

Block module 'Collocation and Applications'						
Code	Workload	Credits	Turnus		Duration	
M25-COAP-20182	90 h	3.0 LP	3. Fachsemester		1 Semester	
1	Courses:			Time of contact	Time of self-study	Regular semester
	1. Collocation and applications (3P)			45 h	45 h	3
2	Teaching method and groups size					
	1. Integrated lectures					
3	Learning objectives					
	Aquisition of deeper knowledge about basic concepts in interpolation and prediction theory					
4	Learning content					
	<p>The problem of data interpolation and prediction. Revision of the least-squares principle and Tikhonov regularization. The collocation approach and its deterministic and stochastic interpretation. Wiener-Kolmogorov optimization principle. Collocation estimates and error estimates with and without change of functional. Empirical covariance estimation and the concepts of invariance by translations and rotations. Examples of covariance models. Wiener filter and power spectra in the frequency domain. The generalization to the least-squares collocation approach and to the ordinary kriging.</p> <p>The collocation approach is applied to a set of numerical examples, and in particular to the data filtering and prediction of a 1D time series, to an inverse gravimetric problem in 2D planar approximation and to a geoid determination from gravity data in spherical approximation. These examples are performed in a computer laboratory, preferably by using MATLAB software.</p> <p>Keywords: Interpolation Theory - Collocation - Least Squares Collocation - Wiener Filter - Empirical Covariance Estimation - Covariance Models - Example of 1D Time Series Filtering - Example of 2D Inverse Gravimetric Problem - Example of Gravimetric Geoid Determination - MATLAB Software Development</p>					
5	Key competences					
	A graduate of this course shall be able to solve practical approximation problems on his/her own and to rate the quality and reliability of the predicted results.					
6	Course program usability					
	Geodäsie und Geoinformation (MSc)					
7	Prerequisites for admission to the module					
	Well-grounded knowledge in Linear Algebra, Numerics, Statistics and Computing are recommended					
8	Prerequisites for admission to the exam					
	none					
9	Exam(s) (Duration in time)					
	Semesterbegleitende Aufgaben (Assignment)					
10	Coordinator					
	Prof. Dr.techn. W.-D. Schuh (Institut für Geodäsie und Geoinformation)					
11	Lecturers					
	Prof. Dr.techn. W.-D. Schuh (Institut für Geodäsie und Geoinformation), Dr. Mirco Reguzzoni (Politecnico di Milano)					
12	Further information					
	The module will be conducted in English language and will take place from 28.01. to 01.02.2019.					
13	Date of issue					
	... bitte ergänzen ...					