

Department	08 Geoinformatics
Course title	Remote Sensing 1
Hours per week (SWS)	4
Number of ECTS credits	5
Course objective	After attending this course the students know the opportunities and the limitations of today's remote sensing techniques. They are able to search and understand the difference between diverse remote sensing products, as well as the required processing steps for delivering correct and meaningful results. They are capable of designing, implementing, and assessing common remote sensing applications requested by typical users in pre-operational processing chains. They are trained in presenting and defending the results drawn from remote sensing data in front of an interdisciplinary and intercultural audience. Students have an overview of tools and software available (licensed and open source) to process the data according to up-to-date developments in the field.
Prerequisites	Mathematics: matrices, system of linear equations, 3D-transformations, homogeneous coordinates. Digital processing of images: linear filters, image segmentation based on histograms, colouring, correction of images. Statistics: statistical properties (standard deviation, covariance, correlation coefficient)
Recommended reading	Remote sensing and image interpretation Lillesand, Thomas M. 7. ed. Hoboken, NJ Verlag: Wiley 2015 Umfang: XII, 720 S. ISBN: 9781118343289 Practical handbook of remote sensing Lavender, Samantha Boca Raton ; London ; New York Verlag: CRC Press 2016 Umfang: xxii, 212 Seiten ISBN: 9781498704335 Geoinformation: remote sensing, photogrammetry, and geographic information systems Konecny, Gottfried 2. ed. Boca Raton, Fla. [u.a.] Verlag: CRC Press 2014 Umfang: XXXIII, 436 S. : ISBN: 9781420068566 Remote Sensing and GIS for Ecologists: Using Open Source Software (Data in the Wild) Wegmann, Leutner, Dech; Exeter. Pelagic Publishing, UK. 2016 ISBN-13: 978-1784270223
Teaching methods	Active/Experiential Learning; Collaborating; Demonstrating; Exkursionen; Lectures; Lecturing; Practices; Teamwork
Assessment methods	Schriftliche Prüfung
Language of instruction	English/German, Teaching materials in English
Name of lecturer	Prof. Dr.-Ing. Andreas Schmitt / M.Sc. Yrneh Ulloa
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Course content	<p>This module provides an overview of the recent development of remote sensing including former, current and potentially future applications.</p> <p>The main points are:</p> <ul style="list-style-type: none">• Physical Fundamentals• Types of Sensors (active, passive, etc.)• Platforms for Sensors and Communication• Geometric Characteristics of Imaging systems• Radiometric Properties of Remote Sensing Images• Spectrometric Measurements in Optics• (Partial-) Polarimetric Radar Images• Interferometric Analysis of Radar Acquisitions• Extended Feature Space for Classification Purposes• Classification of Raster Data using parametric, non-parametric, and Machine Learning Approaches <p>Strategies for the Validation of Classifications</p> <p>Usage of diverse software for the processing of remote sensing data</p> <p>The topics are introduced during the lecture and consolidated in exercises using practical examples provided by partners from research institutions, remote sensing service providers and administration.</p>
Remarks	<p>2 SWS Übung in englischer Sprache (Ulloa) + 2 SWS Vorlesung in deutscher oder englischer Sprache (Schmitt) - Vorlesungsmaterialien werden in englischer Sprache bereitgestellt</p>