



INTRODUCTION TO ENVIRONMENTAL ENGINEERING AND SCIENCE - FUNDAMENTAL AND SUSTAINABILITY CONCEPTS

PROF. BRAJESH KUMAR DUBEY

Department of Multidisciplinary
IIT Kharagpur

PRE-REQUISITES : Basic High School Math, Physics and Chemistry

INTENDED AUDIENCE : Students of all UG Programs

INDUSTRIES APPLICABLE TO : AECOM, Ramky, Environmental Resource Management (ERM), SENES/ARCADIS, L&T, Tata-Projects, and all companies involved in any construction projects in the country.

COURSE OUTLINE :

The objective of this online course is to provide an overview of the environmental issues that all our working professionals should be aware of as per the directive of the Honble Supreme Court of India. The course will cover basic concepts of Ecology, Water Pollution, Water and Wastewater Quality and Treatment, Solid and Hazardous Waste

Management, Soil and Noise Pollution, Sustainability Concepts including Environmental Impact Assessment, Life Cycle Assessment, Waste Minimization, Circular Economy and Sustainable Development Issues. Overall the goal of the course is to:

- 1) Sensitise the young workforce on the basics and complexity of environmental issues associated with global developmental and commercial activity on day to day issues
- 2) Identify the current environmental issues that the global community is facing and discuss the realistic risk assessment
- 3) Use the tools of green design for sustainable solutions, helping the students to grasp the concepts of four I's: Inherency, Integration, Interdisciplinary, and International. Fundamental science and engineering skills will be applied throughout the course.

ABOUT INSTRUCTOR :

Prof. Brajesh Kr. Dubey has his bachelors degree in Civil Engineering (Hons) from Indian Institute of Technology (IIT) Kharagpur, India and PhD in Environmental Engineering Sciences, University of Florida, Gainesville, Florida, USA. He is presently Associate Professor (Integrated Waste Management and Sustainable Engineering) in the Division of Environmental Engineering and Management at Indian Institute of Technology (IIT), Kharagpur, India. Dr. Dubey has more than 17 years of research, teaching, training and industrial outreach experience in the areas of Integrated Solid and Hazardous Waste Management, and Sustainable Engineering and Application of Life Cycle Assessment techniques. He also works in the area of Life Cycle Analysis and Sustainable Engineering. He has been teaching courses in the area of Solid Waste Management, Hazardous Waste Management, Life Cycle Analysis and Environmental Risk Assessment among other courses for nearly a decade. He has taught at several universities in USA, Canada, New Zealand, China and India. He has also conducted training programs in the Integrated Waste Management areas including that for Electronics Waste. Dr. Dubey has authored/co-authored more than 200 publications in his area of expertise and have presented at several national and international conferences. He has worked as Waste Management Expert for UN agencies and World Bank.

COURSE PLAN :

Week 1: Sustainability Concepts – Innovations and Challenges

Week 2: Environmental Measurements from Different Disciplines

Week 3: Ecology, Population & Environmental Chemistry

Week 4: Physical Process in Environment

Week 5: Environmental Biological Concepts

Week 6: Environmental Risk Assessments with Concepts of EIA and LCA

Week 7: Water – Quantity and Quality

Week 8: Water Treatment Basics

Week 9: Basics of Wastewater Collection, Treatment & Resource Recovery

Week 10: Basics of Solid Waste, Soil and Noise Pollution

Week 11: Basics of Air Pollution Issues – Global and Local

Week 12: Case Studies and Course Wrap-up