

**AGRICULTURAL ENGINEERING & FARM MACHINERY**

**(Subject Code-94)**

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- Unit-1:** Status of farm mechanization in India. Power availability on farm, animal and power operated equipments for tillage, land development, sowing, planting, fertilizer application, plant protection, harvesting and threshing. Selection of machinery elements, gears, pulleys, chains, sprockets, belts, bearing, coupling, springs. Force analysis of agricultural tools and implements, pull, drafts, power calculation of animal and power operated implements.
- Unit-2:** Farm structures, house glass, house protective house principles and design of shade, green house, net house.
- Unit-3:** Calibration of seed drills, planters, plant protectors equipments, testing and evaluation of tillage equipments seed drills, planters, fertilizers applications, sprayers dusters, harvesting, threshing machines, combine, sugarcane and potato planters, calculation of field capacity, efficiency and losses in threshers, harvesters cost analysis of animals and power operated implements and tractor, various systems of spark and compression ignition engines. Design of engine components, calculation of horse power, speed, firing arrangement, heat load power transmission from piston and fly wheel.
- Unit-4:** Farm tractors and types, design, mechanical and power steering, tractor chassis mechanics, power filters, hitching systems and hydraulic control, for tractors, automatic position control, draft control system used in tractors, types of dynamometers, tractor testing.
- Unit-5:** Anthropometry in equipment design, ergonomics in design of farm tools, safety aspects of agricultural machinery, effect of noise and vibration on work performance, chemical hazards and control measures. Design parameters and performance of tillage tools, solar radiations and its measurement, heat and mass transfer in solar energy and solar systems materials, collection methods and solar energy storage and application of solar energy.
- Unit-6:** Generation and application of wind energy, wind velocity measurement, wind power production, wind current, wind power equipment, wind power measurement and recording, wind velocity equipments, types of wind rolls.
- Unit-7:** Bioconversion of biomass, production and conversion of alcohols, organic acids, solvents, amino acids, bio-fuel, bio-photosynthesis, biogas technology, thermochemical conversion of biomass, hydrolysis, hydro-generation, carbonisation, polarization and densification of biomass methods of extraction of natural bio-fuel, bio-diesel purification and esterifications. Energy sources in agriculture, conventional and renewable energy equipments, energy requirement in different agro-based industries and green house production systems, energy ratio and specific energy value, inflow and outflow of energy in agriculture operation, planning and design of energy system, modeling and project planning.
- Unit-8:** Sources of irrigation water, methods of irrigation, and micro systems of irrigation devices, irrigation schedules, moisture regism physiological stages of crops and metrological parameters, water use efficiency, weather forecasting equipments, evapo-transportation and consumptive use, measurement of irrigation water, drainage system and methods of drainage, irrigation pumps classification, design and control systems.
- Unit-9:** Post harvest engineering and technology in production of agricultural products, moisture determination, drying and dehydrations methods, cleaning, grading, seed treatment, leveling, storage, milling machineries of cereals, pulses, oilseeds.

