

## Hydrological Modelling (I002659)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 4.0**

**Study time 120 h**

**Course offerings and teaching methods in academic year 2026-2027**

A (semester 1)

Dutch

Gent

lecture

seminar

**Lecturers in academic year 2026-2027**

Lievens, Hans

LA20

lecturer-in-charge

**Offered in the following programmes in 2026-2027**

[Master of Science in Bioscience Engineering: Land, Water and Climate](#)

**crdts**

4

**offering**

A

**Teaching languages**

Dutch

**Keywords**

Hydrological models, calibration, uncertainty, model updating

**Position of the course**

An overview of the modelling of the different hydrological processes and of the most important types of hydrological models is given. Attention is also given to the problem of calibrating and uncertainty. Finally, the updating of models through data assimilation is discussed.

**Contents**

1. Basic concepts of hydrological models
2. Overview of hydrological models
3. Hydrological data
4. Model calibration
5. Uncertainty analysis
6. Data assimilation

**Initial competences**

Hydrological modelling builds upon certain final competences of the courses 'Hydrological Processes and Hydrometry', 'Modelling and simulation of biosystems', 'Scientific computing' (knowledge of Matlab) and 'Probabilistic models'; or the learning outcomes have been achieved differently.

**Final competences**

- 1 To explain different alternatives for the modelling of hydrological processes
- 2 To explain the basic principles of hydrological modelling
- 3 To build a simple hydrological model.
- 4 To explain and implement an uncertainty analysis in hydrological modelling.
- 5 To explain and implement different alternative methods for data assimilation.

**Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

**Conditions for exam contract**

This course unit cannot be taken via an exam contract

**Teaching methods**

Seminar, Lecture

**Extra information on the teaching methods**

The theory is taught during lectures. During these lectures, scientific papers are critically read. Exercises exist of programming of algorithms that demonstrate the theory and of discussing the results of the simulations performed with them, and to write a scientific report.

### **Study material**

Type: Syllabus

Name: Hydrological Modelling

Indicative price: € 12

Optional: no

Language : English

Number of Pages : 308

Type: Handouts

Name: Hydrological Modelling

Indicative price: Free or paid by faculty

Optional: no

Available on Ufora : Yes

### **References**

Beven K., Rainfall-Runoff Modelling - The primer, Wiley-Blackwell, 2nd edition, 2012

### **Course content-related study coaching**

Possibility to ask questions during and after lectures and availability of the lecturer for questions and additional information with regard to theory and practice

### **Assessment moments**

end-of-term and continuous assessment

### **Examination methods in case of periodic assessment during the first examination period**

Oral assessment, Written assessment with open-ended questions

### **Examination methods in case of periodic assessment during the second examination period**

Oral assessment, Written assessment with open-ended questions

### **Examination methods in case of permanent assessment**

Assignment

### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible in modified form

### **Extra information on the examination methods**

Closed book exam (written and oral) for the theory. Oral exam on the software developed during the practicals and the obtained results with them.

### **Calculation of the examination mark**

Theory (period aligned evaluation): 40%

Exercises (period aligned evaluation): 25%

Exercises (non-period aligned evaluation): 35%

Students who eschew one or more non-period aligned or permanent evaluations for this course unit may be failed by the examiner, leading to a result of maximum 9/20.