



**Course Name:**

Environmental Engineering

<b>Course Number:</b> 20-669	<b>Credit:</b> 3
<b>Program:</b> Undergraduate	<b>Course Type:</b> Technical required
<b>Prerequisite:</b> Engineering Hydrology, General Chemistry I	<b>Corequisite:</b> -

**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, 2<sup>nd</sup> Ed., Mc Graw Hill, New York, 2009.