

2019.HS

<b>Module Name: Machine Learning: An Applied Introduction</b>			
Module Code	w.BA.XX.2ISL.XX		
Module Description	(Statistical) machine learning refers to a set of tools for modeling and understanding complex data, especially for making predictions. The availability of more and more data ("big data") and the ability of computer technology to evaluate them have made machine learning a highly dynamic field of research and application. Machine learning skills are very much in demand on the job market. This module teaches the basics of machine learning based on concrete problems. The introduction of and the extensive use of software suitable for machine learning (Python/scikit-learn) is a key element of the module.		
Program and Specialization	<ul style="list-style-type: none"> <li>§ Business Administration - Accounting, Controlling, Auditing</li> <li>§ Business Administration - Banking and Finance</li> <li>§ Business Administration - Banking and Finance (FLEX)</li> <li>§ Business Administration - Banking and Finance (PIE)</li> <li>§ Business Administration - Economics and Politics</li> <li>§ Business Administration - General Management</li> <li>§ Business Administration - Risk and Insurance</li> <li>§ Business Information Technology</li> </ul>		
Legal Framework	Academic Regulations BSc dated 29.01.2009, Appendix to the Academic Regulations for the degree programs in Business Administration, Business Information Technology, and Business Law, first adopted on 12.05.2009		
Module Category	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"><b>Module Type:</b> Compulsory Elective</td> <td style="width: 50%;"><b>Program Phase:</b> Main Study Period</td> </tr> </table>	<b>Module Type:</b> Compulsory Elective	<b>Program Phase:</b> Main Study Period
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ECTS	3		
Organizational Unit	W Institut für Wealth & Asset Management		
Module Coordinator	Thomas Gramespacher (grat)		
Deputy Module Coordinator	-		
Prerequisite Knowledge	w.BA.XX.2Mathe1.XX, w.BA.XX.2Mathe2.XX (or similar mathematics courses) w.BA.XX.2Stat.XX (or a similar introduction to statistics)		
Contribution to Program Learning Goals (Affected by Module)	<ul style="list-style-type: none"> <li>§ Professional Competence</li> <li>§ Methodological Competence</li> <li>§ Social Competence</li> <li>§ Self-Competence</li> </ul>		
Contribution to Program Learning Objectives	Professional Competence <ul style="list-style-type: none"> <li>§ Knowing and Understanding Content of Theoretical and Practical Relevance</li> <li>§ Apply, Analyze, and Synthesize Content of Theoretical and Practical Relevance</li> <li>§ Evaluate Content of Theoretical and Practical Relevance</li> </ul> Methodological Competence <ul style="list-style-type: none"> <li>§ Problem-Solving &amp; Critical Thinking</li> <li>§ Scientific Methodology</li> <li>§ Work Methods, Techniques, and Procedures</li> <li>§ Information Literacy</li> <li>§ Creativity &amp; Innovation</li> </ul> Social Competence <ul style="list-style-type: none"> <li>§ Oral Communication</li> </ul> Self-Competence <ul style="list-style-type: none"> <li>§ Self-Management &amp; Self-Reflection</li> <li>§ Ethical &amp; Social Responsibility</li> <li>§ Learning &amp; Change</li> </ul>		
Module Learning Objectives	Students... <ul style="list-style-type: none"> <li>§ understand the meaning of machine learning.</li> <li>§ are able to explain the difference between "supervised" and "unsupervised" learning.</li> <li>§ can distinguish between regression and classification problems.</li> <li>§ understand the key bias-variance trade-off and take it into account adequately in creating models.</li> <li>§ understand and use the classification into training and testing data to evaluate the generalization properties of a model.</li> <li>§ apply (multiple) linear regression to solve supervised-learning problems.</li> <li>§ solve classification problems using logistic regression and the k-nearest-neighbor algorithm and recognize the benefits and drawbacks of these methods.</li> <li>§ use validation to compare the performance of different models and to tune hyperparameters.</li> </ul>		

	§ have an overview of further important machine learning methods.		
Module Content	§ Machine learning: What is machine learning? Essential machine learning workflow. Evaluating model quality. § Linear regression: Simple linear regression; multiple linear regression. § Classification: an overview; logistical regression; k-nearest-neighbor algorithm. § Use of data in training, validation, and testing a machine learning algorithm. § Other important methods of machine learning - an overview § Introduction to the software environment used		
Links to other modules	The content of this module is linked to the following modules: w.BA.XX.2DAPyt.XX w.BA.XX.2Stat.XX w.BA.XX.2Stat-en.XX w.BA.XX.2Stat-flex.XX w.BA.XX.2Stat-WIN.XX		
Methods of Instruction	§ Interactive Instruction § Case Studies § Exercises	<b>Social Settings Used:</b> Individual Work	
Digital Resources	§ Practice and Application Exercises (with Key) § Case Studies (with Key)		
Type of Instruction	<b>Classroom Instruction</b>	<b>Guided Self-Study</b>	<b>Autonomous Self-Study</b>
Large Class	-	-	
Small Class	-	-	
Group Instruction	28 h	42 h	
Practical Work	-	-	
Seminar	-	-	
<b>Total</b>	<b>28 h</b>	<b>42 h</b>	
Performance Assessment			
<b>End-of-module exam</b>	<b>Form</b>	<b>Length (min.)</b>	<b>Weighting</b>
Written exam	Closed book	30	100,00 %
<b>Permitted Resources</b>	Approved calculator according to "Guidelines on Supplementary Materials"		
<b>Others</b>			
	<b>Assessment</b>	<b>Length (min.)</b>	<b>Weighting</b>
	-	-	-
Classroom Attendance Requirement	-		
Language of Instruction/Examination	German		
Compulsory Reading	-		
Recommended Reading	§ Müller, A. & Guido, S. (2017). Introduction to Machine Learning with Python. Boston: O'Reilly. ISBN 978-1-449-36941-5. § James, G., Witten, D., Hastie, T. & Tibshirani, R. (2013). An Introduction to Statistical Learning: with Applications in R. New-York: Springer. ISBN 978-1-4614-7137-0.		
Comments	The willingness to learn and use a programming language is a prerequisite for completing this course successfully and with enjoyment.		