

| Course Name | Code\No. | Number of Credits | | | |
|--------------------|----------|-------------------|------|--------|--------|
| | | Theo. | Lab. | Train. | Credit |
| Sediment Transport | HWR 423 | 3 | - | - | 3 |
| Pre-Requests | HWR 323 | | | | |

Course Objectives:

The course aims to introduce the student to the basics of sediment transport science. Includes: sediment characteristics, initiation in movement, shields graph, transport and sediment patterns, bottom bearing, suspended load, total load and bottom shape mechanics, effective bottom roughness, sediment transport due to fluctuating flow, meandering rivers, formation of islands in rivers, local slaughter at Facilities, sampling, design of stable channels, bottom reinforcement, leakage effects, and mathematical models for sediment transport.

Course Contents:

1. Incipient motion
2. Resistance to flow
3. Bed forms
4. Bed-load computation
5. Suspended load computation
6. Total load transport
7. Sediment transport models
8. Sediment measuring techniques
9. Designing stable channels, bottom reinforcement and leakage effects,
10. Mathematical models for sediment transport

Course outcomes:

The student, upon completion of this course, should be able to:

- Compute bed-load, suspended load and total load transport
- Quantify incipient motion, resistance to flow and relation to bed-fords
- Calculate potential reservoir sedimentation
- Prescribe program for measuring sediment distribution

Introduction to the major sediment related issues relative to stream habitat, channel evolution and stability, reservoir sedimentation, channel maintenance operations. Discussion of the underlying physical concepts of incipient motion, resistance to flow and bed-fords. Computational methods for bed-load, suspended load and total load transport. Application and evaluation of sediment transport functions and models. Techniques for measuring sediment distribution.

Evaluation Method:

The evaluation is performed by periodic tests, homework and requirements given to the student by the staff member.

References:

- Van Rijn, L.C., 1993, 2012. Principles of sediment transport in rivers, estuaries and coastal seas. Aqua Publications, Amsterdam, the Netherlands (WWW.AQUAPUBLICATIONS.NL)
- Van Rijn, L.C., 1984a. Sediment Transport, Part I: Bed Load Transport. Journal of Hydraulic Engineering, ASCE, Vol. 110, No. 10.
- Van Rijn, L.C., 1984b. Sediment Transport, Part II: Suspended Load Transport. Journal of Hydraulic Engineering, ASCE, Vol. 110, No. 11.
- Van Rijn, L.C., 1984c. Sediment Transport, Part III: Bed Forms and Alluvial Roughness. Journal of Hydraulic Engineering, ASCE, Vol. 110, No. 12.
- Einstein, H.A., 1950. The Bed-Load Function for Sediment Transportation in Open Channel Flow. Technical Bulletin No. 1026, U.S. Dep. of Agriculture, Washington, D.C.

- Hassanzadeh, Y. (2012). Hydraulics of Sediment Transport, Hydrodynamics - Theory and Model, Dr. Jin - Hai Zheng (Ed.), ISBN: 978-953-51-0130-7, InTech, DOI: 10.5772/25982. Available from: <http://www.intechopen.com/books/hydrodynamics-theory-and-model/hydraulics-of-sediment-transport>
- Yang, C. (2003). Sediment Transport: Theory and Practice. ISBN-13: 978-1575242262.