Sediment transport modelling - BMEEOVVDT83

I. Subject Specification

1. Basic Data

1.1 Title

Sediment transport modelling

1.2 Code

BMEEOVVDT83

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Baranya Sándor
academic rank	Associate professor
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1.8 Department

Department of Hydraulic and Water Resources Engineering

1.9 Website

https://epito.bme.hu/BMEEOVVDT83
https://fiek2.mywire.org/course/view.php?id=2500

1.10 Language of instruction

english

1.11 Curriculum requirements

Ph.D.

1.12 Prerequisites

Recommended prerequisites:

- Modelling of Hydrosystems (BMEEOVVMV-1)
- Hydromorphology (BMEEOVVMV-2)
- Hydrology II (BMEEOVVAI41)

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The course focuses on the numerical modelling of sediment transport in rivers. Starting from the initiation of sediment motion, the course will cover the modeling of bedload transport as well as suspended sediment transport. Large scale, 1D approach to more sophisticated 3D methods will be overviewed.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. Knows the theoretical and empirical description of fluvial sediment transport.
2. Knows the conditions of the threshold of sediment movement.
3. Knows the state-of-the-art measurement methods of fluvial sediment transport.
4. Knows the calculation methods of fluvial sediment load.
5. Knows the role of bedforms in fluvial sediment transport.
6. Knows the natural morphological processes of rivers.
7. Knows how to model bedload transport and suspended sediment transport in 1D.

B. Skills

1. Able to assess which simplified description of flows can be used for solving specific engineering tasks.
2. Provides an empirical estimate of the fluvial suspended sediment load
3. Provides an empirical estimate of the fluvial bedload transport.
4. Able to set up schematized 1D sediment transport model of rivers.

C. Attitudes

1. Collaborates with the instructors and fellow students to expand knowledge.
2. Constantly acquires knowledge.
3. Continuously and actively seeks ways of gaining knew knowledge even beyond the required curriculum and employs the internet for finding intuitive answers to research problems.
4. Open to learn new software skills.
5. Attempts to perform precise problem solutions.

D. Autonomy and Responsibility

1. Resolution to solving homework on one's own within feasible limits.
2. Accepts substantiated critical remarks.

2.3 Methods

Lectures on theory. Practical guidance about the steps needed for setting up schematized numerical sediment transport models. Consultation of the homework individually or in groups using one's own laptop on top of written (e-mail) and personal oral communication during consultation hours.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	Introduction, basics of sediment transport
2.	Problems related to sediment transport
3.	Measurement methods of sediment transport
4.	Schematized modeling of river flow
5.	Threshold of movement
6.	Modelling of bedload transport 1.
7.	Modelling of bedload transport 2.
8.	Modelling of suspended sediment transport
9.	Role of bedforms
10.	Hydraulic resistance
12.	Modelling of river morphodynamics
13.	Multi-dimensional modeling of ST
14.	Consultation with homework

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

- Sedimentation Engineering: Processes, Measurements, Modeling, and Practice. Edited by Marcelo Garcia , Ph.D., P.E.
- 1D SEDIMENT TRANSPORT MORPHODYNAMICS with applications to RIVERS AND TURBIDITY CURRENTS by Gary Parker. http://hydrolab.illinois.edu/people/parkerg/morphodynamics_e-book.htm
- Numerical modelling and hydraulics by Nils Reidar Olsen. https://folk.ntnu.no/nilsol/tvm4155/flures6.pdf

2.6 Other information

2.7 Consultation

This Subject Datasheet is valid for:

Sediment transport modelling - BMEEOVVDT83

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

Evaluation of the participant's learning progress described in A 2.2. is performed by a written final test and one homework assignment.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Homework	HW	A.2, A.4, A.5, A.7; B.2, B.3, B.4; C.1, C.4; D.1, D.2
Written exam	E	A.1-A.7; B.1; C.2, C.3, C.5

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Abbreviation	Score
HW	50%
E	50%
Sum	**100%**

3.4 Requirements and validity of signature

Not-relevant.

3.5 Grading system

Grade	Points (P)
excellent (5)	85%<=P
good (4)	70<=P<85%
satisfactory (3)	55<=P<70%
passed (2)	40<=P<55%
failed (1)	P<40%

3.6 Retake and repeat

1. The homework is due back within two weeks always.
2. The homework can be corrected within that time limit.

3.7 Estimated workload

Activity	Hours/semester
participation in contact classes	14×2=28
preparation for the final test	22

preparation for homework	25
study from notes, textbooks	15
Sum	**90**

3.8 Effective date

1 September 2022

This Subject Datasheet is valid for:

Inactive courses