

Course Name:

Environmental Engineering

Course Number:

20669

Credits:

3

Prerequisite:

Engineering Hydrology; General Chemistry 1; Chemistry Lab 1

Corequisite:

Hydraulic Lab

Course Description (Objectives):

- Introduction to production, transport, and fate of air and water pollutants in environment
- Fundamentals of environmental management and control

Course Content (outline):

- Introduction: An introduction to environmental engineering, major environmental issues, sustainable development, and environmental management.
- Fundamentals of materials balance and contaminant transportation: Material balances, reactor types, reactor analyses, reaction kinetics, transport mechanism, mechanism of water movement and pollutants dispersion, and basics of modeling contaminant transportation.
- Aquatic characteristics: The foundations of characteristics of water, water quality criteria, and physiochemical and biological water properties such as oxygen demand (e.g. BOD and COD).
- Surface and ground water quality: River (point sources, non-point sources, and oxygen model), lake and reservoirs (thermal stratification and eutrophication), groundwater (pollutants and salinity), and pollution control methods and types of contaminants for surface and ground water.
- Water treatment: Physical treatment (settling, filtration) and chemical treatment (coagulation, flocculation, softening, disinfection).
- Wastewater treatment: Physical treatment (sedimentation, sludge thickening), biological treatment including aerobic methods (filtering, biological towers, activated sludge, continuous aeration, aerobic digestion) and anaerobic methods (lagoon and high rate system) and sludge processing (physicochemical and biological).
- Air quality: Stationary and mobile sources of air pollution, particulate and gaseous pollutants, emission (atmospheric stability), control (particle and gaseous pollutants), environmental regulations, ozone depletion, acid rain and global warming.
- Solid waste management: Municipal solid waste management (production, collection and disposal), solid waste reuse and recycle and sanitary landfills.

- Sustainable Development: An introduction to sustainable developments and green building.

References:

- Principles of Environmental Engineering and Science, M. L. Davis and S. J. Masten, 2nd Ed., Mc Graw Hill, New York, 2009.