

**Course offered for the PhD program
in Civil, Chemical and Environmental Engineering
a.y. 2024/2025 (XL cycle)**

(course is open for participation of students from other PhD cycles or programs)

1. Title

Extreme Value Analysis of compound events for coastal engineers.

2. Course Objectives and Description

The course provides the background for multi-variate extreme value analysis of meteocean parameters, a critical tool in the design of most maritime engineering projects.

First, classical extreme value theory is introduced, addressing key concepts such as the IID condition, frequency distribution, and return periods for individual parameters. Next, various multivariate models, such as Copulas and the Inverse First Order Reliability Method (IFORM) are presented, enabling the joint study of multiple variables characterized by interdependence.

While the course covers the basic theory of all models introduced, particular attention is given to case studies and applications related to the fields of oceanography and coastal engineering.

3. Course Organization

The course comprises lectures (10 hours) and practical hands-on exercises (6 hours).

4. Teacher

Francesco De Leo.

<https://rubrica.unige.it/personale/UkNOUI9s>

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5. Duration and credits

16 hours/3 credits.

6. Activation mode and teaching period

Teaching period: June 2025 (final schedule to be arranged with students).

7. Deadline for registration

Registration via e-mail within the end of April 2025.

8. Final exam

Students will undertake an exercise utilizing one of the methods covered during the course. They may choose a case-study of their interest or a topic delivery by the teacher.