GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Civil Engineering

Subject Code: ME02065061

Subject Name: Flood Routing and Management

w. e. f. Academic Year:	2024-2025
Semester:	2
Category of the Course:	Professional Elective Course

Prerequisite:	Hydrology and channel hydraulics
Rationale:	Students will be able to understand flood assessment and management using various Geo-spatial techniques and mathematical modeling. They will also be able to understand flood warning system and flood forecasting methods.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Compare different strategies for flood management.	U, R
02	Apply geo-spatial techniques for flood damage assessment.	A, E
03	Carryout risk analysis for flood events	U, R ,C
04	Analyze and carryout flood routing.	N, C

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1	Criteria for sustainable water management, integrated catchment management. Flows in catchments, water resources and floods and its causes, damages caused by flood	12	25
2	Principles of flood management, strategies of intervention, comparing the options, stakeholder's involvement and project appraisal, structural and non-structural measures.	09	15
3	Flood routing in channels and reservoirs. Flood routing using numerical methods, HEC-RAS applications. Flood assessment using Geo-spatial techniques and mathematical modeling.	12	30
4	Flood management as changing risks, frequency approaches vs. time series, risk vs. uncertainty, flood and ecosystem. Vulnerability to floods, impact of floods, assessing the risk, flood damage analysis and flood control measures. Reservoir operations, Real-time flood warning system and flood forecasting.	12	30
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
15	20	20	20	20	5

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Ashley R., Garvin S., Pasche E. and Vassilopoulos A., Advances in Urban Flood Management, Balkema, 2007
2. Saul A, Floods and Flood Management, Springer, 1992.
3. Schanze J., Zeman E., and Marsalek J., Flood Risk Management, NATO Science Series IV: Earth and Environmental Science, 2006.
4. Applied hydrology by V.T chow, David R maidment, and Larry W mays
5. Engineering hydrology by Raghunath Engineering hydrology by K. Subramanya

(b) Open source software and website:

1. http://www.nptel.iitm.ac.in/courses/
2. https://en.wikipedia.org/wiki/Flood_control www.water.ca.gov/floodmgmt/

Suggested Course Practical List: If any

The practical may include study of different flood routing and management methods. Data Collection for design of flood warning systems.Study of various literatures of practice and implementation for Flood damage analysis. The students will work in group for the design work based on syllabus such as;

1. Study of catchments area features
2. Estimation of flood
3. Flood warning system
4. Flood routing and flood management
5. Flood impact assessment
6. Flood damage analysis
7. Flood control measures

List of Laboratory/Learning Resources Required:

HEC-RAS

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