

M.Sc. Agronomy**COURSE DETAILS:**

CODE	COURSE TITLE	CREDITS
(A) MAJOR COURSES		30
AGRON-501	MODERN CONCEPTS IN CROP PRODUCTION	3 (2+1)
AGRON 502	AGRONOMY OF MAJOR FIELD CROPS (KHARIF)	3 (2+1)
AGRON 503	TILLAGE IN CROP PRODUCTION	3 (2+1)
AGRON 504	FODDER AND FORAGE CROPS	3 (2+1)
AGRON 505	ORGANIC FARMING	3 (2+1)
AGRON 506	DRYLAND FARMING	3 (2+1)
AGRON 507	AGRONOMY OF MAJOR FIELD CROPS (RABI)	3 (2+1)
AGRON 508	PRINCIPLES AND PRACTICES OF WEED MANAGEMENT	3 (2+1)
AGRON 509	PRINCIPLES AND PRACTICES OF WATER MANAGEMENT	3 (2+1)
AGRON 510	SEMINAR	3 (0+3)
(B) SUPPORTING COURSES		12
AG. GPB. 502	SEED PRODUCTION TECHIQUES IN FIELD CROPS	3 (2+1)
AG. SS. 501	SOIL FERTILITY MANAGEMENT AND FERTILIZER USE	3 (2+1)
ENT 511	PESTS OF FIELD CROPS	3 (2+1)
AG.STAT & CA 501	STATISTICS AND COMPUTER APPLICATION	3 (2+1)
(C)Project Work		
AGRON 511	PROJECT WORK (Viva-Voce and Evaluation)	6 (3+3)

Agronomy

SEMESTER WISE DISTRIBUTION

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I- SEMESTER		12
AGRON 501	MODERN CONCEPTS IN CROP PRODUCTION	3 (2+1)
AGRON 502	AGRONOMY OF MAJOR FIELD CROPS (KHARIF)	3 (2+1)
AGRON 503	TILLAGE IN CROP PRODUCTION	3 (2+1)
AG. SS. 501	SOIL FERTILITY MANAGEMENT AND FERTILIZER USE	3 (2+1)
II- SEMESTER		12
AGRON 507	AGRONOMY OF MAJOR FIELD CROPS (RABI)	3 (2+1)
AGRON 505	ORGANIC FARMING	3 (2+1)
ENT 511	PESTS OF FIELD CROPS	3 (2+1)
AG.STAT& CA 501	STATISTICS AND COMPUTER APPLICATION	3 (2+1)
III- SEMESTER		12
AGRON 510	SEMINAR	3 (0+3)
AGRON 508	PRINCIPLES AND PRACTICES OF WEED MANAGEMENT	3 (2+1)
AGRON 506	DRYLAND FARMING	3 (2+1)
AG. GPB. 502	SEED PRODUCTION TECHNIQUES IN FIELD CROPS	3 (2+1)
IV- SEMESTER		12
AGRON 504	FODDER AND FORAGE CROPS	3 (2+1)
AGRON 509	PRINCIPLES AND PRACTICES OF WATER MANAGEMENT	3 (2+1)
AGRON 511	PROJECT WORK (Viva-Voce and Evaluation)	6 (3+3)

AGRON 501: MODERN CONCEPTS IN CROP PRODUCTION 3 (2+1)

THEORY

UNIT I : Crop growth in relation to environment, agro ecological zones of India; concept potential. Yield and its realization

UNIT II: Modern concepts in tillage; zero or minimum, conservation tillage etc; optimization of plant Population and planting geometry in relation to soil fertility, solar radiation and available moisture regimes.

UNIT III: Mitscherlich, Baule and Inverse-yield-nitrogen laws, biotic and abiotic stresses; concept of ideal plant type; crop modeling for maximizing crop yield; crop response production functions

UNIT IV: Cropping and farming systems for sustainable agriculture; organic farming crop, residue recycling and management; Crop production under protective agriculture, precision agriculture; crop and growth analysis.

PRACTICAL:

Cropping Scheme of the form for sustainable crop production, Calculation of fertilizer doses and other organic manures, Vermicompost, green manuring its preparation, mulches and their effect on the soil, Calculation of cost involved in different tillage practices on crop production, Determination of soil moisture content.

AGRON 502: AGRONOMY OF MAJOR FIELD CROPS (KHARIF)

3(2+1)

THEORY

Origin, history, distribution, classification, Climate, varieties improvement and production technology including manuring and irrigation, plant protection, harvesting, and processing of the following crops-

Unit-I : Cereals And Millets Crops: Rice, Maize, Sorghum, Pearl-millet, Smaller-millet.

Unit II: Pulses Crops and Oil Seeds: Pigeonpea, Mung bean, Urd bean, Cowpea, Soya bean, Groundnut, Sunflower, and Sesame.

Unit III: Fiber Crops: Cotton, Jute, and Mesta..

Unit IV: Cash Crops: Sugarcane, and Tobacco.

PRACTICAL:

Identification of crops-seeds, plants, manure & fertilizers, weedicides & fungicides and associated weeds, Practical knowledge of operations from sowing to harvesting of different crops included in theory course, Judging of maturity and estimation of yields, Study of crop production techniques of different crops, Calculation of Seed and fertilizer requirement of crops, Preparation of seed beds of important crops.

AGRON 503: TILLAGE IN CROP PRODUCTION

3(2+1)

THEORY

Unit I: Soil properties in relation to crop growth. Agronomic practices affecting soil properties, principles of different tillage practices.

Unit II: Soil tilth, tillage requirement of crops under different type of soils, concept of minimum tillage, puddling, soil sickness, soil toxicity and soil compaction and their control measures.

Unit III: Role of different types of tillage implements, tillage in relation to weed control, decomposition of organic matter.

Unit IV: Soil and moisture conservation.

PRACTICAL

Use of different type of tillage implements, Measurement of bulk density, Measurement of infiltration rate, Measurement of porosity, Measurement of root distribution pattern.

AGRON 504: FODDER AND FORAGE CROPS

3(2+1)

THEORY

Unit I: Adaptation, distribution, varietal improvement, Agro techniques and quality aspects including anti-quality factors of important fodder crops like maize, bajra, guar, cowpea, oats, barley, berseem, senjit, lucern and clovers; year round fodder production and management.

UnitII: Preservation and utilization of forage and pasture crops; principles and methods of hay and silage making; chemical and biochemical changes, nutrient losses and factors affecting quality of hay and silage; use of physical and chemical enrichments and biological methods for improving nutrition value of poor quality fodder.

Unit III: Economics of forage cultivation. Grasslands of India and their importance, principles of grassland ecology, economic aspect of grasslands, their problems and management; improvement of grasslands; pasture grasses and legumes for improving soil fertility.

Unit IV: Importance, classification and advantage of pastures; establishment of pastures, their improvement and renovation; ley farming. Agro technology for pasture grasses and forage legumes for different agro-ecological situations.

PRACTICAL

Exercises on farm operations in raising fodder crops; exercises on canopy measurement, yield and quality estimation, viz. crude protein, NDF, ADF, lignin, silica cellulose etc. of various fodder and forage crops and ant quality components like HCN in sorghum and such factors in other crops; hay and silage making and economics of their preparation.

AGRON 505: ORGANIC FARMING

THEORY

3 (2+1)

Unit I: Organic farming concept and definition, its relevance to India and global agriculture and future prospects; Land and Water Management, land use, minimum tillage, shelter zones, hedges, pasture management, agro-forestry.

Unit II: Water use efficiency; soil fertility-nutrient, recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermin-compost, green manures, bio-fertilizers.

Unit III: Farming systems crop rotations multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity, control of weeds, diseases and insect pests.

Unit IV: Integrated pest management biological agents and pheromones, bio-pesticides.

PRACTICAL

Aerobic and anaerobic methods of making compost, making of vermin compost; Identification and nursery raising of important agro-forestry trees and trees for shelter belts, Efficient use of bio-fertilizers technique of treating legume seeds with Rhizobium cultures, use of Azotobacter, Azospirillum and PSB cultures in field; Visit to a organic farm; Quality standard,

AGRON 506: DRYLAND FARMING

3(2+1)

THEORY

Unit-I: Definition, concept, characteristics of dryland and rainfed farming. Significance and dimension of dryland farming in Indian agriculture. Constraints limiting crop production in dryland areas. Characterization of environment for water availability. Types of droughts; adaptation of crop plants to droughts; drought management strategies.

Unit II: Preparation of appropriate crop plans for dryland areas. Mid-Season corrections for aberrant weather conditions. Water-harvesting concepts, techniques and practices.

Unit III: Use of mulches, kinds, effectiveness and economics. Concept of watershed management and its application in India.

Unit IV: Types of antitranspirants, use, effectiveness and economics. Soil and crop management techniques, tillage, seeding, fertilizer use, crop and varietal choice.

PRACTICAL

Rainfall probability analysis for crop planning, Measurement of soil and water losses; in situ soil moisture conservation practices; mulches, including live mulches for minimizing evaporation losses, Measures to manage prolonged drought during crop season; dry-seeding practices due to delayed monsoon rains, Visit to a dryland research centre, Study of ongoing watershed management programmes and agroforestry systems.

AGRON 507: AGRONOMY OF MAJOR FIELD CROPS (RABI)

3(2+1)

THEORY

Origin, history, distribution, classification, Climate, varietal improvement and production technology including manuring and irrigation, plant protection, harvesting, and processing of the following crops-

Unit-I : Cereals Crop: Wheat, and Barley.

Unit II: Pulses Crops: Chickpea, Peas, Lentil, Rajmash

Unit III: Oil Seeds Crops: Rapeseed and Mustard, Linseed, Sunflower, Taramira

Unit IV: Cash Crops: Potato, and Mentha.

PRACTICAL:

Identification of crops-seeds plants and associated weeds, Practical knowledge of operations from sowing to harvesting of different crops included in Theory course, Judging of maturity and estimation of yields, Study of crop production techniques of different crops, Calculation of Seed and fertilizer requirement of crops, Preparation of seed beds of important crops.

AGRON 508: PRINCIPLES AND PRACTICES OF WEED MANAGEMENT

3(2+1)

THEORY

Unit I: Classification and characteristics of weeds; special weed problems including aquatic and parasitic weeds, ecology and physiology of major weeds; eco-physiology of crop weed.

Unit II : Crop weed competition including allelopathy; weed indices; principles and methods of weed control, concept of integrated weed management.

Unit III: weed control through bio-herbicides, mycoherbicides and allelochemicals; herbicides history, development and their classification; mode and mechanism of action of herbicides; herbicide selectivity, herbicide mixtures, adjuvant and softeners; degradation of herbicides in soil and plants.

Unit IV: Effect of herbicide in relation to environment; herbicide resistance in weeds and crops; weed management in major crops and cropping systems; weed shifts in cropping systems; control of weeds in non cropped situations.

PRACTICAL

Identification of important weeds of different crops; preparation of a weed herbarium; weed survey in crops and cropping systems; crop-weed competition studies, preparation of spray solutions of herbicides for high and low-volume sprayers; use of various types of spray pumps and nozzles and calculation of swath width; economics of weed control; herbicide resistance analysis in plant and soil; Bioassay of herbicide resistance.

AGRON 509: PRINCIPLES AND PRACTICES OF WATER MANAGEMENT 3(2+1)

THEORY

Unit I: Water and its role in plants; water resources of India; major irrigation projects and extent of area and crops irrigated in India and different states; soil water movement and water availability, uptake, transport and transpiration in plants.

Unit II: Soil-water-plant relationship; plant response to water stress; scheduling, depth and methods of irrigation; micro irrigation system; fertigation; management of water in controlled environments and polyhouses.

Unit III: Water use efficiency; water management of crops and cropping systems; soil, plant and meteorological factors determining water needs of crops; crop plant adaptation to moisture stress condition; quality of irrigation water; effect of saline water and soil salinity on plant-water relation and management of crops; excess soil water and plant growth; water management in problem soils.

Unit IV: Drainage requirements of crops and methods of field drainage management.

PRACTICAL

Measurement of soil moisture using tensiometer, pressure plate and membrane; making of soil moisture characteristics curves; water flow measurement using different devices, determining soil profile moisture deficit and irrigation requirements; computation of water requirement of crops using modified Penman formula; measurement of water flux under saturated and unsaturated conditions; determination of infiltration rates and hydraulic conductivity.

AG. SS. 501 SOIL FERTILITY MANAGEMENT AND FERTILIZER USE 3(2+1)

THEORY

Unit I: Soil fertility and productivity; soil composition in relation to crop production organic and inorganic constituents; essential plant nutrients; deficiency and toxicity symptoms of major and micronutrients and remedial measures; transformation and dynamics of major plant nutrients.

Unit II: Kinds of fertilizers straight, complex and bulk blended; methods of fertilizer application; crop response to nutrients; fertilizer use efficiency, agronomic chemical and physiological.

Unit III: Methods of increasing fertilizer use efficiency; nutrient interactions; fertilizer application in cropping systems-direct, residual and cumulative effects; integrated plant nutrient supply, systems-organic manures, compost, green manures, vermin-compost, biofertilizers.

Unit IV: Crop residue and inorganic fertilizers; sustainable agriculture and soil fertility; fertilizers and environment; fertilizer use in problem soils; soil moisture nutrients interactions.

PRACTICAL

Determination of soil pH, Determination of organic C, Determination of total N, available N, P, K & S in soils, Determination of total N, P, K & S in plants, Interpretation of interaction effect, Computation of economic and yield optima.

ENT. 511

PESTS OF FIELD CROPS

3(2+1)

To familiarize the students about nature of damage and seasonal incidence of insect pests that cause loss to major field crops and their effective management by different methods. Systematic position, identification, distribution, host-range, bionomics, nature and extent of damage, seasonal abundance and management of insect and mite pests and vectors.

UNIT I: Insect pests of cereals and millets and their management. Polyphagous pests: grasshoppers, locusts, termites, white grubs, hairy caterpillars, and non-insect pests (mites, birds, rodents, snails, slugs etc.).

UNIT II: Insect pests of pulses, tobacco and their management.

UNIT II: Insect pests of oilseeds and their management.

UNIT III: Insect pests of fibre crops, forages, sugarcane and their management.

Practical: Field visits, collection and identification of important pests and their natural enemies; detection and estimation of infestation and losses in different crops; study of life history of important insect pests.

THEORY

Unit I: Seed production techniques and agronomical practices for important crops-cereals, pulses, oilseeds, fibre crops and fodder crops.

Unit II: Seed industry in the country and role of various agencies seed morphology seed multiplication chain, seed purity seed health.

Unit III: Dormancy, seed vigour; Hybrid seed production, seed treatments, seed viability, seed quality; physiology of seed germination.

Unit IV: Seed testing for germination and seedling evaluation; seed certification, processing, grading and storage; distribution and marketing, store grain pests.

PRACTICAL

Seed quality on the basis of purity and germination; rouging; detasseling and familiarization with seed processing equipments; materials and precautions for seed storage; comparison of farmers saved seed with certified seed.

AG.STAT AND CA 501: STATISTICS AND COMPUTER APPLICATION 3(2+1)

Unit I: Agriculture statistics: Area, Production and Yield statistics; Agency and method of Collection of Area and yield statistics in U.P.; Crop Cutting experiment; Agriculture and Livestock Censuses; Sources of Official Agriculture statistics.

Unit II: Planning and designing of experiments, Basic principles of Design of Experiments, uniformity trials, Fairfield Smith's law, Shape and size of plots and blocks. Elements of linear estimation. Variance stabilizing transformations. Analysis of variance and covariance. Completely randomized, Randomized block and Latin square designs. Mutually orthogonal Latin squares

Unit III: Introduction to computer. A brief history of computing. Use, Definition, Anatomy, Components, Classification of Computers, Capabilities and limitation of a computer.

Unit IV: Introduction to MS-Office ó Word, Excel, Power Point, Fundamental of computer network ó LAN, MAN & WAN, Introduction of Internet, Email, surfing & browsing.

PRACTICAL:

Crop cutting methods, CRD, RBD and Latin square designs, Introduction of MS paint, MS Note pad, Introduction of MS Word, Excel, Power Point, Introduction of Internet, Browser, E-mail.

