

Valid for 2022.HS

Module Name: Machine Learning I	
Module Code	w.BA.XX.3ML1-WIN.XX
Module Description	Machine learning is more than a buzzword. The aim of this module is to introduce students to the set of rigorous statistical techniques that goes under the name of supervised machine learning. You will learn how to extract information from data, how to build and evaluate models, and how to make educated predictions about trends and random phenomena.
Program and Specialization	Business Information Technology - Specialization in Data Science
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	Module Type: Compulsory
	Program Phase: Main Study Period
ECTS	6
Organizational Unit	W Institut für Wirtschaftsinformatik
Module Coordinator	Pasquale Cirillo (ciri)
Deputy Module Coordinator	Elena Gavagnin (gava)
Prerequisite Knowledge	<ul style="list-style-type: none"> • Basic calculus. • An understanding of basic statistical concepts, including mean, variance, and correlation. • Some knowledge of R is an advantage but not a requirement.
Contribution to Program Learning Goals (Affected by Module)	§ Professional Competence § Methodological Competence § Social Competence § Self-Competence
Contribution to Program Learning Objectives	Professional Competence § Knowing and Understanding Content of Theoretical and Practical Relevance § Apply, Analyze, and Synthesize Content of Theoretical and Practical Relevance § Evaluate Content of Theoretical and Practical Relevance Methodological Competence § Problem-Solving & Critical Thinking § Scientific Methodology § Work Methods, Techniques, and Procedures § Information Literacy § Creativity & Innovation Social Competence § Written Communication § Oral Communication § Teamwork & Conflict Management § Intercultural Insight & Ability to Change Perspective Self-Competence § Self-Management & Self-Reflection § Ethical & Social Responsibility § Learning & Change
Module Learning Objectives	Students... § will understand the theoretical framework of supervised machine learning. § will be able to fit supervised models to different types of data. § will be able to judge the quality and the goodness-of-fit of a supervised model. § will know how to implement basic supervised learning models in R. § will learn some basic yet fundamental heuristics of machine learning.
Module Content	§ What is machine learning? What is supervised machine learning? What can be learnt? § Basics of statistical testing and data issues. § Linear regression. § Generalized linear models. § Trees and forests. § Discriminant analysis and support vector machines. § An introduction to neural networks. § Extra topic: urns (if time allows).
Links to other modules	The content of this module is linked to the following module: w.BA.XX.3ML2-WIN.XX

Methods of Instruction	§ Lecture § Exercises § Explorative Learning § Literature Review	Social Settings Used: § Individual Work § Group Work		
Digital Resources	§ Reader § Teaching Materials § Practice and Application Exercises (with Key)			
Type of Instruction	Classroom Instruction	Guided Self-Study	Autonomous Self-Study	
Large Class	56 h	-		
Small Class	-	-		
Group Instruction	-	-		
Practical Work	24 h	-		
Seminar	-	-		
Total	80 h	0 h	100 h	
Performance Assessment				
End-of-module exam	Form	Length (min.)	Weighting	
Oral exam		30	45,00 %	
Permitted Resources	Permitted resources to be communicated.			
Others				
	Assessment	Length (min.)	Weighting	
Talk/oral presentation	Grade	5	15,00 %	
Written Assignment	Grade	-	40,00 %	
Classroom Attendance Requirement	Mandatory Attendance: None Attendance is highly recommended, also considering the importance of the group assignment.			
Language of Instruction/Examination	English			
Compulsory Reading	§ Cirillo, P. (2022). Supervised Machine Learning. Lecture Notes. Available for free download on Moodle.			
Recommended Reading	§ James, G., Witten, D., Hastie, T. & Tibshirani, R. (2021). An Introduction to Statistical Learning. 2nd edition. Springer. ISBN 978-1-0716-1418-1. Freely available at: https://www.statlearning.com . § Dekking, F., Kraaikamp, C., Lopuhaä, H. & Meester, L. (2005). A Modern Introduction to Probability and Statistics. 1st edition. Springer. ISBN 1852338962.			
Comments	I strongly recommend downloading the book by James et al. (2021) on statistical learning as it represents a very valid complement to the lecturer's notes, especially for the use of R. The book by Dekking et al. (2005) is recommended as an additional resource for students who feel they need more statistical and probabilistic knowledge.			