5th Semester	REV5D006	Hazard Identification and Risk Assessment	L-T-P 3-0-0	3 Credits

Module I: **(8 Hours)**

Introduction Sources of Environmental hazards-Types of Risk-Environmental, Safety and ecological risks-Risk assessment framework-Regulatory perspectives and requirements-Risk Analysis and Management -Social benefit Vs technological risks-Path to risk analysis-Perception of risk-Risk assessment in different disciplines.

Module II: **(10 Hours)**

Elements of environmental risk assessment Hazard identification and accounting -Properties, processes and parameters that control fate and transport of contaminants --Dose Response Evaluation -Slope Factors-Dose Response calculations and Dose Conversion Factors -Risk Characterization and consequence determination-Estimation of carcinogenic and non carcinogenic risks to human health.

Module III: **(8 Hours)**

Exposure Assessment -Exposure Factors -Multimedia and multipathway exposure modeling of contaminant concentrations in air, water, soils and vegetation Tools and methods for risk assessment HAZOP and FEMA methods-Cause failure analysis -Event tree and fault tree modeling and analysis -Vulnerability assessment -Uncertainty analysis -Methods in Ecological risk assessment -Probabilistic risk assessments-Radiation risk assessment-Data sources and evaluation.

Module IV: **(8 Hours)**

Risk management Risk communication and Risk Perception-Comparative risks-Risk based decision making-Risk based environmental standard setting-Emergency Preparedness Plans-Emergency planning for chemical agent release-Design of risk management programs-Adaptive management-Precaution and stake holder involvement.

Module V: **(6 Hours)**

Applications 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 and Three Mile Island.

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. Mark Burman, Risks and Decisions for Conservation and environmental management,Cambridge University Press, 2005.