



PHD COURSE

INTEGRATED RIVER ECO-MORPHODYNAMICS

*Eco-Morphodynamics of River Bars
Integrating Theories, Modelling, and Observations*

DICAM, UNIVERSITY OF TRENTO, ITALY

June 7-11, 2021

The course is at its 5th edition and it is offered within the Doctoral School of Civil, Environmental and Mechanical Engineering, the Doctoral School of Agrifood and Environmental Sciences and the Honours Programme in Modelling and Simulation of the University of Trento, Italy.

The general aim of the course is to show how the integration of different approaches can lead to a comprehensive insight into river eco-morphodynamics, also in relation with the mutual interactions among flow, sediment transport, riparian vegetation.

The course strategy is to focus on specific morphodynamic patterns, particularly alternate bars in channelized streams, a rather popular subset of patterns related with river eco-morphodynamics that can be taken as an example of other patterns evolving at different time and spatial scales.

INSTRUCTORS

- Guido Zolezzi, Walter Bertoldi, Annunziato Siviglia (University of Trento)

CONTENTS:

- Basics of theoretical river morphodynamics
- Analytical theories of river bars: overview of the existing theories and the recent “eco” component
- Step-by-step development of a linear stability analysis for free bars in straight channels
- Bars in real rivers: processes, forms and implications for river behavior
- Numerical modelling of river bars eco-morphodynamics

At the end of the course, participants are expected to:

- Have developed an understanding of how to integrate multiple approaches to investigate morphodynamics of river bars
- Have learned the “machinery” that lays behind the linear stability analysis of free bars, and, more in general, behind stability analyses in eco-morphodynamic problems





- Are able, individually or in small groups, to develop and use a simple computational tool to predict the main properties of free bars in straight channels.

The course is suitable for graduate students with a background in fluid mechanics, civil and environmental engineering, physical geography, environmental and physical sciences, including young scientists and professionals with an interest in increasing their knowledge of river morphodynamics.

REQUIRED BACKGROUND

A basic knowledge of the following is required:

- Basic calculus, particularly ordinary and partial differential equations
- Basic of fluid mechanics, particularly equations for momentum and mass conservation
- (preferred) Basic knowledge of sediment transport processes and fundamental equations

The course starts on Monday, June 7th 2021 at 9.30 and finishes Friday, June 11th at 13.30pm CEST

The course duration is 32 hours.

For students who need a formal recognition for participation to the course a final test is foreseen

The course will be offered in a blended format: in presence (at DICAM, room 1H), few places available, and online via Zoom. The link for online participation will be sent to all registered participants.

Registration to the course is required to participate and is free of charge.

To register, please send an email and CV to dicamphd@unitn.it, and specify if you would like to participate in presence or online.

