

Course – Plan

School : School of Sciences
Department : Environmental Science
Course Code : ES 561
Course Title : Environmental Engineering

L2-T0-P1-CR3

Instructor/s: Dr. Manish Kumar
Dr. Amit Prakash

Abstract:

This course exposes students to the prevalent and advanced technologies available for air, and water and noise pollution control. It explores various design aspects as well as sanitation related issues with special reference to water and odor pollution.

Objectives:

To introduce the different technologies for air, water and noise control
To study the benefits and limitations of these technologies
To understand the role of sanitation to water and odor pollution.
To formulate the societal response and policies regarding sanitation

Prerequisites of the course:

Basic knowledge of environmental issues and current environmental problems.

Course Outline:

Water purification processes in natural systems: Impact of wastewater discharge on streams, Oxygen Sag Curve. Introduction to Water Treatment Technologies: Sedimentation, Coagulation and Flocculation, Hardness Reduction, Filtration and Disinfection.

Wastewater Characteristics, Introduction to wastewater treatment technologies. Primary Treatment: Screening, Grit Removal, Secondary Treatment: Microbial growth curve, Wastewater reclamation and reuse in industry.

Categories of water quality index. Determining of water quality, index (WQI):, ambient water quality index, combined water quality index and Delphi method.

Meteorological phenomena and their influence on Air Quality, Air Pollution Control: Introduction to Particulate and Gaseous pollutant control technologies.

Air quality monitoring equipments design principle. Air Quality Models (Box Models, Gaussian Plume Model), extremes values indices, noise vibration control techniques.

Environmental Sanitation: Sanitation and health; industrial sanitation and hygiene, rural sanitation, problems of water supply and sanitation aspects, low cost excreta disposal systems and case studies.

TextBooks:

1. Rao Venugopala., P. Principles of Environmental Science and Engineering, Prentice-Hall of India Private Limited, New Delhi, 2006.

2. Magrab E.B., Env. Noise Control Wiley, New York, 1975
3. Masters G.M., 1991, Introduction to Environmental Engineering and Science, Prentice-Hall International, Inc., Englewood Cliffs, NJ.
4. Sawyer C.N. and McCarty P.L., Chemistry for Environmental Engineering, 3rd Edition, McGraw-Hill Book Company, New York, 1978.

ReferenceBooks:

1. Henry J.G. and Heinke G.W., Environmental Science and
2. Engineering, Prentice-Hall International, Inc., Englewood Cliffs, NJ, 1989.
3. Peavy H.S., Rowe D.R., and Tchobanoglous G., Environmental Engineering, McGraw-Hill Book Company, New York, 1985.
4. Tchobanoglous G., Theisen H. and Vigil S., Integrated Solid Waste Management, McGraw-Hill Inc. Singapore, 1993.
5. Sincero A.P. and Sincero G.A., Env. Engineering: A design Approach PHI, 2012.

Pedagogy:

Lectures, Assignments, Practicals and presentations.

Time Plan

<i>Lecture No.</i>	<i>Topics</i>
1	Introduction and course overview
2-3	Water purification processes in natural systems
4-5	Impact of wastewater discharge on streams,
5-6	Oxygen Sag Curve
7	Introduction to Water Treatment Technologies
8-9	Sedimentation, Coagulation and Flocculation,
10-12	Hardness Reduction, Filtration and Disinfection
UNIT TEST - 1	
13	Wastewater Characteristics
14	Introduction to wastewater treatment technologies.
15-16	Primary Treatment: Screening, Grit Removal,
UNIT TEST - 2	
17-18	Secondary Treatment: Microbial growth curve,
19-21	Wastewater reclamation and reuse in industry.
22-24	Categories of water quality index. Determining of water quality, index (WQI):,
25-27	Ambient water quality index, combined water quality index and Delphi method.
MID TERM TEST	
28	Meteorological phenomena and their influence on Air Quality,
29-32	Air Pollution Control: Introduction to Particulate Matter control technologies.

33-34	Air Pollution Control: Introduction to Gaseous pollutant control technologies.
35-36	Air quality monitoring equipments design principle.
UNIT TEST – 3(ASSIGNMENT TYPE)	
36-38	Air Quality Models (Box Models, Gaussian Plume Model)
39-41	Extremes values indices, Noise vibration control technique
UNIT TEST - 4	
42-43	Environmental Sanitation: Sanitation and health;
44-45	Industrial sanitation and hygiene, rural sanitation,
46-48	problems of water supply and sanitation aspects,
49-51	low cost excreta disposal systems and case studies.
END TERM TEST	

Evaluation Plan (Theory)

Test/ Assignments	Marks	Tentative Date
Unit Test – 1	20	3 rd to 4 th Week
Unit Test – 2	20	6 th week
Mid Term	30	9 th week
Unit Test – 3	20	12 th week
Unit Test – 4	20	14 th Week
End Term	35	17 th to 19 th week
Total (Theory)	155	
Practical	50	
Total	205	

Practicals:

Practical Copy and Assignments: 25 Marks

Practical Exams: 25 Marks

Expected Outcome:

At the successful completion of this course, student will develop the understanding of the inherent principals and methods to address the problems of environmental pollution.