

Agricultural Engineering

1. Basic Agriculture

- 1.1 Weather and climate in crop and livestock production system.
- 1.2 Factors of crop and livestock production
- 1.3 Production and management practices of crops and livestock.
- 1.4 Soil physical, chemical and biological properties.
- 1.5 Choices of crops, cropping system and farming system.
- 1.6 Nepalese rural society, problems and prospects.
- 1.7 Agricultural policy and development strategy in Nepal.
- 1.8 Agricultural enterprise and entrepreneurship development
- 1.9 Agricultural and rural development interface

2. Basic Engineering

- 2.1 Work, power and energy
- 2.2 Measurement of area and volume
- 2.3 Engineering materials, their properties and selection
- 2.4 Basic mechanics- statics and kinematics
- 2.5 Internal combustion engines and engine systems
- 2.6 Analysis of forces and their analysis on buildings and other physical infrastructures
- 2.7 Planning and design of physical infrastructures relevant to agriculture and rural development
- 2.8 Fundamentals of machine elements and design
- 2.9 Electrical circuits and electromagnetic devices
- 2.10 Electronics in agriculture

3. Rural Energy System and Use

- 3.1 Energy demand and supply status in Nepal
- 3.2 Energy-agriculture-rural development interface
- 3.3 Renewable and non-renewable sources of energy for agricultural and rural applications
- 3.4 Biomass and biomass energy conversion processes and devices
- 3.5 Solar energy applications and energy conversion devices
- 3.6 Wind energy harnessing and use in agriculture
- 3.7 Micro-hydropower systems

4. Farm Power and Machinery

- 4.1 Objectives and options of farm mechanization
- 4.2 Agricultural mechanization policy and strategy of Government of Nepal
- 4.3 Farm tractors- types, selection and management
- 4.4 Newer innovations on tillage practices and implements
- 4.5 Tillage implements, their selection and management
- 4.6 Seeding and planting equipments, their selection and management
- 4.7 Implements for weed control and soil cultivation
- 4.8 Harvesting and threshing machines, their selection and management
- 4.9 Machines and equipments for cleaning, grading, sorting, material handling and transportation
- 4.10 Cost of operation of farm machines and equipments

5. Land Development and Management

- 5.1 Land grading and farm layout
- 5.2 Land capability assessment and land use planning
- 5.3 Objectives and approaches of land consolidation
- 5.4 Land reclamation

6. Soil and Water Engineering

- 6.1 Climate-soil-water-plant relationship
- 6.2 Importance, coverage and performance of irrigation in Nepal
- 6.3 Structures for water abstraction, conveyance, distribution, measurement and control in and irrigation system
- 6.4 Design of open channels and underground pipelines
- 6.5 Design of farm irrigation system
- 6.6 Choice of methods of irrigation and irrigation schedules for crops
- 6.7 Groundwater formations and groundwater potential
- 6.8 Devices for groundwater pumping, their performance and their selection
- 6.9 Processes of erosion and land degradation
- 6.10 Assessment and estimation of soil erosion and land degradation
- 6.11 On-site and off-site consequences of soil erosion
- 6.12 Structural, mechanical and cultural measures for soil and water conservation.
- 6.13 Watershed management
- 6.14 Water harvesting system
- 6.15 Farm ponds and reservoirs
- 6.16 Bioengineering systems and options for soil and water conservation

7. Post-Harvest Engineering

- 7.1 Unit operations in processing of agricultural commodities
- 7.2 Drying and dehydration of agricultural produces
- 7.3 Grain milling, hulling and expelling
- 7.4 Storage of agricultural produce
- 7.5 Modified environment storage for grains
- 7.6 Grain pressure theory and design of grain bins
- 7.7 Refrigeration and cold storage
- 7.8 Seed processing
- 7.9 Dairy processing equipments- pasteurization and sterilization
- 7.10 Importance of value chain development in agriculture
- 7.11 Quality assurance of processed agricultural produce
- 7.12 Management of food processing industries

8. Farm and Rural Infrastructures

- 8.1 Rural and farm roads
- 8.2 Planning and design considerations for rural roads
- 8.3 Farmstead planning
- 8.4 Animal shelter- for dairy animals, swine, sheep and goat
- 8.5 Rural water supply system
- 8.6 Collection centers for agricultural commodities and rural market