Module name	**Machine Learning in Signal Processing**
Module number	CMS-TRK-MLSP
Senior Lecturer	Prof. Dr. Fettweis Gerhard.Fettweis@tu-dresden.de
Qualification objectives	Students have an overview of basic machine learning methods and their application in signal processing, in particular the estimated heoretic foundations of learning algorithms. Students have an understanding of the design principles of machine learning algorithms and of the fundamental trade-off between the flexibility of a machine learning model and its generalisation capability. They are familiar with methods of signal pre-processing and signal presentation for machine learning to apply to signal processing problems.
Contents	The module includes basic regression and classification methods, such as linear regression, logistic regression and the k-nearest-neighbor algorithm, and their estimated heoretic foundations, trade-off between model flexibility and generalisation capability, characteristics of learning in high-dimensional spaces compared to learning in low-dimensional spaces, flexibilisation of linear models by polynomous and splines, structured signal display Wavelets, key concepts of convex optimisation, support vector machines and neural network foundations.
Forms of teaching and learning	The module includes lectures of 2 SWS, exercises of 1 SWS, internships of 1 SWS and self-study. The language of the lectures, exercises and internships will be English.
Eligibility for participation	Basic skills are required in probability theory and linear algebra at bachelor's level.
Usability	In the Computational Modeling and Simulation Masters Course, the module is a compulsory voting module in the Track Applied Artificial Intelligence, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.

Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a 120-minute away time and an unrated portfolio of 15 hours. The language of the test will be English.
Credits and marks	The module allows 5 credit points to be obtained. Taking into account the sixth sentence of Section 15(1) of the General Audit Regulation, the module score results from the unweighted average of the scores for the individual audit services.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.