



आपदा न्यूनीकरण एवं प्रबन्धन उत्कृष्टता केन्द्र, भारतीय प्रौद्योगिकी संस्थान रुड़की,

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CENTRE OF EXCELLENCE IN DISASTER MITIGATION & MANAGEMENT, 3rd Floor,
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1. Subject Code : **DMN-607** Course Title : **Vulnerability and Risk Analysis**
2. Contact Hours: **L: 3 T: 1 P: 0**
3. Examination Duration (Hrs.) : **Theory: 3 Practical: 0**
4. Relative Weight : **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**
5. Credits: **4** 6. Semester: **Spring** 7. Subject Area: **PEC**
8. Pre-requisite: **Nil**
9. Objective: To impart knowledge of basic steps and processes used for vulnerability and risk assessment due to different hazards.

10. Details of Course:

Sl. No.	Particulars	Contact Hours
1.	Probabilistic and deterministic risk analysis, concept of probability, random variables, probability distribution, functions of random variables, conditional probability, expectation, law of large numbers	8
2.	Point estimation, method of moments, maximum likelihood, extreme value, Bayesian statistics, prior and posterior probability, concept of utility and decision tree	8
3.	Poisson process, Filtered Poisson process, Normal process, Seismic risk analysis with line, area and volume source, Models of mathematical strength, Damage accumulation laws	4
4.	Vulnerability Assessment: Damage statistics and cumulative damage models, analytical and hybrid methods, calibration of models	6
5.	Preparation of exposure database: Sample surveys, sampling techniques, uncertainty analysis, applications of remote sensing and GIS	6
6.	Risk assessment due to various types of structures, deterministic and probabilistic approach, role of planners, architects, engineers, banks and insurers, rating damage assessment; Disaster impact analysis	10
	Total	42

11. Suggested Books:

Sl. No	Name of Authors/Book/Publisher	Year of Publication/Reprint
1.	HAZUS-MH, MR1 & MR2 Technical Manual, Federal Emergency Management Agency	2006
2.	Robin K., Seismic Hazard and Risk Analysis, Earthquake Engineering Research Institute, McGuire	2004
3.	Coburn, A. and Spence R., Earthquake Protection, John Wiley & Sons	2002
4.	Reiter, L., Earthquake Hazard Analysis, Issues and Insights, Columbia University Press	2001
5.	Srinivasan, S.K. and Mehta K.M., Probability and Random Processes, Tata McGraw-Hill	1981