



Department of Land, Water and Environment

0604101 Principles of Soil

Importance and development of soil science. Components of soil. Soil forming factors. Physical properties. Soil water. Soil mineralogy. Chemical, and biological characteristics of soil. Soil organic matter. Plant-soil macro and micro nutrients relation.

0604102 Soil Laboratory

The laboratory part includes demonstrating different kinds of rocks and minerals and identification some of their physical properties in addition, the lab includes some physical properties of soils such as texture ,density and calculation of soil porosity in addition to some soil chemical properties such as soil pH ,CE, exchangeable reactions and soil organic matter content.

0604103 Irrigation Principle 3 - 3 0301101

Introduction to irrigation and drainage, soil-water-plant relations, soil moisture determination, soil water movement, crop water requirements, irrigation scheduling, irrigation methods (Surface Sprinkler and Trickle irrigation), irrigation efficiencies.

Irrigation (1)

Fluid properties. Hydrostatic pressure forces. Fluid in motion .Forces of fluid in motion. Continuity, energy and momentum equations. Resistance to fluid flow in pipes and open channels.

0604212 Hydrology

Hydrologic cycle. Precipitation, evaporation and transpiration. Ground and surface water. River's hydrograph. Measurement of river's flow. Rainfall and surface runoff relationship.



0604311 Irrigation Systems and Design

Importance of irrigation. Irrigation system elements (water resources and its importance). Selection of the irrigation methods. Surface, sprinkler and trickle irrigation components and principles. Irrigation scheduling. Efficiencies and uniformity of irrigation water. Design criteria for the different irrigation systems. Practical applications.

0604312 Farm Irrigation Management

Percentage area wetted associated with the different irrigation systems. Crop water requirement. Maximization of irrigation water efficiencies and uniformity of irrigation water in the crop root zone. Irrigation amounts, leaching requirements, and timing of application. Soil-water budget and irrigation system management. Irrigation system selection according to the soil type, crop rotation and crop. Media and mesh screen filters. Fertilizer injection and management.

0604313 Drainage Science Principles

Sources, effects and controlling excess water in the soil. Soil drainage theory. Drainage, soil and crops relationship. Drainage systems.

0604410 Water Resources and Management

Water resources and sustainability, relationship between surface water and ground water, uses and management of restricted water quality, water management in arid and semi-arid areas, water harvesting techniques.



0604221 Environmental Soil Chemistry

Soil solution chemistry, chemical and mineralogical nature of solid phase, and chemical reactions that take place at solid-liquid interface. Concepts of complex ion formation and single ion activity in soil solution reactions of ion exchange, precipitation, dissolution and adsorption.

0604222 Environmental Soil Physics

Soil physical properties: Water infiltration into soil. Components of soil water potential: Matric potential, osmotic potential, gravitational potential, and hydraulic potential. Soil water movement under saturated and unsaturated conditions: Darcy's Law and continuity equation, soil water equilibrium with water table. Gaseous diffusion in soil. Heat flow equations in soil. Solar energy budget and aerodynamic effects, on evaporation.

0604223 Soil Fertility and Fertilizers

Soil chemical and physical properties as related to soil fertility. Macro and micro nutrients regarding their reactions in soils, availability, role in plants, additions, uptake by plants. Reaction of fertilizers in soils and methods of their addition to soils.

0604320 Soil Genesis and Classification

Soil and non-soil, chemical and physical weathering Soil forming factors; climate, living organisms, Relief, Parent material, time, Soil forming processes, Soil classification, Soil taxonomy :- Concepts categories. Soils of Jordan, their genesis, classification properties and distribution



0604321 Plant -Soil-Water Relationships

Ecological importance of water. Thermal water properties. Physical laws of solutions: Vapor pressure, solution potential, and latent heat. Plant relations with soil physical properties: Apparent specific gravity, soil compactness, soil water regime, and soil temperature regime. Soil water replenishment of the roots. Mechanism of water absorption ,Factors affecting ET and technology of ET reduction. Direct measurement of ET: Depletion, lysimeter, and pan evaporation Effect of water stress on plant growth and yield.

0604323 Soil Survey and Land use

**Soil classification systems. Design of and .Objectives of surveys, types and scale of surveys
Land evaluation Systems, Land use for Agricultural .execution of surveys, surveys quality control
Purposes, Land use for non- Agricultural Purposes.**

0604324 Soil Microbiology

Development of soil microbiology. Essential elements and compounds required for growth and activity of microbes. Environmental factors that determine growth and activity of microbes in the soil. Carbon and Nitrogen and Phosphor cycles in soils. Decomposition of soil organic matter and its importance to soil fertility.

0604421 Preservation of Soil Environment

**Land ecosystem, Eco-system components. Concept of land preservation.type of land degradation
Erosion by water, Erosion by wind, Desertification. Degradation of soil fertility, mitigation requirements to protect land from various degradation processes. Modern techniques for data collection and evaluation Integrated resource management. Sustainability of land resources .utilization**



0604422 Soil Reclamation

Sources of soluble salts. Salt balance for irrigated areas and irrigated fields. The concept of leaching fraction. Assessment of crop salt tolerance: soil profile salinity, water uptake model and time-weighted salinity. Specific ion toxicity. Sodicity and alkalinity hazards. Reclamation of saline, sodic and/or alkaline soils. Soft wares employed in the studies of saline soils and waters.

Environment and Meteorology

Components and classification of the atmosphere. Atmospheric pressure: nature, local and regional changes. Physics of atmospheric temperature. Frost. Relations between atmospheric temperature and soil temperature. Mechanism of seasonal and regional wind formation. Types of atmospheric moisture: clouds, dew, water vapor, rainfall, snow, and hail. Methods of climatic components measurement.

0604330 Environmental Information Systems

Introduction to systems and technology for information management. Principles of GIS utilized for management of natural resources. Data acquisition and data sources. Principles and application of remote sensing technologies. Field use of Global Positioning Systems (GPS). Data preprocessing and management. Data manipulation and analysis.

0604430 Soils and Environmental Quality

The course includes a brief introduction to the soil characteristics with emphasis on physical, chemical and microbiological properties pertinent to environmental quality. In addition, it includes the interaction of soils with environmental contaminants and the role of soils in pollution control.



0604431 Environmental Monitoring and Control

The main environmental problems at both global and local levels. The basic steps of the environmental monitoring: selection of indicators, ground survey and sampling, data collection analysis and output, concept and analysis. Monitoring of vegetation and endangered species: of index number. The state of environment in Jordan: monitoring of water quality, monitoring of air pollution and other environmental problems. Jordanian Standards and environmental monitoring. The use of remote sensing technology in environmental monitoring.

Training, Research and Seminars 0604491 Seminar in Land, water and Environment

Training of the student on collecting proper information on specific subject on area of specialization from different sources, presentation and discussion.

0604494 Practical Work in Land , Water and Environment

Exposing the students with practical training in Land, water and environment.

0604499 Field Training in Land , Water and Environment

Exposing the students with practical training in Land, water and environment
(* Minimum successful 95 Credit hours.