



Electronic Waste Management – Issues and Challenges

Civil Engineering

Instructor Name: Dr Brajesh Kumar Dubey

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Department: Civil Engineering

About Instructor: Dr Brajesh Kr. Dubey is an Associate Professor in the Division of Environmental Engineering and Management at Indian Institute of Technology (IIT), Kharagpur, India. Dr. Dubey has more than a decade of research, teaching, training and industrial outreach experience in the areas of Integrated Solid and Hazardous Waste Management, Life Cycle Assessment (LCA) and Sustainable Engineering. He has collaborated with UN agencies, World Bank, National Science foundation, Ontario Ministry of Environment and Auckland Regional Council on various projects including that in the area of LCA. He has been resource person for several municipal solid waste management training programs including that for electronics waste and has delivered lectures on this subject at several universities in USA, Canada, New Zealand, China and India. Dr. Dubey has authored/co-authored more than 160 publications in his area of expertise and have presented at several national and international conferences.

Pre Requisites: : – Environmental Sciences – Introduction to Environmental Engineering

Core/Elective: : Elective

UG/PG: : Both

Industry Support : E Parisaraa – Bangalore; Ecoreco Recycling – Mumbai; Earth Sense – Telangana; Attero Recycling – Noida; EWRI-Bangalore; WEEE Recycle – New Delhi; J. S. Pigments Limited – Kolkata. In addition ULBs across the country will be interested in this course, so as professionals from SPCB and CPCB.

Course Intro: : This course will discuss the overall scenario of E-Waste management in India in comparison with other countries around the globe. At first, the present scenario of E-Waste management in India (mostly informal) will be discussed along the role of various stakeholders. Then, the effects of recycling and management of Electronic Waste on human health, environment and society will also be presented. This will be followed by the risk assessment owing to pollutants released from E-Waste recycling in soil, air and water. The possible option of extraction of Rare-Earth Minerals will also be discussed in this course. The E-Waste management Rules of India and around the World will be compared. Finally a Life-Cycle Analysis approach will be employed for a possible sustainable solution of E-Waste Management for cutting the ill-effects of informal recycling. The topics will include: Composition of E-Waste and its generation rates across the world; The various processes of informal E-Waste management and its ill-effects on health and society; Formal Metal extraction processes from E-Waste; Life-Cycle-Analysis (LCA) and sustainable engineering from electrical and electronics industry perspectives. The existing E-Waste Management rules in India and comparison with other countries around the world, the Extended Producer Responsibility (EPR) and other take-back system. A major focus of this course will be the role of E-Waste management within the various initiatives of the Govt. of India including: Swachh Bharat Mission, Smart Cities as well as Make in India. The challenges of E-Waste management for smart cities will also be discussed taking few case studies from various developing nation around the globe. This will be followed by overview of the Electronic Waste (E-Waste) management issues in India in general and for the smart cities in particular. The new rules such as Extended Producer Responsibility (EPR) with respect E-Waste Management will also be covered in these course.

COURSE PLAN

SL.NO	Week	Module Name
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1	1	<ul style="list-style-type: none"> • Overview of the course • Electronic Waste Management in India • Overview of E-Waste Recyclers in India Digital India Initiative Corporate Management Plans • Electronic Waste Management • Global Issues including Exports to Poor Countries • Environmental and Public Health Issues of Electronic Waste Management
2	2	<ul style="list-style-type: none"> • Exposure pathway of pollutants emitted from Recycling of E-Waste • Quantification of Pollutants in Dust, Air and Water • Risk Assessment (According to USEPA method) of Recycling of E-Waste • Recovery of Valuable Rare-Earth metals from E-Waste
3	3	<ul style="list-style-type: none"> • E-Waste Management Rules of India (2011 and 2016 Rules) • E-waste Regulations from around the World (European, North America etc.) • WEEE rules, EPR concepts, Compare and Contrast with Indian E-waste rules
4	4	<ul style="list-style-type: none"> • E-waste Management: Case Studies and Unique Initiatives from around the World • Concept of Life Cycle Analysis and Sustainable Engineering especially from an Electrical and Electronics industry Perspectives • Socio-Economic Life Cycle Analysis (SLCA) of E-Waste Management in Developing countries