 - d. Study of the working of cold storage

Paper III- RURAL SOCIOLOGY AND COMMUNICATION

M.M.50

1. **Rural Sociology:** Meaning definition and importance, Relation of Rural Sociology to Extension Education.
Elements of Rural Society, Community, Social Structure, Social Values & norms, Community, Organisation, Meaning objectives Principles, Steps in community, Organisation, Meaning objectives Principles, Steps in community action, rural institutions, rural leadership concept, importance, type and their role, Social diagnosis leadership ascertainment of felt needs leading to social image change.
2. **Communication:** Meaning difintion and importance of communication, communication process and elements of communications, Factors affecting communication and use of effective communicative channel for agriculture production.
3. Meaning, definition and concept of Diffusion and adoption process, Stages of adoption of agricultural innovations.

PRACTICAL

M.M.50

1. Conducting socio-economic survey in an assigned village., To Study social composition occupational distribution, Rural migration Land utilization Pattern leadership and working of rural Insitution.
2. Writing Extension Literatures Circular letters, Radiotalks, Televisiontalks.
3. Conducting field trip and Tour for 7 days.
4. Practice of Public speaking.

Paper-IV PRINCIPLES OF PLANT BREEDING & PRACTICE

M.M.50

1. Morphology of reproductive organs, Development of at thers and ovules, Pollination Self incompatibility and male sterility, Fertilization and embryo development Apomixis, Embryo and Tissusculture.
2. Variation, Kind and causes, Importance of variation in plant breeding measurement of variation.

3. Plant Introduction and Acclimatization, centres of origin, plant quarantine.
4. Selection; Types and methods of selection, Achievements through selection.
5. Hybridization: Types and techniques of Hybridization, Heterosis and inbreeding depression, hybrid, Synthetic and composite varieties Back cross method of plant Breeding.
6. Breeding for disease resistance, Genetics of pathogenicity and resistance methods of breeding for disease resistance.
7. Special methods of plant breeding Mutation and Polyplodization in Plant breeding.
8. Review of plant breeding work done on important crops in India.
9. Definition, classes, qualities and importance of improved seed, Gentic purity and its maintenance seed testing.
10. Methods of seed production of important crops.
11. Seed caertification, Parts of seed certification, Inspection, General and specific standards of seed certification, seed certificate.
12. Seed Act.

PRACTICAL

M.M.50

1. Study of reproductive organs.
2. Study of ovules and seed development by microtomy.
3. Preparation of culture media and study of embryo and tissue culture.
4. Practice of Selection.
5. Practices of emasculation in important crops.
6. Practices of selfing and crossing.
7. Study and measurement of cariation.
8. Seed purity tests.
9. Germination test of germination paper and petridish methods.
10. Viability test by tetrazoilum chloride and sulfuric acid method.
11. Tour of different plant breeding research station and preqaration of reports.

ELECTIVE PAPER

ELECTIVE 1-CROPSCIENCE PAPER

Paper:V- FOODS OF PLANT ORIGIN

M.M.50

VEGETABLES AND FRUITS: Scope and importance of Hortico Industry in India, Genral principles of Vegetables and Fruit preservation, Raw material for processing, Methods of preservation and processing e.g. caning, dehydration preserves pickles, Cordial, Squashes, Jam, Jellies, Equipment and techniques of freezing of fruits and vegetables, Juice and puries, Methods of storage of fresh and preserved products, quality control during processing, Fruit Product order.

PRACTICAL

M.M.50

1. Caning of different fruits and vegetables.
2. Preparation of jam, jellies and marmides.
3. Preparation of Aonls and Apple morabba.
4. Preparation of lime, lemon and orange squash and lime juice cordials.
5. Vinegar making.
6. Tomato cause and ketchup.
7. Preparation of pickles.
8. Dehydration of some vegetables and fruits
9. Maintenance of practical records
10. Visit of different scientific Institutes and Laboratory industry

Paper VI (Plant Protection Plant Pathology and Entomology) M.M.50

Section (A)

1. General principles of plant protection and importance in agriculture.
2. Principles of plant infection, Physiology specialization and methods of isolation and study of plant pathogen.
3. Principles of plant disease control: Quarantine, Cultural method, Biological control, Chemical control, soil sterilization seed treatment spraying and dusting copper, sulphur mercurial and organic fungicides and their mode of action, Knowledge of system fungicides and their action, antibiotics and virois inhibitors and nematocedes.
4. Plant disease resistance, principles of breeding for disease resistance, Factors responsible for resistance and break down or resistance Important crop varities known to be resistant to diseases.

Section (B) Entomology

1. History and Importance of plant protection in India.
2. Set up of plant protection organization in U.P.
3. Principle of pest control viz. Physical and mechanical Cultural leagal and biological and Integrated Control.
4. Post Management Concept and Scope.
5. Pesticide and their classification, Toxicity of pesticides and First Aid Treatment.
6. Insecticidal laws.
7. Plant Protection equipment their care and maintenance.
8. Recent trends of pest control their care and maintenance.
9. Damage, life history and pest management practices of rats, birds.

10. Formylation of pesticides.

PRACTICAL

M.M.50

1. Acquaintance with the working of autoclave oven and incubators.
2. Knowledge on the method of preparation of media, Isolation and purification of pathogens.
3. Preparation and use of fungicides, Elementary Knowledge of Method of evaluation of fungicides in laboratory and field, Handling of the equipments for fungicidal application.
4. Field trips and collection of plant diseases.
5. Viva voce and record.

Section B

1. Study of petioids and their various formulations, Emulsible concentrates (EC): Wattle power (WD), Granules and dusts.
2. Calculation and preparation of spray material.
3. Opening and fitting of high volume sprayer and hand rotary duster.
4. Study of nozzles and lances.
5. Visit organization dealing with plant protection in India.

Paper-VII Production Economics (Field Crops Live Stock Poultry) MM:50

- 1. Scope & Nature of Production Economics:**
Production Economics its nature and scope,
Terminology used in production Economics.
- 2. Factor-product relationship:**
Production Function,
Types of factor-product relationship,
Rational & irrational stages of production,
Functions optimum input use.
Impact of Technology changes on production function.
- 3. Production & cost:**
Concept of cost, cost function average and marginal cost three zones of cost function & profit maximization, factor & product price changes and product decision.
- 4. Factor-Factor Relationship:**
Factor-Factor relationship iso-cost lines, least cost, combination, iso-curve, expansion path, Ridge lines, choosing optimum level of out-put, rational and irrational zones of production, Substitution curves, input price changes and least cost combination.

5. Product-product-Relationship

Types of production possibilities choosing the optimum product combination, optimum combination of many products.

6. Linear Programming:

Linear programming defined, concepts in solution in Linear programming
Assumptions of Linear programming prerequisites of Linear Programming
Simple graphical solution, Utility of Linear programming.

7. Production Function Analysis

Methodology of production function analysis, Different forms of production function, Linear production function, Cob Douglas production function, quadratic production function their, characteristics and uses.

PRACTICAL

M.M.50

1. Application of input-output analysis in:
 - (a) Nitrogen application to crop.
 - (b) Feeding dairy cattle for milk production.
 - (c) Feeding for egg production.
 - (d) Feeding broiler.
2. Application of factor-factor analysis in cost minimization.
3. Application of Linear programming model, profit maximization.
4. Application of Linear, Coob-Douglas & quadratic functions to crops, livestock and poultry.

ELECTIVE II- ANIMAL SCIENCE PAPERS

Paper-V FOODS OF ANIMAL ORIGIN

M.M.50

Classification of different foods of animal origin and their importance in human diet. I.S.I./P.F.A. Specifications for foods of animal origin. Composition, nutritive value preparation/processing and preservation of foods of animal origin. Composition, nutritive value, preparation/ processing and Preservation of foods of animal origin.

- (a) Milk and Milk Product-Cow, Buffalo, Goat and sheep milk humanized milk, toned and double toned milk, flavoured milk; recombined and reconstituted milk, Milk products such as Dahi, Yoghurt, Chhena, Panner, Cottage cheese, Cheddar and processed cheese, Ice-cream, butter and ghee, Milk powder baby food condensed and evaporated milk khoa and Rubbari.
- (b) Egg and egg products
Whole egg, whole egg powder and egg-yolk, powder
- (c) Different kinds of meat such as mutton, chicken and pork packaging storage and transportation of above food products.

PRACTICAL

M.M.50

1. Sampling of foods of animal origin.
2. Judging of different foods of animal origin.
3. Estimation of fat, protein, carbohydrate and mineral matters of common foods of animal origin.
4. Visits of food processing industries.
5. Practical records & Viva-voce.
6. Formulation of poultry rations for different classes of chickens
7. Disinfection and litter management of poultry house.
8. Vaccination and deworming of the Poultry.
9. Method of sexing of Day Old Chicks.
10. Poultry records on commercial poultry farms.
11. Selection and Culling of layers.
12. Visit of poultry farms.
13. Practical record and viva-voce.

Paper-VI POULTRY PRODUCTION

M.M.50

Development of poultry industry in India and national poultry improvement plans, Different breeds of chickens for egg and meat, production, crosses and their relative importance.

Anatomy and Physiology: External feature of the Chickens, digestive and reproductive systems, formation and structure of the egg, nutritive value of egg, abnormalities of eggs.

Breeding: Principles of breeding, Systems of breeding, breeding for egg production and development of strains of broilers selection and Culling, breeding practices.

Incubation: Selection handling and care of hatching eggs, natural and artificial incubation, types of incubators, embryomortality and its cause, Factors affecting successful incubation, testing of eggs during incubation stages of embryo development during incubation stages of embryo development during incubation sexing, vaccination packaging and transportation of day old Chicks.

Brooding of Chicks: Brooding requirements natural and artificial brooding care and management during brooding types of brooders used and their relative importance.

Feeding Principles and Practices: Requirement of nutrients for different age groups of Chickens and their sources in the ration composition formulation and preparation of poultry ration for different categories of chickens, Various feeding practices used feed additive and supplements.

House Equipments and Management: Housing system; requirement of house of poultry requirement for different categories of birds, Equipments required in a poultry house, lighting arrangement for poultry, sanitation of poultry house, vaccination Common poultry disease, their control, prevention and treatment such as New Castle,

Chicken pox coccidiosis makers and C.R.D. External and internal obmmon parasites of Poultry.

PRACTICAL

M.M.50

1. Study of external features of male and female chickens.
2. Study of normal and abnormal eggs.
3. Candling for hatching and marketing of the eggs.
4. Debeaking fo chickens.
5. Demonstration of dissection of male and female chickens.
6. Formulation of poultry rations for different classes of chickens.
7. Disinfection and litter management of poultry house.
8. Vaccination and deworming of the poultry.
9. Method of sexing of Day Old Chicks.
10. Poultry records on commercial poultry farms.
11. Selection and culling of layers.
12. Visit of poultry farms
13. Practical record and viva-voce.

Paper-VII PISCICULTURE, APICULTURE, SERICULTURE AND PARASITOLOGY

M.M.50

Pisciculture: Defintion of fish, general character of fishes, Places of fish in Animal Kingdom, Study of class (Teleostoml Ostechthyes) with special reference to the order of economics importance. Culturable fishes including exotic carps, First pod, Pond culture, Fish farm implements Induced breeding in carp fishes, External morphology of fishes Habbit, Habitat food and biolody of importedible fishes of U.P. Enmies and diseases of fish, Fisheries and Agriculture, Economic importance of fish and fish as foods.

Apiculture: Kinds of honey bee found in India, study of their castes colony and life-history, Importance of honey and wax History of Apiculture in India Modern methods of bee keeping, Bee live, tools and apparatus requirements of an apiry and problems, Swarming and migration of obsconding, Taxonomy of honey bee Enemies and disease of honey bee.

Sericulture: History and scope of sericulture in India, Kinds of silk worm found in India, Taxonomy of silk worm study external morphology of silkworm with special reference to Bombyxmrol, Life history & seasonal history of silkworm, Modern method & sericulture, needs and problems Enemies and disease of silkworm.

PRACTICAL

M.M.50

1. Identification of local edible & culturable fishes including exotic fishes.
2. Study of external morphology including scale, Skin.

3. Collection of fishes, their enemies and parasites from fresh waters.
4. Identification of species & castes honey bee & their collection.
5. Acquaintance with apiculture tools and bee-hive etc.
6. Identification and collection of different species of silkworm and their life stages, Sericulture tools and food plants of silkworms.
7. Visits of model fish ponds Apiculture & Sericulture centres.
8. Viva- voce
9. Practical records.