GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Civil (Water Resource Engineering)

Subject Code: ME02033101

Subject Name: Fluvial Hydraulics

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

Prerequisite:	Fundamental knowledge of channel hydraulics, uniform and non-uniform flow and channel resistance.
Rationale:	The knowledge of flow characteristics in alluvial channel is required in the design of hydraulic structures, and to understand channel morphology. The idea about incipient motion of sediment in necessary to compute the bed load transport and in stable channel design. The phenomenon of aggradation and degradation is responsible for reservoir sedimentation and general scour on the downstream of dam respectively. For a hydraulic engineer, it is essential to apply the all above knowledge for safe hydraulic design of structures and bridge pier.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Label sediment poetries and describe incipient motion of sediment	R, U
02	Explain bed form and channel resistance	R, U, A
03	Describe the sediment sampling procedure and sediment control	R, U
04	Compute bed load and suspended load transport rate	A, N, E
05	Apply mathematical models to analyze bed level variation	A, 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.	Sediment origin and formation, Properties of sediments, incipient motion of non-uniform and uniform sediments,	**8**	**15**
2.	Bed forms, regimes of flow, channel resistance, resistance to flow, velocity distribution in alluvial channel	**8**	**15**
3.	Bed load transport of uniform and non-uniform sediment, suspended load transport uniform and non-uniform sediment, total load transport equations.	**11**	**30**
4.	Sedimentt sampling, bed load sampling, suspended load sampling, stable channel design, reservoir sedimentation and sediment control,	**8**	**15**
5.	Bed level variations, Aggradation, degradation, meandering of rivers, braided rivers, local scour at different structures and bank protection, design of guide bunds and other river training works, physical and mathematical models of sediment transport	**10**	**25**
	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	15	20	20	20	10

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. Mechanics of sediment transport – R .J.Garde and Ranga Raju K.G.New Age international Publishers
2. Fluvial hydraulics – W.H. Graph, John Wiley and Sons publishers
3. River Mechanics – M. Selim Yalin, Pergamon Press
4. Practical Aspects of Computational River hydraulics, J A Cunge and F.M.Holly, Pitman Advanced Publishing Program
5. Open Channel flow by M Hanif Chaudhry, Printice hall of India, New Delhi

(b) Open source software and website:

1. HEC-RAS, HEC-GeoRAS, HEC-HMS, Mike-11
2. http://en.wikipedia.org/wiki/Category:Hydraulic_engineering

Suggested Course Practical List: If any

List of Laboratory/Learning Resources Required:

1. Tilting flume
2. Sediment sampler for bed load and suspended load

Suggested Project List:

1. Sediment deposition study in various reservoir across India
2. Study of river meandering
3. Local scour around bridge pier
4. Degradation downstream of the dam
5. Design of river training works

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