

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VIII
ENVIRONMENTAL SCIENCE AND ENGINEERING

Subject Name: Environmental Risk Assessment and Management

Subject Code:183702

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam(E)	University Exam(P)	Mid Sem Exam(Theory) (M)	Practical (Internal)
3	4	0	7	70	30	30	20

Sr No	Course Contents
1	Introduction: Sources of Environmental hazards, Environmental and ecological risks, Environmental risk assessment framework, Regulatory perspectives and requirements, Risk Analysis and Management and historical perspective; Social benefit Vs technological risks; Path to risk analysis; Perception of risk, risk assessment in different disciplines.
2	Elements of Environmental Risk Assessment : Hazard identification and accounting, Fate and behaviour of toxics and persistent substances in the environment, Properties, processes and parameters that control fate and transport of contaminants, Receptor exposure to Environmental Contaminants, Dose Response Evaluation, Exposure Assessment, Exposure Factors, Slope Factors, Dose Response calculations and Dose Conversion Factors, Risk Characterization and consequence determination, Vulnerability assessment, Uncertainty analysis.
3	Different Analysis for Risk Assessment: Cause failure analysis, Event tree and fault tree modeling and analysis, Multimedia and multipathway exposure modeling of contaminant migration for estimation of contaminant concentrations in air, water, soils, vegetation and animal products, Estimation of carcinogenic and non carcinogenic risks to human health,
4	Methods for Risk Assessment: HAZOP and FEMA methods, Methods in Ecological risk assessment, Probabilistic risk assessments, radiation risk assessment, Data sources and evaluation.
5	Risk Management: Risk communication and Risk Perception, comparative risks, Risk based decision making, Risk based environmental standard setting, Risk Cost Benefit optimization and tradeoffs, Emergency Preparedness Plans, Emergency planning for chemical agent release, Design of risk management programs, risk based remediation; Risk communication, adaptive management, precaution and stake holder involvement.
6	Application: Case studies on risk assessment and management for hazardous chemical storage, Chemical industries, Tanneries, Textile industries, Mineral processing and Petrochemical plants, Hazardous waste disposal facilities, nuclear power plants, contaminated site remediation, Case histories on Bhopal, Chernobyl, Seveso, Three Mile Island.

TEXT BOOKS:

1. Cutter, S.L., Environmental Risk and Hazards, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
2. Kolluru Rao, Bartell Steven, Pitblado R and Stricoff, Risk Assessment and Management Handbook, McGraw Hill Inc., New York, 1996.
3. Kofi Asante Duah, Risk Assessment in Environmental management, John Wiley and sons, Singapore, 1998.
4. Kasperson, J.X. and Kasperson, R.E. and Kasperson,R.E., Global Environmental Risks, V.N.University Press, New York, 2003.
5. Risks and Decisions for Conservation and environmental management, Mark Burman, Cambridge University Press.
6. Susan L Cutter, Environmental Risks and Hazards, Prentice Hall of India, New Delhi, 1999.
7. Joseph F Louvar and B Diane Louver, Health and Environmental Risk Analysis fundamentals with applications, Prentice Hall, New Jersey, 1997.