

COURSE CODE: ENE-101
COURSE NAME: Introduction to Environmental Engineering
CREDIT HOURS: Theory = 3 Practical = 0 Total = 3
CONTACT HOURS: Theory = 48 Practical = 0 Total = 48
PREREQUISITE: None
MODE OF TEACHING: Three hours of lecture per week

COURSE DESCRIPTION:

This course is designed to familiarize the students with the basics of Environmental Engineering. It deals with major environmental concerns in four spheres, sources of pollutants, their control and mathematics of growth measurement. The concept of pollutants tracking and impacts of environmental issues will be covered.

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the PLOs:

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|---|----------------------------------|--------------------------|----|---------------------------------|-------------------------------------|
| 1 | Engineering Knowledge: | <input type="checkbox"/> | 7 | Environment and Sustainability: | <input checked="" type="checkbox"/> |
| 2 | Problem Analysis: | <input type="checkbox"/> | 8 | Ethics: | <input type="checkbox"/> |
| 3 | Design/Development of Solutions: | <input type="checkbox"/> | 9 | Individual and Teamwork: | <input type="checkbox"/> |
| 4 | Investigation: | <input type="checkbox"/> | 10 | Communication: | <input type="checkbox"/> |
| 5 | Modern Tool Usage: | <input type="checkbox"/> | 11 | Project Management: | <input type="checkbox"/> |
| 6 | The Engineer and Society: | <input type="checkbox"/> | 12 | Lifelong Learning: | <input type="checkbox"/> |

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

S. No.	CLOs	Domain	Taxonomy Level	PLOs
1	Discuss pollution concerns associated with major environmental matrices.	Cognitive	2	7
2	Explain the principle of pollution remediation techniques used in environmental engineering.	Cognitive	2	7

PRACTICAL APPLICATIONS:

The Industrial revolution during the past century has led to an increase in human health problems and climate change. This course will enable the environmental engineering students to understand the relationship between environment pollutants and human health, current technologies available to deal with environmental problems and the potential role of waste treatment technologies for a cleaner environment in the near future.

TOPICS COVERED WITH THEIR CONTRIBUTION TO PLOs:

Theory:

Week	Topic	Reading Assignment/ Homework	CLO #
1	Causes of Environmental Problems: Nature and scope of environmental problems, Population growth, Urbanization Industrialization, Environmental impact	Chapter 1	1
2	Units of Measurement & Materials Balance: Steady-State Conservative Systems, Batch-Systems with Non-conservative Pollutants, Step Function Response	Chapter 2 Assignment 1	1
3	Mathematics of Growth: Exponential Growth, Continuous Compounding, Doubling Time & Half-Life, Disaggregated Growth Rates, Resource Consumption, Exponential Resource Production Rates, Population Growth, Logistic Growth, Human Population Growth	Chapter 3 Quiz 1 Assignment 2	1
4, 5, 6	Water Pollution and Water Treatment: Water resources, Water usage, Water pollutants, Surface water quality, Rapid mixing, Flocculation, Coagulation, Softening, Filtration Sedimentation, , Disinfection, Other Treatment Processes, Water Plant Residuals Management	Chapter 4 Quiz 2	1,2
7, 8	Wastewater and Sludge Treatment: Domestic wastewater characteristics, On-site Disposal Systems, Wastewater Treatment Systems, Pretreatment, Primary Treatment, Secondary Treatment, Activated Sludge, Trickling Filters, Oxidations ponds, Rotating biological contractors, Disinfection, Advanced wastewater treatment, Land treatment, Sludge thickening, Sludge conditioning, Sludge dewatering, Sludge Disposal	Chapter 5 Quiz 3 Assignment 3	1,2
9, 10, 11	Air Pollution: Fundamentals, Air pollutions standards, Effects of air pollutants, Effects on materials, Effects on vegetation, Effects on health, Origin and fate of air pollutants, Stationary Sources, Gaseous Pollutants, Particulate Pollutants, Mobile Sources	Chapter 6 Quiz 4	1,2
12, 13, 14	Solid Waste management & Disposal by Sanitary Landfill: Solid Waste Characteristics Solid Waste Collection, Waste as Resource, Solid Waste Reduction, Site Selection, Operation, Leachate, Methane and Other Gas Production, Landfill Design	Chapter 7 Quiz 5 Assignment 4	1,2
15, 16,17	Hazardous Waste Management: Hazardous Waste Designation System, Generator Requirements, Treatment, Storage and Disposal Requirements, Waste Minimization, Waste AI applications in Environmental Engineering (water, air and solid waste management)	Chapter 8 Quiz 6	1,2

	Recycling, Treatment Technologies, Biological Treatment, Chemical Treatment, Physical/Chemical Treatment, Incineration, Land Disposal		
18	An End Semester Exam of 3 hour.		

Practical:

Not Applicable.

Text Books (s)

1. "Introduction to Environmental Engineering and Science" by Gilbert M. Masters and Wendell P. Ela (Third Edition, 2008)
2. "Principles of Environmental Engineering & Science" by Mackenzie Davis and Susan Masten (Second Edition, 2008)

ASSESSMENT SYSTEM:

Theoretical/Instruction	100%
Assignments	10%
Quizzes	15%
Mid Semester Exam	25%
End Semester Exam	50%
Practical Work	0%
Lab Attendance	0%
Lab Report	0%
Lab Quiz	0%
Lab Rubrics	0%