Faculty of Agriculture

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

SULLABUS

(As per ICAR Vth Dean Committee)

Name of Departments

1. **Department of Agronomy**
2. **Department of Agricultural Engineering**
3. **Department of Plant Pathology**
4. **Department of Agricultural Economics and Statistics**
5. **Department of Genetics and Plant Breeding**
6. **Department of Agricultural Chemistry and Soil Science**
7. **Department of Soil Conservation**
8. **Department of Agricultural Entomology**
9. **Department of Animal Husbandry and Dairying**
10. **Department of Horticulture**
11. **Department of Agriculture Extension**

Faculty of Agriculture

Courses forB.Sc.(Ag.) Degree

(As per ICAR Vth Dean Committee)

B. Sc. (Ag.)- I

1. Principles of Agronomy
2. Plant Structure, Function and Crop Systematics
3. Live Stock Production and Management
4. Agricultural Engineeringand Green Technology
5. Fundamentals of Agricultural Microbiology
6. Soil Science, Fertilizers and Manures

7. Fundaments of Agricultural Economics
8. Fundamentals of Agricultural Entomology
9. Agricultural Journalism, Comprehension and Communication Skills in English

B. Sc. (Ag.)- II

1. Crop Production of Cereals, Fodder and Fibre Crops
2. Agricultural Biochemistry
3. Extension Education and Rural Development
4. Fundamentals ofOlericulture and Floriculture
5. Dairy Technology
6. Agricultural Statistics and Elementary Mathematics
7. Principles of Geneticsand Biotechnology
8. Soil and Water Conservation
9. Agri- Informatics andIntellectual Property Rights

B. Sc. (Ag.)- III

1. Crop Production of Pulses, Oil Seed and Special Crops
2. Pests of Crops and Stored Grain and Their Management
3. Farm Management and Production Economics
4. Environmental Science and Disaster Management
5. Plant Diseases and their Management
6. Farm Engineering
7. Geo-informatics, Nano-technology and Precision Farming
8. Physical Education, Human Value and Ethic and Yoga
9. **Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA) Activities of 10 days**

B. Sc. (Ag.)- IV

1. Problems of Soil, Water and their Management
2. Economic Structure of Indian Agriculture
3. Communication and Rural Sociology
4. Principles of Plant Breeding and Seed Technology
5. Pomology and Fruit Preservation
6. Beneficial Insects and Their Management
7. Poultry Science
8. Rainfed Agriculture, Watershed Management and Agroforestry
9. **Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)**

Evaluation of Experiential Learning Programme

i. Project Planning and Writing
ii. Presentation
iii. Regularity
iv. Monthly Assessment
v. Output delivery
vi. Technical Skill Development
vii. Entrepreneurship Skills
viii. Business networking skills
ix. Report Writing Skills
x. Final Presentation

Faculty of Agriculture

Department wise allocation of papers in different years of B.Sc.(Ag.) course

1-Department of Agronomy

1. Principals of Agronomy, Paper-I, B.Sc.(Ag.)- I
2. Crop Production of Cereals, Fodder and Fibre crops, Paper- I, B.Sc.(Ag.)-II
3. Crop Production of Pulse, Oilseeds and Special crops, Paper-I, B.Sc.(Ag.)-III

2-Department of Agricultural Engineering

1. Agricultural Engineering and Green Technology -Paper-IV, B.Sc.(Ag.)-I
2. Farm Engineering, Paper-VI, B.Sc.(Ag.)-III

3-Department of Plant Pathology

1. Fundamentals of Agricultural Microbiology -Paper-V, B.Sc.(Ag.)-I
2. Plant Diseases and their Management-Paper-V, B.Sc.(Ag.)-III

4-Department of Agricultural Economics and Statistics

1. Fundaments of Agricultural Economics- Paper-VII, B.Sc.(Ag.)-I
2. Agri- Informatics andIntellectual Property Rights– Paper-IX B.Sc.(Ag.)-II (Common with Genetics and Plant Breeding)
3. Agricultural Statistics and Elementary Mathematics- Paper-VI, B.Sc.(Ag.)-II
4. Farm Management and Production Economics - Paper-III, B.Sc.(Ag.)-III
5. Economic Structure of Indian Agriculture-Paper-II, B.Sc.(Ag.)-IV

5-Department of Genetics and Plant Breeding

1. Plant Structure, Function and Crop Systematics, Paper-II, B.Sc.(Ag.)- I
2. Agri- Informatics andIntellectual Property Rights– Paper-IXB.Sc.(Ag.)-II(Common with Agricultural Economics)
3. Principles of Genetics and Biotechnology, Paper-VII, B.Sc.(Ag.)-II
4. Environmental Scienceand Disaster Management - Paper-IV, B.Sc.(Ag.)-III(Common with Agricultural Chemistry and Soil Science)
5. Principles of Plant Breeding and Seed Technology-Paper-IV, B.Sc.(Ag.)-IV

6-Department of Agricultural Chemistry and Soil Science

1. Soil Science, Fertilizers and Manures-Paper-VII, B.Sc.(Ag.)-I
2. Agricultural Biochemistry- Paper-II B.Sc.(Ag.)-II
3. Environmental Science and Disaster Management -Paper-IV, B.Sc.(Ag.)-III (Common with Genetics and Plant Breeding)
4. Geo-informatics, Nano-technology and Precision Farming,Paper-VII, B.Sc.(Ag.)-III
5. Problems of Soil, Water and their Management- Paper-I, B.Sc.(Ag.)-IV

7-Department of Soil Conservation

1. Soil and Water Conservation,Paper-VIII, B.Sc.(Ag.)-II

2. Rainfed Agriculture, Watershed Management and Agroforestry-Paper-VIII, B.Sc. (Ag.)-IV

8-Department of Agricultural Entomology

1. Fundamental of Agricultural Entomology-Paper-VIII, B.Sc.(Ag.)-I
2. Pests of Crops and Stored Grain and Their Management,Paper-II. B.Sc.(Ag.)-III
3. Beneficial Insects and Their Management-Paper-VI,B.Sc.(Ag.)-IV

9-Department of Animal Husbandry and Dairying

1. Live Stock Production and Management-Paper-III, B.Sc.(Ag.)-I
2. Dairy Technology, Paper-V, B.Sc.(Ag.)-II
3. Poultry Science- Paper-VII, B.Sc.(Ag.)-IV
4. Physical Education, Human Value and Ethic and Yoga, Paper -VIII, B.Sc.(Ag.)-III

10-Department of Horticulture

1. Fundamentals of Olericulture and Floriculture—paper-IV, B.Sc.(Ag.)-II
2. Pomology and Fruit Preservation- paper-V, B.Sc.(Ag.)-IV

11-Department of Agriculture Extension

1. Extension Education and Rural Development paper-III, B.Sc.(Ag.)-II
2. Agricultural Journalism, Comprehension and Communication Skill in English, Paper-IX-B.Sc.(Ag.)-I
3. Communication and Rural Sociology- Paper-III, B.Sc.(Ag.)-IV

PROPOSED REGULATIONS

Faculty of Agriculture

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

B.Sc.(Ag.)-Part I	**Title of thepapers**	**Theory**		**Practical**	
		Max. Marks	**Mini. Marks**	**Max. Marks**	**Mini. marks**
Paper- I	Principles of Agronomy	75	27	25	
Paper –II	Plant Structure, Function and Crop Systematics	75	27	25	
Paper III	Live Stock Production and Management	75	27	25	
Paper –IV	Agricultural Engineering and Green Technology	75	27	25	
Paper-V	Fundamentals Agricultural Microbiology	75	27	25	
Paper-VI	Soil Science, Fertilizers and Manures	75	27	25	
Paper-VII	Fundaments of Agricultural Economics	75	27	25	
Paper-VIII	Fundamental of Agricultural	75	27	25	

	Entomology				
Paper-IX	Agricultural Journalism, Comprehension and Communication Skill in English	100	34		
Total aggregate of First year		Max. Marks – 900			
B.Sc.(Ag.)-Part II	**Title of the papers**	**Theory**		**Practical**	
		Max. Marks	**Mini. Marks**	**Max. Marks**	**Mini. marks**
Paper- I	Crop Production of Cereals, Fodder and Fibre Crops	75	27	25	
Paper –II	Agricultural Biochemistry	75	27	25	
Paper III	Extension Education and Rural Development	75	27	25	
Paper –IV	Fundamentals of Olericulture and Floriculture	75	27	25	
Paper-V	Dairy Technology	75	27	25	
Paper-VI	Agricultural Statistics and Elementary Mathematics	75	27	25	
Paper-VII	Principles of Genetics and Biotechnology	75	27	25	
Paper-VIII	Soil and Water Conservation	75	27	25	
Paper-IX	Agri- Informatics and Intellectual Properties Rights	100	34		
Total aggregate of Second year		Max. Marks – 900			
B.Sc.(Ag.)-Part III	**Title of the papers**	**Theory**		**Practical**	
		Max. Marks	**Mini. Marks**	**Max. Marks**	**Mini. marks**
Paper- I	Crop Production of Pulses, Oil Seed and Special Crops	75	27	25	
Paper –II	Pests of Crops and Stored Grain and Their Management	75	27	25	
Paper III	Farm Management and Production Economics	75	27	25	
Paper –IV	Environmental Science and Disaster Management	75	27	25	
Paper-V	Plant Diseases and their Management	75	27	25	
Paper-VI	Farm Engineering	75	27	25	
Paper-VII	Geo-informatics, Nanotechnology and Precision Farming	75	27	25	
Paper-VIII	Physical Education, Human Value, Ethic and Yoga	75	27	25	
Paper-IX	Rural Agricultural Work Experience			100	34

	and Agro-industrial Attachment (RAWE &AIA)				
Total aggregate of Third year		Max. Marks – 900			
B.Sc.(Ag.)-Part IV	**Title of the subject/papers**	**Theory**		**Practical**	
		Max. Marks	**Mini. Marks**	**Max. Marks**	**Mini. marks**
Paper- I	Problems of Soil, Water and their Management	75	27	25	
Paper –II	Economic Structure of Indian Agriculture	75	27	25	
Paper III	Communication and Rural Sociology	75	27	25	
Paper –IV	Principles of Plant Breeding and Seed Technology	75	27	25	
Paper-V	Pomology and Fruit Preservation	75	27	25	
Paper-VI	Beneficial Insects and their Management	75	27	25	
Paper-VII	Poultry Science	75	27	25	
Paper-VIII	Rainfed Agriculture, Watershed Management and Agroforestry	75	27	25	
Paper-IX	Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)			100	34
Total aggregate of Fourth year		Max. Marks – 900			
Total aggregate of B.Sc.(Ag.) Part-I+PartII+Part III + Part IV		Max. Marks = 3600			

1. Each course is dividing into 60 per cent for theory and 40 per cent marks for practical examination.
2. Practical examination shall be conducted byexternal and internal examiners.
3. The students shall be required to pass both in theory and practical examination separately.

IIIrd year

No. Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)
Activities No. of weeks

1. General orientation &On campus training by different faculties
2. Village attachment
3. Unit attachment in Univ./ College. KVK/ Research StationAttachment
   Plant clinic
4. Agro-Industrial Attachment
5. Project Report Preparation, Presentation and Evaluation
   Total weeks for RAWE & AIA 100

1. **Agro- Industrial Attachment:** The students would be attached with the agro-industries for aperiod of 3 weeks to get an experience of the industrial environment and working**.**

2. Educational tour will be conducted in break between IIndand IIIrd year

RAWE Component-I

Village Attachment Training Programme

Sl. No.Activity Duration

1. Orientation and Survey of Village 1 week
2. Agronomical Interventions 1 week
3. Plant Protection Interventions 1 week
4. Soil Improvement Interventions(Soil sampling and testing)1 week
5. Fruit and Vegetable production interventions 1 week
6. Food Processing and Storage interventions 1 week
7. Animal Production Interventions 1 week
8. Extension and Transfer of Technology activities 1 week

RAWE Component –II

Agro Industrial Attachment

1. Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks.
2. Industries include Seed/Sapling production, Pesticides-insecticides, Post harvest-processingvalueaddition, Agri-finance Institutions, etc.

Activities and Tasks during Agro-Industrial Attachment Programme

1. Acquaintance with industry and staff
2. Study of structure, functioning, objective and mandates of the industry
3. Study of various processing units and hands-on trainings under supervision of industry staff
4. Ethics of industry
5. Employment generated by the industry
6. Contribution of the industry promoting environment
7. Learning business network including outlets of the industry
8. Skill development in all crucial tasks of the industry
9. Documentation of the activities and task performed by the students
10. Performance evaluation, appraisal and ranking of students

Modules for Skill Development and Entrepreneurship: A student has to register 50 marks opting for two modules of (0+50) marks each (total 100 marks) from the package of modules in theIV^{rth} year**.**

Sl. No. Title of the module Credits

1 Production Technology for Bioagents and Biofertilizer

2 Seed Production and Technology

3 Mushroom Cultivation Technology

4 Soil, Plant, Water and Seed Testing

5 Commercial Beekeeping

6 Poultry Production Technology

7 Commercial Horticulture

8 Floriculture and Landscaping

9 Food Processing

10 Agriculture Waste Management

11 Organic Production Technology

12 Commercial Sericulture

NOTE: In addition to above ELP modules other important modules may be given to the students

Evaluation of Experiential Learning Programme/ HOT

S.No. Parameters Max. Marks

1. Project Planning and Writing	10	
2. Presentation	10	
3. Regularity		10
4. Monthly Assessment	10	
5. Output delivery		10
6. Technical Skill Development	10	
7. Entrepreneurship Skills		10
8. Business networking skills		10
9. Report Writing Skills		10
10. Final Presentation		10
Total 100		

Details of Syllabus

B.Sc.(Ag.)- Part-I

PAPER- I: PRINCIPLES OF AGRONOMY ` M.M.:75

(DEPARTMENT OF AGRONOMY)

Agronomy history, scope and distribution, 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, scientificprinciples, 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, 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.Agro-meteorological observation and their importance for crop production.

PRACTICALS M.M.:25

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- II: PLANT STRUCTURE, FUNCTION AND CROP SYSTEMATICS M.M.:75

(DEPARTMENT OF GENETICS AND PLANT BREEDING)

Plant Cell Structure and Function.Tissues and Tissue Systems.Internal Anatomy of Roots, Stems and Leaves.Secondary growth,Osmosis, diffusion, absorption and loss of water in plant.Plant nutrients and their deficiency symptoms.Respiration; aerobic and anaerobic respiration: factors affecting respiration.Photosynthesis: Mechanisms and factors affecting photo-synthesis.Planthormones, Growth and development, Vernalization and photo-periodisms,Dormancy.seed germination.Distinguishing features of the following families with special reference to the genera mentioned against them-

A.FAMILIES OF MONOCOT: (i)Araceae-Colocasia.(ii)Graminae-Triticam, Hardeum, Oryza, Zea, Pennisetum, Sorghum

B. FAMILIES OF DICOT:(i)Leguminosae-Pisum, Cicer, Crotolaria, Cajanus, Arachis
(ii) Cucurbitaceae-Luffa, Lagenaria.(iii) Cruciferea- Brassica
(iv) Solanceae-Solanum, Nicotiana.(v)Euphorbiaceae-Ricinus.(vi)Linaceae-Linum
(vii) Pedaliaceae-Sesamum.(viii) Compositae-Carthamus.(ix)Tiliaceae-Carchorus
(x) Malvaceae- Hibiscus, Gossypium

PRACTICALS M.M.:25

1. Free hand section cutting, staining, mounting and study of internal structure of roots, stemsand leaves.
2. Experiments on endosmos is and exosmosis
3. Study of plasmolysis and deplasmolysis in the pealingsofTredescantia leaves.
4. Measurement of transpiration by photometers.
5. To study the effects of light and darkness on starch formation.
6. To study the necessity of CO_2 during photosynthesis by Moll's experiment.
7. Demonstration of oxygen evolution during photosynthesis in Hydrilla plant.
8. To study the effect of quality and intensity of light on rate of photosynthesis by counting bubbles in Hydrilla plant
9. The measurement of R.Q. by Ganong'sRespiremeter
10. Plants and flowers description and identification

PAPER- III: LIVESTOCK PRODUCTION AND MANAGEMENT M.M.75

(DEPARTMENT OF ANIMAL HUSBANDRY AND DAIRYING)

ANIMAL BREEDING AND ARTIFICIAL INSEMINATION: Aims of breeder, Mendelian rules and its importance in livestock improvement, Heredity and variation, Elementary idea of essential and accessory organs of male and femalereproductive 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,Artificial Insemination (A.I.),their techniques 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.

ANIMAL FEEDING AND FODDER CONSERVATION: 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 itskind, principles of rationing, characteristics of ideal ration, food requirements for growth, reproduction, pregnancy, milk, work and wool production in farm animals, computation of ration. Calf feedingschedule and feeding of crossbred cows.Principles and methods of fodder preservationHay and Silage Making.

DAIRY FARM MANAGEMENT AND HEALTH CARE: Building: Location and grouping of different dairy farm buildings and sheds Requirement and arrangement of floor space in various dairy farm buildings. (a) **Fodder requirement**: of a dairy farm and cropping scheme for the supply of succulent fodders throughout 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. (b) **Animal Health & Hygiene**: Symptoms of ill health principles of immunzition, first aid in farm animals. Sterility in farm animals simple obstetrics in farm animals such as abonormalpasturisation, Retention of placenta, prolapse of uterus, milk fever,tymphanitis, impaction of rumen.Elementaryidea about poisoning in farm animals.General measure for prevention and control of infectious and contagious diseases, care of down calvers and newly born calf.

PRACTICALS M.M.:25

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: AGRICULTURAL ENGINEERINGAND GREEN TECHNOLOGY

M.M.:75

(DEPARTMENT OF AGRICULTURAL ENGINEERING)

Definition branches and object of Agricultural Engineering

SURVEYING: Objectives and types of Surveying, Methods of Measuring distances, Erros chaining and their corrections, Laying out right angles with chain, or tape, crose 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, bulliding, irrigation and drainage channel and fencing.**IRRIGATION:** Source of irrigation water, measurement of irrigation water, method or 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 maintainance, Discharge and power requirement in relation to a particular crop and area.

Green Technology: Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic systemand their application, introduction of wind energy and their application.

PRACTICALS **M.M.:25**

(A) SURVEYING

1.Study of chain, types, cross staff, optical square and ranging instruments.

2.Ranging chain line and reciprocal ranging tabling offset on chain line and recording on field book.

3.Traingulation 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 boundries 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 boundries, Farm Roads, Farm Buildings Farm Fencing, Irrigation, Channels and drainage channels.

(D) IRRIGATION & DRAINAGE- 1. Measurement of irrigation water.2.Determinationof 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 produce before the examination.

PAPER-V:FUNDAMENTALS OF AGRICULTURAL MICROBIOLOGY M.M.:75
(DEPARTMENT OF PLANT PATHOLOGY)

History of Plant diseases with reference to Indian work, Importance of Plant diseases, Factors affecting disease development, Classification of Plant diseases biotic and abiotic diseases. Dispersal and survival of Plant pathogens, parasitism pathogenesis. Principle of Plant disease management, Integrated disease management and quarantine. Important group of chemicals in plant disease control, systemic and contact fungicides, General formulations of fungicides.**Fungi-** General character, reproduction and classification (Hawksworth and Kirk-1995,2001) with reference to economically important genera (*Aspergillus, Penicillium, Erysiphae, Uncinula, Agaricus, Puccinia, Ustilago, Mucor, Rhizopus, Albugo, Peronospora, Pythium, Phytophthora and Plasmopora*) and important diseases caused by them.**Bacteria-** General character, reproduction and classification with reference to economically important Genera (*Xanthomonas, Pseudomonas, Ralstonia,Streptomycin,Erwinia, Clavibacter*). **Virus-** Nature, structure and transmission of important plant viruses (Ricetungro virus, Pigeon pea sterility mosaic virus, Tomato and Tobacco mosaic virus Tomato and Tobacco leaf curl Chilli leaf curl, Banana bunchy top). **Nematodes-** General morphology and reproduction, symptoms and nature of damage caused by important Genera (*Heterodera, Meloidogyne, Anguina and Radopholus*).Phanerogamic plant parasites Orobanche, Striga, Cuscuta and Loranthus. Mycorrhizae.General characters of Phytoplasma, Spiroplasma and fastidious vascular bacteria and important diseases caused by them.

PRACTICALS M.M.:25

1. Introduction to laboratory equipment
2. Collection and preservation of Disease specimen
3. Media preparation (PDA and NA) Isolation and Koch's Postulate
4. Study of plant disease symptoms, general appearance of spores and mycelium,
5. Gram staining. Study of fungicide their applications and formulations.
6. Field visit

PAPER-VI: SOIL SCIENCE, FERTILIZERS AND MANURES M.M.:75

(DEPARTMENT OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE)

Pedological and Edophological concepts of soil, soil forming rocks and minerals, weathering ofrocks, soil genesis, process and factors of soil formation, soil profile.Soil physical properties-density, porosity, soil colour, consistency and plasticity, texture and structure of soil, soil components, soil water, air, temperature and their effect.Elementary knowledge of soil taxonomy: classification and soil survey, soils of India and soils of U.P. Soil colloids, ion exchange phenomenon, cation and anion exchange, base saturation.Soil pH, E.C. and their effect on nutrient availability.Soil organic matter, humus and humification, biodegradation, nutrients transformations in soil.

Soil organisms: micro and macro organisms and their role in soil fertility: carbon, nitrogen, phosphorus and sulphur cycle.Biological Nitrogen Fixation, rhizosphere and phylosphere, biofertlizers.History of soil fertility and plant nutrition, mechanisms of nutrients transport to plants, chemistry of essential plant nutrients in soil and their availability, fertilizers recommendation. Nutrients use efficiency.

FERTILIZERS AND MANURES

Plant nutrients: their role, essential criteria, principles of fertilizers application. Organic manures: properties and methods of preparation and their application, compost and composting.Integrated Nutrient Management.Chemical fertilizers: classification, composition and properties of major nutrients:nitrogenous,phosphatic, potassic, secondary and micronutrients fertilizers, complex fertilizers. Nano-fertilizers.Soil amendments.FertilizersControl Order.Radioisotops and their use in agriculture.

PRACTICALS **M.M. 25**

1. Volumetric estimation by internal, external and self indicator method
2. Determination of temporary and permanent hardness of water
3. Study of soil sampling tools, soil sampling, processing and storage
4. Determination of soil pH and E.C.
5. Study of soil forming rocks and minerals
6. Determination of organic matter content in soil
7. Study of soil density, soil moisture and soil profile
8. Identification, staining and microscopic examination of microbes
9. Determination of available and total nutrient element in soil
10. Estimation of N,P& K in manures and fertilizers
11. Practical records and viva-voce

PAPER –VII:FUNDAMENTS OF AGRICULTURAL ECONOMICS **M.M.:75**

(Department of agricultural Economics and Statistics)

Consideration: Definition of economics, Definition and scope of Agricultural economics, significance and agricultural economics in economic development.Theory of demand: Demand, Supply and market price, price elasticity, utility analysis of demand, indifference curve analysis. Theory of firm: Firm and its decision, theory of production choice of input and output cost Economics function.Pricing of output: Pricing of output under pure competition, monopoly, oligopoly, and monopolistic competition. Theory of distribution: Determination of rent interest and wages.Money and Banking: Meaning and significance of money, value of money, inflation and Deflationary standards, credit and credit instruments, bank and their functions and classifications and commercial bank and central banking.

PRACTICALS **M.M.:25**

Elasticity of demand, Cost Principle, Evaluation and Apportionment of costs. Cost of production of major Crops. Determination of various measures of farm income, Survey of at least two farmers and analysis of their cost and returns.

PAPER- VIII:FUNDAMENTALS OF AGRICULTURAL ENTOMOLOGY M.M.75

(DEPARTMENT OF AGRICULTURAL ENTOMOLOGY)

General Entomology-History of Entomology in India. Major points related to dominance of Insecta in Animalkingdom.

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 venetion.

(iii)Addomen: Segmentation and external gentalia 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.
   Orthopter: (Acrididae) (Termitidae)
   Hemiptera: (Coreidar, Pyrrhocoreidae, Pentatomidao and Lygaeidae)
   Homoptera: (Fuigoridae, AlcurodidaeJassidae, Aphididae, Coccidae and Lacciferidae)
   Coleptera: (Dermestidae, Coccinellidae, Scarabidae and Cicindelidae)
   Hymenoptera: (Apidea, TenthredindaemBarconidate, Ichncumonidate and Trichogrammatidae)

Lepidoptera: (Pyralidae, Noctuidae, Cymbidae and Bombycidae)
Diptera: Trypetidae and Tachnidae.

PRACTICALS- M.M.25

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.
4. Insect collection and preservation.
5. Visit of Research centers dealing with pant protection in India.

PAPER- IX: AGRICULTURAL JOURNALISM, COMPREHENSION AND COMMUNICATION SKILLS IN ENGLISH MM:100

Theory

Agricultural Journalism: The nature and scope of agricultural journalism characteristics and training of the agricultural journalist, how agricultural journalism is similar to and different fromother types of journalism. Newspapers and magazines as communication media: Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. Form and content of newspapers and magazines: Style and language of newspapers and magazines, parts of newspapers and magazines. The agricultural story: Types of agricultural stories, subject matter of the agricultural story, structure of the agricultural story. Writing the story: Organizing the material, treatment of the story, writing the news lead and the body, readability measures. Illustrating agricultural stories: Use of photographs, use of artwork (graphs, charts, maps, etc.), writing the captions. Editorial mechanics: Copy reading, headline and title writing, proofreading, lay outing.

English: You and Your English- Spoken English and broken English. ReadingComprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confusedwords. Functional grammar: Articles, Prepositions, Verb, Subjectverb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Written Skills:Paragraph writing, Precise writing, Report writing and Proposal writing. The Style: Importanceof professional writing. Preparation of Curriculum Vitae and Job applications.Synopsis Writing.Interviews: kinds, Importance and process.

B.Sc. (Ag.)- Part II

PAPER-I:CROP PROCUTION OF CEREALS, FODDER AND FIBRE CROPS- M.M.75
(DEPARTMENT OF AGRNOMY)

Study of the following crops-

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

PRACTICAL **M.M. 25**

1. Practical study of crops mentioned in theory course.
2. Preparation of cropping scheme.
3. Working out the cost of seed and fertilizer.
4. Tours & visits.
5. Practical Record.
6. Viva-Voce.

PAPER-II: AGRICULTURAL BIOCHEMISTRY **M.M.:75**

(DEPARTMENT OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE)

Scope and importance of Biochemistry.Biochemical functions and composition of plant and animal Cell.Colloidal state, Osmosis:osmotic pressure and its determination. Membrane phenomenon, acids, bases, pH, buffers and their importance.Carbohydrates:importance and classifications of monosaccharide,disaccharides and polysaccharides their chemistry and biosynthesis in plants. Proteins and Amino acids: importance and classifications, their chemistry and biosynthesis in plants. Lipids and fatty acids: importance and classifications, chemistry and biosynthesis in plants.Enzymes: classification, general properties, Mechanism of action, factors affecting their activities.Introduction to enzymes.Vitamins:**c**lassification, chemistry, biochemical functions, physiological role, deficiency symptoms and requirements.Nucleic acids: Importance and classification, structure of nucleotides. Metabolism of carbohydrates:Glycolysis, metabolism of lipids, beta oxidation and biosynthesis of fatty acids. Protein metabolism.Biological Oxidation.Hormones and phytohormones, growth regulators,elementary knowledge of plant pigments.Biological changes during germination, growth, ripening of fruits, vegetables and crops.Milk: Chemistry,milk constituents and their phasic distribution,Detection andadulteration in milk and Ghee. Use of preservatives and their detection.

PARCTICALS M.M.75

1. Preparation of solution, pH and buffer
2. Estimation of Starch in plants
3. Estimation of reducing and non-reducing sugars in cane juice and jiggery.
4. Separation and identification of plantpigments by paper chromatography.
5. Detection and identification of organic compounds, Fructose, glucose, Starch, sucrose, acetic acid, oxalic acid, ethyl alcohol and proteins.
6. Iodimetric titration.
7. Estimations of diestarase enzyme in biological materials.
8. Estimation of calcium by EDTA method.
9. Practical records and viva-voce

PAPER-III: EXTENSION EDUCATION AND RURAL DEVELOPMENT M.M.:75

(DEPARTMENT OF AGRICULTURAL EXTENSION)

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. **Extension Methods:**Definitions, importance and selection methods of approach individual, group community and mass.**ExtensionTechnique:**Demonstration particularly method demonstration, result demonstration, group discussion and audio-Visual Aids.**Extension Teaching and Learning:** Meaning objective, principles, importance and factors affecting teaching and learning process, learning situation and experience, motivation.The role qualifications, responsipilities and relationships of professional extension workers at various level.Community Development and Panchayati Raj: Definition, objectives of community development, Panchayati Raj, TRISEM, Pilot Project, I.R.D.P.,I.A.A.P., N.A.T.P.,N.A.I.P.,transfer of technology (National demonstration, Operational research) project of K.V.K. and Land grant programme. Programme and planning:meaning, importance, principles, steps and procedure in developing a sound extension programme, seeking cooperation of local leaders.Extension evaluation: meaning, definition, purpose methods, types and steps in evaluation.Cyber extension, e-extension, market-led extention, Farmers-led extension and expert system.

PRACTICALS **M.M.75**

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.

PAPER –IV: FUNDALMENTALS OF OLERICULTURE AND FLORICULTURE
M.M.:75

(DEPARTMENT OF HORTICULTURE)

(A) Olericulture

Importance of Vegetable in human nutrition and as a source of income to the power, Classifications of vegetable crops, Types of vegetable gardening, Role of plant nutrients and growth regulators in Vegetable production Nursery techniques, dormancy of sedds, Preparation of land Manures and fertilizers and methods of their application, Spacing transplanting irrigation, interculturemulohingm crop rotation, sussesion 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 (Tamato, Chilli, Brinjal), Cucurbits (Bottle gourd, Luffa, Bitttergroud, Pointed gourd cucumber, Muskmelon).Cole Crops-Cabbage cauliflower, Knol-Khol. Bulb Crops (Onion, garlic)

B. Floriculture

Importance and scopes of floriculture in India, importance, General description cultivation and uses of annuals, biennials perennials and bulbous plants, Classification and cultivation of Ornamental trees, Shurbessucculants, Bonsal, flower shows, Juddging 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.

PRACTICALS **M.M.:75**

(A) Olericulture

1. Cultivation of different vegetables.
2. Judgin 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 rasing 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, Shurbs, creepers and climbers and foliage plants.
3. Layout of herbaceous and shrubbers borders.
4. Layout of private and public grandens
5. Pruning of hedges and up keep of lawnas
6. Cultivation of winter, summer and rainy season annuls in pots and beds.
7. Layout of lawns and study of lawn grasses.
8. Visit to various important parks and gardens.

PAPER –V:DAIRY TECHNOLOGY **M.M.:75**

(DEPARTMENT OF ANIMAL HUSBANDRY AND DAIRYNG)

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/BIS Specifications for different milks production or clean milk, adulteration of milk and its detection.**MILK PROCESSING:**Receiving of milk in dairy, staining, filteration, classification, standardization, cooling, pasteurization, sterilization and homogenization, packaging and distribution of milk, Cleaning and sanitization of dairy equipments and

Machinery.**MILKMICRO 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.**MILK PRODUCTS:**Composition of cream, different methods of cream separation factors affecting the rechness of cream and essentials of successful cream separation objects of ripening natural cream ripening and ripening with starters, neutralization of cream for butter making.**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. **GHEE:**Manufacture of ghee from cream and butter. Composition, factors affecting the quality of ghee, AG marking of ghee.**FROZEN and FERMENTED MILK PROCUCTS:**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.Condensed and Evaporated milk product. Milk powders and baby food.**INDEGENIOUS MILK PRODUCTS:**Manufacturing techniques of various indigenous milk products such as Chenna&Paneer, Khoa, Rabbari.

PRACTICALS **M.M.:25**

1. Sampling of milk.
2. Testing of milk for:
   (a) Specific gravity by Lactometer.
   (b) Fat by Garber's 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. Detection 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, Khoachenna, 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.

11. Visit of milk processing plant

PAPER–VI: AGRICULTURALSTATISTICS AND MATHEMATICS STATISTICS

M.M.: 75

(DEPARTMENT OF AGRICULTURAL ECONOMICS AND STATISTICS)

1.FREQUENCY DISTRIBUTION: Classification; Tabulation Diagrammatic Representation and Graphic Representation of data; Histogram Frequency, Polygon Frequency curve and ogive

2.MESASURES 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.

4.Limit of Correlation Coefficient, Rank Correlation, Regression, Liner of regression, Regression coefficient, Properties of regression coefficient, Angle between two lines of regression.

5.TEST OF SIGNIFICANCE: Concept of random sample and Statistics; Test of Significance based on Z, T, F and chi Square Statistics.

6.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.D., R.S.D. and L.S.D.

MATHEMATICS

1.ALGEBRA OF METRICES: Elementary concept of determinants, Minor and Co-factor of determinants, Preoperties of determinants, Definition of Matrices, Types of Matrices and Properties Addition, Substraction, 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 ssimple cases, integration by parts and concept of Definite Integrals Simple Cases.

PARCTICALS **MM: 25**

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 mode.
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. z, t and f
9. Exercises on CRD, RBD and LSD.

10-Record and viva-voce.

PAPER- VII: PRINCIPLES OF GENETICS AND BIOTECHNOLOGY M.M.:75

(DEPRTMENT OF GENETICS AND PLANT BREEDING)

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.

7. Syntheses of Protein and Genetic code. Mutation and Chromosomal Aberration, role of Chromosomal Aberration.

8. Concepts and Applications of Plant Biotechnology: Scope, organ culture, Embryo culture, Cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Somatic hybridization and Cybrids; Somaclonal variation and its use in crop improvement; Cryo-preservation; Introduction to recombinant DNA methods

PRACTICALS **M.M.:25**

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. Tissue culture
5. Field trips, class record and viva-voce.

PAPER-VIII: SOIL AND WATER CONSERVATION **M.M.75**

(DEPARTMENT OF SOIL CONSERVATION)

Hydrology-Rainfall and Runoff Hydrologic cycle, occurrence of precipitation,storms, measurement of precipitation. Analysis and computation of precipitationdata, kind of runoff, characteristicsof runoff Rational method of estimating runoff, Measurement of runoff, watershed management.

SOIL EROSION-Mechanics and types of erosion, Factors affecting rate of erosion causes and effect of erosion, extent on erosion problems in Utter Pradesh.

SOIL AND WATER CONSERVTION-Definition and aim of soil and 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 practicesof 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,

Elementary knowledge of gully control structuressuch as drop spillway drop inlet spillway chute spillway check dams, diversionbunds and dithes, grass waterways.

PRACTICALS **M.M.:25**

1. Differential, profile leveling and cross sectioning.
2. Preparation of contour map.
3. Study of rain gauges, Anemometer, Thermohygrometer, Wet and dry blub. Thermometer, evoporimeter, evaporation pan, infiltrometer&currentmeter.
4. Measurement of temperature, Humidity, Rainfall, runoff, evaporation and infiltration.
5. Computation of average rainfall depth over and area;
6. Analysis of automatic rain gauges chart and plotting of mass rainfall curve and intensity.
7. Preparation of soil conservation survey and I and capability classification map.
8. Field study of different types of erosion and erosion control Structures.
9. Laying out of contouring strip cropping, irrigation channel terrace graded bund and contour bands.
10. Identification of tree-species. botanical characteristics of species and varieties of different forestry plants
11. Diameter measurements using calipers and tape, diameter measurements of forked, buttressed, fluted and leaning trees.
12. Height measurement of standingtrees by shadow method, single pole method and hypsometer.

A. Visit to the Organizations/Institutions working in the forestry plants.
Estimation of earth work quality and cost of earth work in leveling ferracingbunding, check dams irrigation & drainage channels.
Note:-(i) Visit to the soil and water conservation engineering projects research and training centres.

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

PAPER-IX: AGRI-INFORMATICS and INTELLECTUAL PROPERTY RIGHTSMM: 100

Agri-Informatics (Department of Agricultural Economics and Statistics)

World Wide Web (www):Concepts and components, concepts and standard input/output operations.e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models forunderstanding plant processes. IT application for computation of water and nutrient requirementof crops, Computer-controlled devices (automated systems) for Agri-input management,Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc;Geospatial technology for generating valuable agri-information. Decision support systems,concepts, components and applications in Agriculture, Information Systems etc for supporting Farm decisions.Preparation of contingent crop-planningusing IT tools.

Intellectual Property Rights (Department of genetics and Plant Breeding)

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Trade secrets.Patents Act 1970 and Patent system in India, patentability, process and product patent, filingof patent, patent specification, patent claims, Patent opposition and revocation, infringement,Compulsory licensing,

Practical

Study of Computer Components, accessories, Use of statistical tools,Preparing queries and reports, demonstration of Agri-information system.Introduction toWorld Wide Web (WWW).IT tools. Hands on Decision Support System. Preparation, Contingent crop planning.

B.Sc.(Ag.)-Part – III

PAPER-I:CROP PRODUCTION OF PUSES, OILSEEDS AND SPECIAL CROPSM.M.75

(DEPARTMENT OF AGRONOMY)

Study of the following crops

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

Practical **M.M.25**

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. Determination of ginning percentage in cotton.
6. Tour & visits.
7. Viva-Voce
8. Record

PAPER-II: PESTS OF CROPS AND STORED GRAINS AND THEIR MANAGEMENT M.M.75

(DEPARTMENT OF AGRICULTURAL ENTOMOLOGY)

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

Order-Orthoptera-Paddy grass hopper (Hieroglyphusspp).

Order-Isoptera-Termites (Odontotemsabesus).

Order-Hemiptera-Bagrada, Cruciderarum.LeptocorisaVaricornis, Indeocerusspp, PyrillasppAleurolobusbesodensis, Drosic, hamangiferae, Lipaphiserasimi, Dysderouskoengei.

Order-Lepiddoteer-Heliothisarmigera, AgrotisSpp, Eariasspp, Paplleodemoleus, Emmaloeeradepressela, Tnyporizanivella, Sitotrogacerealella, Gnorimosehemaaperculella, Syleptaderogate,Pectenophoragasspiella, chillopartelius MythimnaSeperata, Euzopherapertiella.

Order- Coleoptera- Raphidopula (Aulacophora) foveicollis, Bruchusspp, Sitoppilusorazy, Trogodenagrananriym.

Order- Dipt, (Strumata) Dacuscucrbitae, Agremyzaobtusa.

Order- Hymenoptera-Athaliaproxima

PRACTICAL **MM:25**

1. Identification of different types of damage.
2. Identification and study of life cycle and seasonal Identification of insect pests and Mites associated with stored grain.
3. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique.
4. Fumigation of grain store / godown.
5. Identification of rodents and rodent control operations
6. Determination of moisture content of grain.
7. Methods of grain sampling under storage condition.
8. Visit to Indian Storage Management and Research Institute
9. Visit to nearest FCI godowns.

PAPER-III:FARM MANAGEMNT AND PRODUCTION ECONOMICS M.M:75

(DEPARTMENT OF AGRICULTURAL ECONOMICS AND STATISTICS)

Definition, nature and scope of Farm Management and production economics.Difference between farm management and production economics. Technology used in farm management.Economic principles of farm management, farm planning and budgeting.**Factor Product Relationship:** Production function,Types of factor product relationship,Rational and Irrational stages of production, Functions optimum input use, Impact of technological changes on production function.Concept of cost, cost function, average cost and marginal cost. Three Zones of cost function & profit Maximization factor and product price changes and product changes and product decision.**Factor- Factor Relationship:** Factor- Factor relationship, iso-cost line, least cost combination, iso-cline, expansion path, Ridge lines, choosing optimum level of output, rational and irrational zones of production, substitution curves, input price changes and least cost

combination.**Product – Product Relationship:** Types of production possibilities, choosing the optimum product combination, optimum combination of many products.**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.**Production Function Analysis:** Methodology of production function analysis, different forms of production function linear production function, Cobb Douglas production function, Quadratic production function there, characteristics and uses.Farm records and accounts, measures for Farm income and efficiency.

PRACTICALS **M.M.:25**

1. Application of input output analysis in
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 enterprises
8. Preparation of farm budgets
9. Nitrogen application to Crop
10. Feeding Dairy cattle for milk production..
11. Feeding for egg production
12. Feeding broiler.

PAPER-IV: ENVIROMENTAL SCIENCE AND DESASTER MANAGEMNT M.M.:75

Section 'A'- DEPARTMENT OF AGRICULURAL CHEMISTRY AND SOIL SCIENCE

Environmental Studies, Meaning and scope, environmental segments, atmosphere, lithosphere, hydrosphere and Biosphere Soil environment and its pollution, Soil ecology and environmental quality, land resources, Geo-organic contaminants of soil, solid wastes management, use of sewage sludge and industrial wastes for crop production, water environment, resources and its pollution. Biochemical effect of toxic chemicals with particular reference to water, soil, plants and animals. Climate change, Issues involved in enforcement of environmental legislation.Natural Disasters- Meaning, nature, their types and effects. Man Made Disasters, Disaster Management-concept, international strategy for disaster reduction, national disastermanagement framework; role of NGOs, Central, state, district and local administration; Police and other organizations.

Section 'B'- DEPARTMENT OF GENETICS AND PLANT BREEDING

Ecosystem: type, components and structure, 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-greenhouse effect, nature extent and variation

of plant response to air pollution, conservation of Flora and Fauna Managing Biomass energy flow and cycling of essential elements.National parks, centaury, biosphere reserves.Disaster Management- Effect to migrate natural disaster at national and global levels.International strategy for disaster reduction.Concept of disaster management, national disastermanagement framework; role of NGOs, community –based organizationsand media. Central, state, district and local administration; Armed forces in disaster response;Disaster response; Police and other organizations

PRACTICALS **M.M.25**

Section 'A'-Agricultural Chemistry and 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'- Genetics and Plant Breeding

(i) Bacteria (Pathogenic-coli form 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- V: PLANT DISEASES AND THEIR MANAGEMNT M.M.75

(DEPARTMENT OF PLANT PATHLOGY)

1. Symptoms, etiology, disease cycle and management of following plant diseases:
2. **Field Crops:**
   Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro;
   Maize: downy mildew; Groundnut: leaf spot; Pigeon pea: wilt and sterility mosaic;
   Black & green gram: yellow mosaic; Wheat: rusts, loose smut, karnal bunt and ear cockle;
   Sugarcane: red rot, grassy shoot, ratoon stunting; Mustard: Alternaria blight, white rust, downy mildew. Gram: wilt and Ascochyta blight; Lentil: rust, Cotton: vascular wilt, and black arm; Pea: downy mildew, powdery mildew.
3. **Horticultural Crops:**
4. Potato early and late blight,Cucurbits: downy mildew, wilt. Chillies: wilt and leaf curl; Turmeric: leaf spot. Coriander: stem gall.Rose: dieback, powdery mildew.
5. Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato:Blight and leaf curl, Okra: Yellow Vein Mosaic; Ginger: soft rot; Colocasia: Phytophthora blight.

6. Guava: wilt; Banana: Panama wilt, bacterial wilt and bunchy top; Papaya: leaf curl and mosaic,
7. Mango: anthracnose, malformation, bacterial blight; Citrus: canker and gummosis; Grape vine: downy mildew, Powdery mildew. Apple: scab, powdery mildew, fire blight and crown gall; Peach: leaf curl.

PRACTICALS **M.M.25**

1. Identification of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems.
2. Collection and preservation of plant diseased specimens for herbarium.
3. Crop monitoring for disease arrival
4. Herbarium (Collection of Plant disease)
5. Viva & Class Record.

PAPER-VI:FARMENGINEERING **M.M.:75**

(DEPARTMENT OF AGRICULTURAL ENGINEERING)

Necessity, Scope and Importance of Mechanized forming in India, Source of Farm Power-Various conventional and Non-conventional sources of farm power their utilization merits and demerit. Green house technology

I.C. Engines-Classification important parts & their functions. Principles of operation of 4- Stroke and 2-Stroke cycle of C.I. and S.I.engines, value timing and Firing order Engine. Terminology and calculation of displacement, I.H.P.,B.H.P.,D.B.HP and mechanical efficiency.Different engine systems.

Tractors-Classification, Selection Availability and purchase of Tractors, Periodical maintenance of tractors and their storage.Calculation of cost of operation of tractors.

Farm Machinery-Study and Operation of farm equipments: sowing, Planting (Excluding trans planters), Harvesting, Threshing, combines, Winowing. Planning farm stead and study of septic tank.

PRACTICALS **M.M.25**

A – FARM ENGINEERING

1.Familiarization with different sources of energy and farm power.
2.Study and sketch of aform tractor.
3.Experience of staring stopping &operating a tractor.
4.Sources of availability of different form units.
5.Practical working; of following farm equipments:Seed bed preparation, Sowing, Planting,Harvesting, Threshing, Winnowing equipments
6.Calculation on cost of working with different farmequipments

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

PAPER-VIII: GEO-INFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING MM:60

(DEPARTMENT OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE)

Precision agriculture: concepts and techniques; their issues and concerns for Indianagriculture; Geo-informatics- definition, concepts, tool and techniques; their use in PrecisionAgriculture. Crop discrimination and Yield monitoring, fertilizer recommendationusing geospatial technologies; Spatial data and their management in GIS; Remote sensing conceptsand application in agriculture; Global positioning system(GPS), components and its functions; Introduction to crop Simulation Models of Agricultural; STCR approach for precision agriculture;

Nanotechnology: definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles,nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer,plant protection for scaling-up farm productivity.

PRACTICAL MM:25

1. Introduction to GIS software
2. Spatial data creation and editing.
3. Introduction to image processing
4. Software. Visual and digital interpretation

PAPER-VIII: PHYSICAL EDUCATION, HUMAN VALUE AND ETHIC, JOURNALISM AND YOGA MM:100

(DEPARTMENT OF ANIMAL HUSBANDRY AND DAIRYING)

Physical Education

Food and Nutrition, health and fitness, Major games, Rules & regulationof important games, Skill development in any one of the game-Cricket, Football, Basket ball,Volley Ball and Net ball. Athletic events-Rules & regulations of athletic events–participation inany one of the athletic events-short & long distance running.

Health, hygiene and sanitation

Definition needs and scope of health education; role of food, nutrition, safe drinking water, water born diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programmes and reproductive health.

Values and Ethics-An Introduction.Goal and Mission of Life.Vision of Life. Principles and Philosophy.Self Exploration.Self Awareness.Self Satisfaction.Decision Making.Motivation. Sensitivity.Success.Selfless Service.Positive Spirit.Body, Mind and Soul.

Yoga: History, philosophy, concept, myths and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative methodYoga; Introduction to - Asanas, Pranayam, Meditation and Yogic Kriyas; Role of yoga in health.

PRACTICAL

Prevention of sports injuries. First aid training in sports-Sprain, Fractures, Burns, Snakebite, Drowning, Unconscious victim, First aid ABC, Sling and Splint and carrying techniques. Yoga continuation.Skill development in any one of the game-Cricket, Football, Basket ball,Volley Ball and Net ball.Athletic events–participation inany one of the athletic events-short & long distance running.Adventure training-On Land– Trekking, High Altitude Trekking, RockClimbing, Mountaineering.In water-River Crossing.

PAPER-IX-Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA) MM :100

B.Sc.(Ag.)-Part – IV

PAPER- I: PRBLEMS OF SOIL, WATER AND THEIR MANAGEMNT M.M.75

(DEPARTMENT OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE)

Soil quality and health, Distribution of waste land and problem soils in India. Their categorization based on properties. Alkaline, Saline and sodic soil: chemistry, formation, reclamation and management. Acid soil and acid sulphatesoil:chemistry, formation, reclamation and management.

Eroded and Degraded soil: formation and their management. Waterlogged and flooded soil: chemistryand their management. Polluted and degraded soil: chemistry and their management, behavior of pesticides, fertilizers and inorganic contaminants, prevention and mitigation of soil pollution. Water: resources, history and distribution, importance and management, irrigation and drinking water, quality and standard, measurement and establishment of thresh hold limits, brakish water, utilization and management of saline water in agriculture. Dams-benefits and problems.

Soil testing, indicator plants. Nutrient transformation in problematic soil (Acid, saline, sodic, alkaline, waterogged and degrades land). Importance of Organic and inorganic wastes.Land degradation, desertification and restoration, desert soil and their management. Remote sensing and GIS techniques in the diagnosis and management of problem soil, Multiple tree species, bioremediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soil under different Agro-ecosystem. Water harvesting, Public awareness.

PRACTICALS M.M.25

1. Determination of pH, E.C. and total dissolve salts and D.O., Redox potential in soil and water
2. Determination of temporary and permanent hardness of soil and water
3. Determination of lime, gypsum requirement
4. Estimation of acid requirement f soil.
5. Determination of SAR, ESP and Base saturation percentage of soil
6. Study of soil profilein problematic area
7. Determination of organic matter in soil
8. Visit to a local area to document
9. Records and viva-voce

PAPER –II:ECONOMIC STRUCTURE OF INDIAN AGRICULTURE M.M.:75

(DEPARTMNT OF AGRICULTURAL ECONOMICS AND STATISTICS)

Structure of Indian Agriculture, Land- Problems of Land holdings, Land tenures and land reform measures with special reference to U.P.Labour-Problems of agricultural labour, unemployment and under employment, Agricultural wages & Methods of wage Payment.Finance- Agricultural credit requirement, types of agricultural credit and credit sources, problems of institutional credit.Organization- Economics of small and large scale farming, systems and types of farming.Natural Resources and Indian agriculture: Definition, Role, types, Utilization. Green Revolution- Meaning, Causes, Effect, Evaluation & Suggestions.New Agricultural Policies-Objectives, Strategy, Features and Evaluation.**Agricultural Co-operation**: meaning and principles, Credit Cooperatives: Primary, Central, Apex, CARDB, Cooperative Marketing Societies: Meaning, Functions Importance & Advantages, Difficulties & Suggestions for improving Cooperative marketing.Processing cooperatives and Service cooperatives, **Agricultural Marketing**-Marketing: definition, types, marketed and marketable surplus.Marketing services and functions- Assembling, Processing, Distribution and Subsidiary function (Packing, Transportation, Grading and Standardization, Storage, Financing, Risk bearing, Demand creation and price discovery), Marketing channels and organizations intermediary & other functionaries.Marketing margin, costs and Marketing efficiency,Regulation of marketsAgricultural prices-fluctuations and measures taken to stabiles agricultural marketing.Problem of Agricultural marketing and their measures taken by the Govt. for the improvement of marketing, GST

PRACTICALS M.M.25

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 Marketing Channels, Marketing merging and costs.
5. Comparative study of regulated market.
6. Financial Institution:Personal visit and detailed study of at least on of the following:
   a. Primary cooperative

b. Cooperative marketing society
c. Study of working of warehouse and cold storage

PAPER-III:COMMUNICATION AND RURAL SOCIOLOGY M.M.75

(DEPARTMENT OF AGRICUTURE EXTENSION)

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.

Communication: Meaning definition and importance of communication, communication process and elements of communications, Factors affecting communication and use of effective communicative channel for agriculture production.Meaning, definition and concept of Diffusion and adoption process, Stages of adoption of agricultural innovations.ICT and TOT application, Agriculture Journalism. Agricultural Heritage, Communication skills, International and National Agriculture related organizations.

PRACTICALS M.M.25

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 Institution.
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 AND SEED TECHNOL M.M.:75

(DEPRATMENT OF GENITCS AND PLANT BREEDING)

1. Morphology of reproductive organs, Development of anthers and ovules, Pollination Self incompatibility and male sterility, Fertilization and embryo development Apomixis, Embryo and Tissue culture.
2. Variation, Kind and causes, Importance of variation in plant breeding measurement of variation.
3. Plant Introduction and Acclimatization, center 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 Polyploidy in Plant breeding.

8. Review of plant breeding work done on important crops in India.
9. Definition, classes, qualities and importance of improved seed, Genetic purity and its maintenance seed testing.
10. Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production,
11. Seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important. Seed certification, Seed Act, GM crops. Role of WTO

PRACTICALS **M.M.:25**

1. Study of reproductive organs
2. Study of ovules and seed development by microtome
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 preparation of reports.

PAPER –V: POMOLOGY AND FRUIT PRESVATOIN **M.M.75**

(DEPARTMENT OF HRTICULTURE)

(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 unfruifulness and Remediesfruits 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, Cirturs, Guava, Papaya, Litchi, Grape, Ber, Aonla Pineapples Jackfruit, Apple, Pear, Peach and plum concept of high density orcharding.

A. **FRUITS AND VEGETABLES PRESERVATION-**Scope and importance of Hortico Industry in India, General 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.

PRACTICALS **MM:25**

1. Important methods of propagation of fruit plants.
2. Acquintance 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. Preparation of jam, jellies and marmledes, morabba, squash and lime juice cordials.
6. Tomato cause and ketchup.
7. Preparation of pickles.
8. Dehydration of some vegetables and fruits, Maintenance of practical records
9. Caning of different fruits and vegetables.
10. Preparation of jam, jellies and marmides.
11. Preparation of Aonlas and Apple morabba.
12. Preparation of lime, lemon and orange squash and lime juice cordials.
13. Vinegar making.
14. Visit of different scientific Institutes and Laboratory industry

PAPER-VI: BENEFICIAL INSECTS AND THEIR MANAGEMENT MM:75
(DEPARTMENT OF AGRICULTURAL ENTOMOLOGY)

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methodsof rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, beeforaging and communication.Insect pests and diseases of honey bee. Role of pollinators in crosspollinated plants.Types of silkworm, voltinism and biology of silkworm.Mulberry cultivation, mulberryvarieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvestingof cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkwormand methods of disinfection.Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac,shellac, lac- products. Insect orders bearing predators and parasitoids used in pest control and their massmultiplication techniques. Fish and Fisheries resources of India, commercial important fishes and their production.

PRACTICAL **MM:25**

1. Honey bee species, castes of bees.
2. Beekeeping appliances and seasonal management, bee enemies and disease.
3. Types of silkworm, voltinism and biology of silkworm.
4. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification.
5. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.
6. Field visit to fresh water fish farm to study fish production technology

PAPER:VII: POULTRY SCIENCE **M.M.75**

(DEPARTMENT OF ANIMAL HUSBANDRAY AND DAIRYING)

Development of poultry industry: Development of poultry industry in India and national poultry improvement plans, Different breeds of chickens for egg and meatproduction, 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 of hatching eggs:** Selection handling and care of hatching eggs, natural and artificial incubation, types of incubators, embryo mortality 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. **Housing,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 parasites of Poultry.

PRACTICALS **M.M.25**

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 of 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-VIII: RAINFED AGRICULTURE, WATERSHED MANAGEMENT AND AGROFORESTRY MM:75

(DEPARTMENT OF SOIL CONSERVATION)

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershedin India; Problems and prospects of rainfed agriculture in India ; Soil and climatic conditionsprevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of waterdeficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation todrought; Water harvesting: importance, its techniques, Efficient utilization of water through soiland crop management practices,Management of crops in rainfed areas, Contingent crop planningfor aberrant weather conditions, Concept, objective, principles and components of watershedmanagement, factors affecting watershed management.

Watershed management- conceptsand components.Water harvesting and recycling. Wastelands – types and management andalternate land use systems. Dryland practices and watershed management

AGROFORESTRY -Importance and scope of agroforestry; Crop growing under trees; Arboriculture in relation to climate and soil Trees for timbers, fuel, wind breaks and shelter belts. Agroforestry –definitions, importance, criteria of selection of trees inagroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya,alley cropping, wind breaks and shelter belts, home gardens. Silviculture

PRACTICAL MM:25

Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areasin the country and demarcation of rainfed area on map of India.Interpretation of meteorologicaldata and scheduling of supplemental irrigation on the basis of evapo-transpiration demand ofcrops.Critical analysis of rainfall and possible drought period in the country, effective rainfall andits calculation. Studies on cultural practices for mitigating moisture stress. Characterization anddelineation of model watershed.Field demonstration on soil & moisture conservation measures.Field demonstration on construction of water harvesting structures. Visit to rainfed researchstation/watershed**.**Identification of tree-species.botanical characteristics of species and varieties of different forestry plantsDiameter measurements using calipers and tape, diameter measurements of forked, buttressed, fluted and leaning trees. Height measurement of standing trees by shadow method, single pole method and hypsometer.Visit to the Organizations/Institutions working in the forestry plants.

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

PAPER-IX:**Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA) MM:100**

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)

IIIrd year

No. Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)No. of weeks

1. General orientation &On campus training by different faculties
2. Village attachment
3. Unit attachment in Univ./ College. KVK/ Research Station Attachment
   Plant clinic
4. Agro-Industrial Attachment
5. Project Report Preparation, Presentation and Evaluation
   Total weeks for RAWE & AIA 50

1. **Agro- Industrial Attachment:** The students would be attached with the agro-industries for aperiod of 3 weeks to get an experience of the industrial environment and working**.**
2. Educational tour will be conducted in break between IInd year and IIIrd year

RAWE Component-I
Village Attachment Training Programme

Sl. No. Activity Duration

1. Orientation and Survey of Village 1 week
2. Agronomical Interventions 1 week
3. Plant Protection Interventions 1 week
4. Soil Improvement Interventions (Soil sampling and testing)1 week
5. Fruit and Vegetable production interventions 1 week
6. Food Processing and Storage interventions 1 week
7. Animal Production Interventions 1 week
8. Extension and Transfer of Technology activities 1 week

RAWE Component –II

Agro Industrial Attachment

1. Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks.
2. Industries include Seed/Sapling production, Pesticides-insecticides, Post harvest-processingvalueaddition, Agri-finance institutions, etc.

Activities and Tasks during Agro-Industrial Attachment Programme

1. Acquaintance with industry and staff
2. Study of structure, functioning, objective and mandates of the industry
3. Study of various processing units and hands-on trainings under supervision of industry staff
4. Ethics of industry
5. Employment generated by the industry
6. Contribution of the industry promoting environment
7. Learning business network including outlets of the industry

8. Skill development in all crucial tasks of the industry
9. Documentation of the activities and task performed by the students
10. Performance evaluation, appraisal and ranking of students

Modules for Skill Development and Entrepreneurship: A student has to register 100 marks opting for two modules of (0+50) marks each (total 100 marks) from the package of modules in the**IV^{rth} year.**

Sl. No. Title of the module Credits

1. Production Technology for Bioagents and Biofertilizer
2. Seed Production and Technology
3. Mushroom Cultivation Technology
4. Soil, Plant, Water and Seed Testing
5. Commercial Beekeeping
6. Poultry Production Technology
7. Commercial Horticulture

8 Floriculture and Landscaping

9. Food Processing
10. Agriculture Waste Management
11. Organic Production Technology
12. Commercial Sericulture

NOTE: In addition to above ELP modules other important modules may be given to thestudents

Evaluation of Experiential Learning Programme/ HOT

S.No. Parameters	**Max. Marks**
1. Project Planning and Writing	10
2. Presentation	10
3. Regularity	10
4. Monthly Assessment	10
5. Output delivery	10
6. Technical Skill Development	10
7. Entrepreneurship Skills	10
8. Business networking skills	10
9. Report Writing Skills	10
10. Final Presentation	10
Total 100 marks	