**CHI 2403: Industrial Processes and Environment**

**Purpose:**

To learn the industrial processes and their impact on environment

**Learning Outcomes:**

At the end of the course, the learner should be able to:

1. Discuss various industrial processes leading to pollution
2. Explain the sources of atmospheric pollutants, and
3. Describe the effects of pollutants in the atmosphere
4. Describe the various process for controlling industrial pollution

**Course Description**

Introduction to forms of industrial pollution; Atmeospheric photochemistry; Sources of atmospheric pollutants; mechanisms of atmospheric chemical processes (emphasis on gaseous reactions); ozone, nitrogen oxides, halogens, hydroxyl radicals, chlorofluorocarbons (CFC’s), Greenhouse effect (global warming), ozone layer depletion - photochemical oxidants. Control of air pollution. Heavy metals: Lead, mercury, cadmium and arsenic pollution and their biochemical effects; Techniques monitoring and controlling air pollutants including GC, GC-Ms, AAS and related techniques, effects of air pollutants on climate and public health, current including global environmental issues including climate change, destruction of ozone layer, acid rain, air quality standards, photochemistry: atmospheric chemical reactions

**Teaching methodology:** Lectures, tutorials, laboratory practicals and group discussions

**Instruction materials/equipment**

 1. Liquid Crystal Displays.

2. White boards/black boards,

3. Flipcharts

**Assessment**

Continuous Assessment Tests 30%

Examination 70%

**Course Textbooks**

* 1. [Hanrahan](http://www.google.co.ke/search?tbo=p&tbm=bks&q=inauthor:%22Grady+Hanrahan%22&source=gbs_metadata_r&cad=7), G. (2012). *Key Concepts in Environmental Chemistry*. Waltham, Massachusetts: [Academic Press](http://www.google.co.ke/search?tbo=p&tbm=bks&q=bibliogroup:%22Academic+Press%22&source=gbs_metadata_r&cad=7).
	2. [Moore](http://www.google.co.ke/search?tbo=p&tbm=bks&q=inauthor:%22John+Moore%22&source=gbs_metadata_r&cad=7), J. (2012). *Environmental Chemistry*. International. NY, USA: Elsevier.
	3. [Newton](http://www.google.co.ke/search?tbo=p&tbm=bks&q=inauthor:%22David+E.+Newton%22&source=gbs_metadata_r&cad=7), D.E. (2009). *Chemistry of the Environment*. NY, USA: Infobase Publishing

**Course Journals**

1. Chemosphere. ISSN: 0045-6535, Elsevier.
2. Journal of Atmospheric Chemistry, ISSN: 0167-7764, 1573-0662, Springer Publications.
3. Bulletin of Environmental Contamination and Toxicology. ISSN: 0007-4861, 1432-0800, Springer publications.

**Reference Textbooks**

1. Jacob, J. D. (2004).*Introduction to Atmospheric Chemistry*, Princeton University Press.
2. [Barbara, J., Finlayson-Pitts](http://www.google.co.ke/search?tbo=p&tbm=bks&q=inauthor:%22Barbara+J.+Finlayson-Pitts%22) and [Pitts](http://www.google.co.ke/search?tbo=p&tbm=bks&q=inauthor:%22James+N.+Pitts%22), J.N. (2007-digital version).*Atmospheric chemistry: fundamentals and experimental techniques*, Wiley.
3. [Hobbs](http://www.google.co.ke/search?tbo=p&tbm=bks&q=inauthor:%22Peter+Victor+Hobbs%22), P.V. (2000).*Introduction to atmospheric chemistry*.Cambridge University Press.

**Reference Journals**

1. Archives of Environmental Contamination and Toxicology. ISSN: 0090-4341 (Print) 1432-0703 (Online). Springer publications
2. Bulletin of Environmental Contamination and Toxicology. ISSN: 0007-4861 (Print) 1432-0800 (Online), Springer publications.
3. Environmental Chemistry. ISSN 1448-2517 [CSIRO Publishing](http://www.publish.csiro.au/home.htm), [Australia](http://en.wikipedia.org/wiki/Australia).