

## Flood Hazard Assessment and Remediation (Elective)

<b>Code</b> DM-831	<b>Credit Hours</b> 3 – 0
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### **Course Description:**

Aims to give students understanding of flood hazard, flood forecasting, flood warning system, flood mitigation and flood risk assessment and management/remediation.

### **Course Content:**

<b>Topics</b>	<b>Learning Outcomes</b>
Introduction and Overview	Hydrologic cycle and processes, Hydrologic measurements, Extreme events, Forecasting and warning, Impact and mitigation, Definitions: hazard, disaster, vulnerability, risk
Hydrology of Floods and Droughts	Estimation techniques (unit hydrograph, statistical analysis), Flood characteristics and routing, Drought types and severity, Hydrologic and hydraulic models
Climate Change and Floods	Introduction to natural and anthropogenic phenomena contributing to climate change and floods, how climate change is triggering extreme weather events, Association of mega floods in Pakistan to climate change
Forecasting and Warning System	Overview of forecasting models, Equipment for forecasting, Flood and Drought warning, Warning procedure and dissemination, Hazard Analysis, Seismic Hazard Maps and their uses for Earthquake Disaster Mitigation, Seismic Micro-zonation
Impacts and Risk Assessment	Impacts: physical, socio-economic and environmental, Assessment tools and techniques, Vulnerability and capacity assessment, Stakeholder participation
Floods and Mitigation	Mitigation measures, Preparedness, readiness, emergency response and rehabilitation, Flood damages, Institutional arrangement, Collaboration and

	coordination
Risk Management	Framework of risk Management, Risk decision-making principles, Risk assessment methods, Prevention, preparedness and mitigation, Tools, strategies and organizational arrangements
Field visit to collect info for flood zonation and flood risk mapping	
Flood hazard mapping using GIS, Case studies	Mapping of flood parameters such as extent, depth, velocity, etc.
Term Project on flood zonation and flood risk mapping	

**Textbooks:**

No textbook for this course. The course will be based on different reference books, reports, and conference and journal publications.

**Reference Material:**

1. ESCAP (1991). "Manual and Guidelines for Comprehensive Flood Loss Prevention and Management", United Nations, No. ST/ESCAP/933, Bangkok, Thailand.
2. New South Wales Govt (1986). "Flood Plain Development Manual", New South Wales, Sydney, Australia.
3. Tingsanchali, T. (1996). "Floods and Human Interaction Professorial Inaugural Lecture, Asian Institute of Tech, Bangkok, Thailand.

**Pre-requisite:** None

**Assessment System**

Quizzes	15%
Assignments	10%
Mid-Semester Exam	25%
Term Project/Paper	10%
End Semester Exam	40%