

Course title: Environmental Health and Risk Assessment				
Course code: NRE 144	No. of credits: 3	L-T-P: 31-11-0	Learning hours: 42	
Pre-requisite course code and title (if any):				
Department: Energy and Environment				
Course coordinator(s):		Course instructor(s): Prof. Prateek Sharma		
Contact details: prateeks@terisas.ac.in				
Course type: Elective		Course offered in: Semester 2		
Course description				
<p>The Environmental Health Risk Assessment course provides students with the technical and policy knowledge required to identify, assess and address important and emerging environmental health issues to reduce environmental risks to public health.</p> <p>The course is structured primarily on the EPA structures of assessment which is known as the most conservative method of qualitative and quantitative risk calculation. While the assessment frameworks are primarily international, Indian contexts will be explored through the case study should students wish to pursue it within national regulation.</p>				
Course objectives				
<ul style="list-style-type: none"> • Develop a basic understanding of environmental health and risk assessment and its role within the risk management process. • Develop a basic understanding of how to assess impact of pollution such as air pollution, water pollution on environment and human health. • To learn about different risk assessment formats and their use in environmental health studies • To learn about hazard identification and dose response calculations • To understand and use epidemiological data, case study analysis to understand various methods of risk assessment 				
Course content				
Module	Topic	L	T	P
1.	Introduction to Environmental Health and Risk Assessment <ul style="list-style-type: none"> • Risk assessment, epidemiology, toxicology • Environmental health and occupational health • Hazard waste and environmental remediation • Indian scenario <ul style="list-style-type: none"> ○ Current framework (MoEF, CPCB, SPCB) ○ Standards ○ Relevant legislation: (NEPA, NGT etc) 	5	1	
2.	Hazard Identification <ul style="list-style-type: none"> • Background information, past site knowledge • Record of contamination • Sampling plans • Toxicity Profiles • Classification as ‘contaminant of concern’ <p>Assignment: Mock HI exercise. Students are assigned an area for assessment.</p>	5	3	
3.	Guest Lecture: Blacksmith Institute “Indian scenario – Index”	2		
4.	Dose Response Assessment <ul style="list-style-type: none"> • Threshold Effect: NOAEL, LOAEL and UFs, RFD/Cs) • Carcinogenic effects: Group A-E • Relative Absorption Factors: 	5	1	

	<ul style="list-style-type: none"> Groups of Chemicals [PAHs, Dioxins, PCBs, etc...] Recommended format <p>Assignment: Students will be assigned chemicals for classification</p>			
5.	Guest Lecture: Toxicology applications	2		
6.	<p>Exposure Assessment</p> <ul style="list-style-type: none"> Development of Exposure Profiles: In-continuation to sampling plan Basic Approach/Assumptions: Conservative approach, 90th percentile. Quantitative Estimations of Exposure: ADD, LADD, Exposure factors Exposure Equations <p>Assignment: Exposure equations (3 assignments)</p>	6	6	
7.	<p>Risk Characterization</p> <ul style="list-style-type: none"> Non-cancer Risk: HI Cancer Risk: ELCR (SF, UF) Comparison to Applicable or Suitably Analogous Public Health Standards: EPA, WHO, ADB guidelines Risk characterization conclusions 	4		
8.	Uncertainty Analysis	2		
	Total	31	11	
<p>Evaluation criteria</p> <ul style="list-style-type: none"> Assignments: 50% (10% each) 1 case study: 20% Test 3: 30% 				
<p>Learning outcomes</p> <ul style="list-style-type: none"> After attending the course students shall have gained knowledge and understanding of the methods and processes employed in environmental health and risk assessment. The students shall also have gained a professional attitude in the interpretation of epidemiological and toxicological studies for use in environmental health and risk assessment. <ul style="list-style-type: none"> To understand key principles of environmental health risk characterization Should be able to assess risk due to carcinogens, analyse various methods of risk assessment Should be able to understand exposure modelling, point estimate and probability modelling 				
Pedagogical approach				
<p>Materials Required text Suggested readings Case studies Websites</p>				
<p>Journals</p> <ol style="list-style-type: none"> Blacksmith Institute Journal of Health and Pollution 				
Advanced Reading Material				
Additional information (if any)				
<p>Student responsibilities</p> <p>The students are expected to submit assignments in time and come prepared with readings when provided.</p>				