UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

SATELLITE DATA ANALYSIS

Anno immatricolazione	2018/2019
Anno offerta	2019/2020
Normativa	DM270
SSD	ING-INF/03 (TELECOMUNICAZIONI)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	COMPUTER ENGINEERING
Curriculum	Computer Science and Multimedia
Anno di corso	2°
Periodo didattico	Primo Semestre (30/09/2019 - 20/01/2020)
Crediti	6
Ore	45 ore di attività frontale
Lingua insegnamento	English
Tipo esame	ORALE
Docente	DELL'ACQUA FABIO (titolare) - 9 CFU
Prerequisiti	The student is expected to possess the knowledge consequent to having attended and successfully given the exams of first-level courses on: physics, chemistry, mathematical analysis.
Obiettivi formativi	This is a course on Remote Sensing for Earth Observation starting from an introductory level and continuing to an intermediate level. The aim of the course is to provide the student with a solid knowledge of the basic concepts of Remote Sensing, the essential structure of the sensors, the data produced by the various remote sensing systems, and the possible uses for such data. The student will also acquire the capability for evaluating usefulness of the different types of remotely sensed data in solving a given problem related to the phenomenon observed on the Earth surface. This course is designed to teach students a range of processing and analysis techniques commonly applied in various contexts to remotely sensed data, especially optical data. Students will

	learn how different types of data can be managed and used effectively to obtain the information sought.
Programma e contenuti	Basic concepts • what is remote sensing • physical principles: interactions of electromagnetic waves with matter • sensors and platforms, ground-based, air-borne, space-borne Sensors • bands of the electromagnetic spectrum • different types of sensors, their classification and characteristics • optical sensors: multi- and hyper-spectral • (synthetic aperture) radar • examples of real-world sensors Data processing • remotely sensed data: characteristics and organization • radiometric correction • geometric correction • enhancement techniques Processing and analysis of Optical Remotely Sensed Data • Types of Optical Remotely Sensed Data and their characteristics • Statistical analysis • Spatial analysis • Spectral analysis Information extraction • revision on signal theory and stochastic variables • classification and reference data • supervised and unsupervised classification • contextual and object-based classification • accuracy estimation • artificial intelligence in satellite data processing Data fusion, information fusion, other techniques • Data fusion and information fusion concepts • Different types of data and information fusion • Fusion with ancillary data / metadata integration • Distributed collection of information / citizen sensor / crowdsourcing • Big Data from Space
Metodi didattici	The course is based on classroom lectures, possibly integrated with seminars. Whenever possible, hands-on sessions will be organized on processing of spaceborne optical datasets.
Testi di riferimento	Various authors. Land Applications of Radar Remote Sensing. InTech. Edited by Francesco Holecz, Paolo Pasquali, Nada Milisavljevic and Damien Closson, ISBN 978-953-51-1589-2, 318 pages. Chapters published June 11, 2014 under CC BY 3.0 license. DOI: 10.5772/55833 .
Modalità verifica apprendimento	The exam consists of an oral discussion on at least three different topics in the course, aimed at assessing the candidate's level of knowledge and understanding of the subject. The mark is expressed with a number

	between 18 (barely sufficient) and 30 with honours (excellent).
Altre informazioni	The course is suitable for graduate students of the masters course in computer science as well as for graduate students of the master course in electronics. During the course, various chances for additional insights are offered, among which the courses of the European Space Agency (ESA).
Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile