

MANGALAYATAN UNIVERSITY, JABALPUR
Faculty of Agriculture

Syllabus for Ph.D. Entrance examination

Unit: 1. Importance of Agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato, potato and mango. Major soils of India, role of NPK and their deficiency symptoms

Unit: 2. Food and industry; composting and biogas production. Important rural development programmes in India; organizational set up of agricultural research, education and extension in India.

Unit 3: Weed management: Principles of weed management, Classification, biology and ecology of weeds, crop weed competition and allelopathy, concepts and methods of weed control, Integrated weed management Classification, formulations, selectivity and resistance of herbicides, Herbicide persistence in soil and plants, Application methods and equipments, Weed flora shifts in cropping systems, Special and problematic weeds and their management in cropped and non-cropped situations, Weed management in field crops.

Unit 4: Problem soils: Problem soils and their distribution in India, Characteristics and reclamation of these soils, Crop production techniques in problem soils.

Unit 5: Sustainable land use systems: Sustainable agriculture: parameters and indicators, Conservation agriculture, safe disposal of agri-industrial waste for crop production Agro-forestry systems, shifting cultivation, Alternate land use systems, Wastelands and their remediation for crop production.

Unit 6: Importance of Agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato and mango. Major soils of India, role of NPK and their deficiency symptoms. Structure and function of cell organelles; mitosis and meiosis; Mendelian genetics; elementary knowledge of photosynthesis; respiration, and transpiration; structure and functions of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Major pests and Major pests and diseases of rice, wheat, cotton, chickpea, sugarcane and their management. Important rural development programmes in India; organizational set up of agricultural research, education and extension in India.

Unit 7: Soil mechanics, soil classification, compaction & shear strength of soils, engineering mechanics, strength of materials.

Unit 8: Physical properties of soils—texture, structure, density and consistency, infiltration, field capacity, permanent wilting point, available water hydraulic conductivity, soil water flow including Darcy's law, mechanical analysis chemical properties of pH, EC, atoms, molecules, colloids, clay mineral, major and trace elements, salinity and sodicity, cation exchange capacity, evaporation, evapotranspiration, water requirements of crop, plant growth process, soil and water conservation practices and tillage.

Unit 9: Farm equipments and Farm Machinery in India sources of energy and power on farms. Irrigation drainage systems. Basics of post-harvest technology Basics of energy in Agriculture.