

## COURSE SYLLABUS

### Applied Marine Geology

2324-2-F7502Q040

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#### Aims

To provide advanced knowledge on technological solutions for collecting high-resolution terrestrial and marine geo-spatial dataset for geo-environmental studies in coastal and marine regions

#### Contents

The course will provide basic knowledge on methods and techniques adopted to perform assessment of marine geohazard and on the recent progress in 3D geological mapping and computer vision that allows a seamless combination of terrestrial and marine geo-spatial dataset in coastal regions

#### Detailed program

##### Frontal lessons

An introduction to marine geological studies applied to assessing the feasibility of major offshore and coastal activities exploiting resources in the marine environment.

Geohazard assessment for offshore development. Marine geohazard along the Italian coasts: the experience from MAGIC project.

Integrating marine and terrestrial geospatial dataset: "why" and "how" as well as some case studies from tectonically and climatically sensitive coastal areas of the Mediterranean region.

##### Tutorial

The students will engage in tutorial activities to learn how to manage and process data obtained through optical and acoustic remote sensing platforms in marine and coastal regions with varying geomorphological contexts. They will also learn how to retrieve satellite data from online databases, which can be used to monitor extensive marine environments. The obtained data will be utilized to produce Satellite-Derived Bathymetry (SDB) in specific coastal areas.

Marine nearshore environments will be reconstructed using images collected with drones and underwater cameras and processed using Structure from Motion (SfM) techniques.

Acoustic remote sensing data, collected with multibeam echosounders and ROV videos, will be used to map and categorize deep marine environments.

There will be a dedicated day for a field trip at the end of the course. This trip will involve using some of the instruments studied in the tutorials and collecting data on coastal environments with the methodologies described.

## **Prerequisites**

Physics of the Sea; Fundamentals of Marine Physical Geography; International Law of the Sea

## **Teaching form**

2 credits (CFU) of frontal lessons (Prof. A. Savini)

4 credits (CFU) of laboratory and practicals (Dr. Luca Fallati)

## **Textbook and teaching resource**

The Sea Floor: An Introduction to Marine Geology. E. Seibold, W.H. Berger - Springer

Submarine Geomorphology. A. Micallef, S. Krastel, A. Savini . Springer

Remote Sensing and Image Interpretation, 7th Edition Thomas Lillesand, Ralph W. Kiefer, Jonathan Chipman  
ISBN: 978-1-118-34328-9 February 2015 736 Pages

Offshore Operation Facilities: Equipment and Procedures. Fang and Duan, 2014. Elsevier

Submarine Power Cables: Desing, Installation, Repair and Environmental Aspects. Worzyk, 2009. Springer.

A selection of scientific journal articles and the lesson slides will be provided by the teacher

## **Semester**

First semester

## **Assessment method**

Oral examination and practical tests that will be performed during the tutorials.

The oral examination will focus on a brief discussion of the topics covered by frontal lectures.

The practical tests will be done during the tutorials and will be finalised in the delivery of a final report to be sent to the lecturers before the oral examination.

## **Office hours**

by email reservation

## **Sustainable Development Goals**

INDUSTRY, INNOVATION AND INFRASTRUCTURE

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