SYLLABUS FOR UNIVERSITY ENTRANCE TEST

SESSION 2026-27

SUBJECT – M.SC. AGRONOMY

HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR (GARHWAL)
UTTARAKHAND

M.Sc. Agronomy Entrance Exam Syllabus

1. Crop Physiology

• Introduction to crop physiology and its importance in agriculture
• Plant cell: overview
• Diffusion and osmosis
• Absorption of water, transpiration and stomatal physiology
• Mineral nutrition of plants: functions, deficiency symptoms and nutrient uptake mechanisms
• Photosynthesis: light reaction, dark reaction, C3, C4 and CAM plants
• Respiration: glycolysis, TCA cycle and electron transport chain
• Fat metabolism: fatty acid synthesis and breakdown
• Plant growth regulators: physiological roles and agricultural uses
• Growth and development of major crops
• Growth analysis and physiological growth parameters in crop productivity

2. Principles of Agronomy

• Meaning, scope and importance of agronomy
• Crop planning and raising field crops in multiple cropping systems
• Field preparation, seed treatment, nursery raising and sowing methods
• Nutrient management, water management and weed management
• Harvesting, threshing, drying, winnowing, storage and marketing of produce
• Seed production, mechanization, resource conservation and integrated crop management
• Cost of cultivation and net returns

3. Kharif Crops

• Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of major Kharif crops
• Cereals: rice, maize, sorghum, pearl millet and finger millet
• Pulses: pigeonpea, mungbean and urdbean
• Oilseeds: sesame, groundnut and soybean
• Fibre crops: cotton and jute
• Forage crops: sorghum, cowpea, cluster bean and napier

4. Rabi Crops

• Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of major Rabi crops
• Cereals: wheat, barley and oat
• Pulses: chickpea, lentil and pea
• Oilseeds: rapeseed-mustard, linseed and sunflower
• Sugar crop: sugarcane
• Other important crop: potato
• Forage crops: berseem, lucerne and oat

5. Organic Farming

• Principles and scope of organic farming in India
• Government and NGO initiatives for promotion of organic agriculture
• Organic nutrient resources and their fortification
• Restrictions to nutrient use in organic farming
• Choice of crops and varieties under organic farming
• Pest, disease and weed management under organic production system
• Certification process and standards of organic farming

6. Soil and Water Conservation

• Introduction, causes of soil erosion and agents of erosion

• Water erosion: forms, gully classification and control measures
• Soil loss estimation by Universal Soil Loss Equation
• Soil loss measurement techniques
• Principles of erosion control: contouring, strip cropping, contour bund, graded bund and bench terracing
• Grassed waterways and their design
• Water harvesting and its techniques
• Wind erosion: mechanics, types of soil movement and control measures

7. Soil Science and Problem Soils

• Soil quality and soil health
• Distribution of wastelands and problem soils in India
• Reclamation and management of saline, sodic, acid, acid sulphate, eroded, compacted, flooded and polluted soils
• Irrigation water quality and standards
• Utilization of saline water in agriculture
• Remote sensing and GIS in diagnosis and management of problem soils
• Land capability and land suitability classification
• Problematic soils under different agro-ecosystems

8. Agricultural Meteorology

• Meaning and scope of agricultural meteorology
• Earth atmosphere: composition, extent and structure
• Weather variables: atmospheric pressure, wind, solar radiation, temperature, humidity and precipitation
• Condensation: dew, fog, mist, frost and cloud formation
• Monsoon mechanism and its importance in Indian agriculture
• Weather hazards: drought, floods, frost, cyclones, heat wave and cold wave
• Agriculture-weather relationship
• Crop microclimate modification
• Weather forecasting: types and uses
• Climate change, climatic variability, global warming and impact on agriculture

9. Rainfed and Dryland Agriculture

• Introduction, types, history and importance of rainfed agriculture in India
• Soil and climatic conditions in rainfed regions
• Drought: types and effects of water deficit on plants
• Crop adaptation mechanisms under moisture stress
• Efficient water use through soil and crop management
• Crop management in rainfed areas
• Contingent crop planning for aberrant weather conditions
• Precision agriculture: concepts, techniques, issues and concerns

10. Weed, Insect-Pest and Disease Management

• Integrated nutrient, insect-pest and disease management technologies
• Fundamentals of insect, pest, disease and weed management in field crops
• Categories of pests and principles of IPM
• Survey, surveillance and forecasting of insect pests and diseases
• Classification and safe use of insecticides and fungicides
• Economic threshold level and economic injury level
• Biological, cultural, mechanical, physical, legislative and chemical control methods
• Safety issues and legal implications of pesticide use

11. Seed Science and Technology

• Seed and seed production technology: definition and importance

• Causes of varietal deterioration and maintenance of genetic purity
• Seed quality and characteristics of good seed
• Classes of seed
• Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables
• Seed certification: procedure and field inspection
• Seed Act, Seed Control Order 1983, duties of seed inspector, offences and penalties
• Seed drying, processing, testing, treatment, packing and storage
• Pest and disease management during storage
• Seed marketing in public and private sectors

12. Plant Breeding and Genetics for Agronomy

• Historical development, concept and role of plant breeding
• Modes of reproduction, apomixis, self-incompatibility and male sterility
• Centres of origin and genetic diversity
• Heritability and genetic advance
• Breeding methods in self-pollinated, cross-pollinated and asexually propagated crops
• Heterosis and inbreeding depression
• Development of hybrids, composites and synthetic varieties
• Mutation breeding, polyploidy and wide hybridization
• Breeding for biotic and abiotic stress resistance
• DNA markers and marker-assisted selection

13. Soil Microbiology and Biofertilizers

• Prokaryotic and eukaryotic microbes
• Bacteria: structure, growth and genetics
• Role of microbes in soil fertility and crop production
• Carbon, nitrogen, phosphorus and sulphur cycles
• Biological nitrogen fixation: symbiotic, associative and asymbiotic
• Azolla, blue-green algae and mycorrhiza
• Rhizosphere and phyllosphere
• Biofertilizers, biopesticides, biofuel production and biodegradation
• Decomposition of organic matter and compost/vermicompost preparation
• Beneficial and harmful effects of soil organisms

14. Agricultural Economics and Extension Basics

• Meaning, scope and subject matter of economics
• Micro and macro economics
• Basic concepts: demand, supply, utility, cost, price, income and welfare
• Agricultural economics: meaning, characteristics and role in economic development
• Agricultural planning and development
• National income, money, inflation, taxation and economic systems
• Extension education: meaning, scope, objectives and principles
• Extension programme planning and rural development programmes
• Transfer of technology and ICT applications in agriculture

15. Agricultural Engineering and Farm Power

• Sources of farm power in India
• I.C. engines: principles, types and systems
• Tractors: transmission system, hydraulic control and cost analysis
• Tillage implements and intercultural equipment
• Sowing, planting, plant protection, harvesting and threshing equipment

• Calibration of seed drill
• Biomass, biogas, biodiesel, solar and wind energy applications in agriculture

16. Current Trends in Agronomy

• Resource conservation technologies
• Integrated farming and sustainable agriculture
• Precision agriculture and decision support systems
• ICT and e-agriculture applications
• Geospatial technology in crop planning and nutrient/water management
• Climate-resilient agriculture