

Course Code	Course Title	Credit Hours
ENS-820	ENVIRONMENTAL CHEMISTRY	3 (3+0)

### Course Description

This course is designed to provide knowledge about different chemical processes occurring in the environment, various physical and chemical methods to minimize pollution and adverse effects of various pollutants on human health and toxicity.

### Course Outline

**Chemistry of atmosphere:** Major layers in atmosphere, temperature changes in the atmosphere, units to describe atmospheric chemistry,

**Chemical reactions in the atmosphere sources and effects of following pollutant on human health:** Carbon dioxide, Nitrogen oxides, Sulfur dioxide, Volatile organic compounds, automobile pollutants, Industrial smog, Photochemical smog, production of hydroxyl radical, their reaction with hydrocarbons,

**Indoor air pollution:** Various indoor air pollutants, particulates, chemistry of ground level air pollution.

**Biogeochemical Cycles:** NO cycle, the chlorine cycle, Production of ozone in the stratosphere catalytic destruction of ozone, Hydroxyl Radical cycle, Null cycles, Effects of ozone depletion on human health and environment, green chemistry, its principles,

**Water pollution:** Types of water pollutants oxidation – Reduction reactions in aqueous systems. Suspended solids and sediments, Dissolved solids.

**Emerging Contaminants:** Toxic organic compounds, pesticides, organochlorine insecticides, carbamates. Accumulation in biological systems. Biomagnification and Biodegradation. Toxic heavy metals and their Bioaccumulation.

### Recommended Books

1. Environmental Chemistry. Ibanez, J.G., Hernandez-Esparaz, M., Doria-Serrano, C., Fregoso-Infante, A. and Singh, M.M., Springer, Germany.2008.

2. Principles of Environmental Chemistry, Girard, IE., 1st Edition. Jones and Barlett, USA, 2005.
3. Environmental Chemistry. Baird Collin and Michael cann. W.H. Freeman and Company, New York USA. 2008.