

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	ESD406	Environmental Nanotechnology	3	0	0	9
Course Objective						
To gain fundamental knowledge on nanotechnology for environmental engineering applications						
Learning Outcomes						
Upon successful completion of this course, students will be able: To explain the fundamentals behind synthesis and characterisation instrumentals of materials at the nanometre scale To understand the nanomaterials role in water treatment and its toxicology impact on human						
Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome			
1	Nanotechnology and the environment, nanotechnology and our energy challenge nanomaterials fabrication top down and bottom up approaches	18	To understand Fundamentals behind synthesis			
2	Methods and analytical tools for structural characterization of nanomaterials: X-ray Diffraction, Electron Microscope, Scanning Probe Microscopy	12	To understand Fundamentals behind of characterisation tools			
3	Applications of nanomaterials for environmental clean-up: Membranes, Adsorption, photocatalysis	9	To perceive the importance of nanomaterials on environmental clean			
4	Nanomaterial exposure, toxicity, and impact on human health.	3	To get awareness on the health impact of nano materials			

Recommended Text Book

1. T. Pradeep, A Textbook of Nanoscience and Nanotechnology, Tata McGraw-Hill, 2003
2. J.W. Steed, D.R. Turner and K. J. Wallace, Core Concepts in Supramolecular Chemistry and Nanochemistry, John Wiley & Sons, Ltd, 2007.
3. P. Balaz, Mechanochemistry in Nanoscience and Minerals Engineering, Springer-Verlag Berlin Heidelberg, 2008.

Recommended Reference Book

1. M.Wiesner, J.Y. Bottero, Environmental Nanotechnology: Applications and Impacts of Nanomaterials 2nd edition, McGraw Hill, 2016