



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Earth Observation for Geology

2425-2-F7401Q102

Aims

The aim of the course is to provide expertise in the analysis and interpretation of remote sensing images for Earth Sciences applications.

Contents

Theory and practice for remote sensing data analysis using open-source software for image processing for geological applications.

Detailed program

Basis of remote sensing: electromagnetic spectrum, optical, thermal, lidar and microwave (radar) remote sensing, synthetic aperture radar (SAR), SAR interferometry, characteristics of active and passive remote sensing instruments and platforms (e.g. ESA – Sentinels satellites).

Data elaboration and image analysis: satellite image visualization; pre-processing techniques; image processing and extraction of biogeophysical parameters.

Applications: 1) lithological mapping using optical satellite data; 2) monitoring of the cryosphere (e.g. glaciers, rock glaciers) with active and passive remote sensing techniques; 3) thermal remote sensing for active fire detection, urban heat island mapping and monitoring of active volcanos; 4) flood monitoring with Sentinel-1 SAR data; 5) monitoring surface deformation related to landslides, volcanos and land subsidence with SAR interferometry.

Laboratory exercises: use of open-source softwares (e.g. ESA-SNAP, QGIS) for geological applications using the

above mentioned techniques. The exercises are a key part of the course and will be held using computer labs.

Prerequisites

Teaching form

Laboratory (4 credits)

16 three-hour lab activities, in person, Interactive Teaching using virtual computer laboratories

Textbook and teaching resource

Handouts and slides

Brivio, P.A., Lechi, G., and Zilioli E., 2006. Principi e metodi di Telerilevamento, De Agostini - Città Studi edizioni, Torino (Italy), pp. 525.

Lillesand T. & Kiefer R. (2015). Remote sensing and image interpretation, 7th edition, 736 p.

Jensen J.R. (2014). Remote Sensing of the Environment: An Earth Resource Perspective, 2nd edition, Pearson New International edition, 619 p.

Semester

First semester

Assessment method

The exam allows to evaluate the preparation reached in terms of theoretical and practical knowledge of the topics covered during the lessons and the laboratories.

The evaluation of the examination is established through a report on the resolution of a geological / environmental case study aimed at the evaluation of the student's skills to apply the remote sensing techniques in geological applications (40% of the final evaluation) and an oral examination with open questions which allow to verify the theoretical and practical knowledge of the topics covered during the lessons and the laboratories (60% of the final evaluation).

The expositive ability and adequacy of the student's language is also assessed. The examination is retained positive for an evaluation of 18-30/30.

Office hours

During working hours with email appointment to micol.rossini@unimib.it

Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE
