



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Coastal Risks and Dynamics

2122-2-F7502Q023

Aims

The aim of the course is to provide the knowledge concerning coastal processes and risks interacting on coastal dynamics and evolution under changing climate. The student at the end of the course will be able to understand and evaluate the physical coastal system, identify coastal vulnerability and risk and the possible defence policies according to the Integrated Coastal Zone Management (ICZM).

Contents

The course is intended to provide basic knowledge of hydrodynamic (wave genesis and transformation) and morphodynamic (sediment transport, beach-profile evolution and coastline dynamics) processes induced by natural and anthropogenic pressures, and to assess design tools to prevent and reduce coastal risks related to beach erosion, flooding and extreme events.

Detailed program

The coastal zone. Wind waves. Wave theories. Random waves Wave statistics. Wave transformation from offshore to onshore. Sea level. Astronomical tide. Wave set-down and wave set-up. Wave run-up. Longshore, rip and undertow currents. The beach. Sediment characteristics. Cross-shore beach profile. Equilibrium beach profile. Closure depth. The concept of physiographic region. Sediments balance. Coastal Dynamics and processes. Sediment transport. Long-shore and cross-shore sediment transport. Shoreline evolution. Prediction of shoreline evolution.

Prerequisites

None

Teaching form

Lessons: 6 credits (42 hours)

Textbook and teaching resource

- Dean, R.G., Dalrymple, R.A. (1991). *Water wave mechanics for engineers and scientists*. Adv. Series on Ocean Engineering – vol. 2, World Scientific.
- Dean, R.G., Dalrymple, R.A. (2004). *Coastal Processes with engineering applications*. Cambridge University Press.
- Davidson-Arnott R., Bauer B., Houser, C. (2019) *Introduction to coastal process and geomorphology*. Cambridge University Press.
- Masselink, G., Hughes, M.G., Knight, J. (2011). *Introduction to coastal process and geomorphology*. Routledge.
- Ciavola, P., Coco, G. (2017). *Coastal storms: processes and impacts*. Wiley-Blackwell.

Semester

First semester

Assessment method

Oral exam. Mark range: 18-30/30

Office hours

Friday 12:30 pm – 1:30 pm
