

Modulbezeichnung	<b>Data Science</b>								
Modulverantwortliche(r)	Prof. Dr. A. Breiter								
Modulart	Pflicht/Wahl <input checked="" type="checkbox"/> Wahlpflicht <input type="checkbox"/>								
Spezialisierungsbereich									
Dauer des Moduls	1 Semester								
Kreditpunkte	6 CP								
Arbeitsaufwand	<table> <tr> <td>Berechnung des Workloads</td> <td></td> </tr> <tr> <td>Präsenz</td> <td>56 h</td> </tr> <tr> <td>Übungsbetrieb/Prüfungsvorbereitung</td> <td>124 h</td> </tr> <tr> <td>Summe</td> <td>180 h</td> </tr> </table>	Berechnung des Workloads		Präsenz	56 h	Übungsbetrieb/Prüfungsvorbereitung	124 h	Summe	180 h
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Übungsbetrieb/Prüfungsvorbereitung	124 h								
Summe	180 h								
Turnus des Moduls	i.d.R. jährlich								
Voraussetzung für die Teilnahme	Keine <input type="checkbox"/> Folgende <input type="checkbox"/> Inhaltliche Voraussetzungen: Grundlegende Programmierkenntnisse								
Lehr- und Lernformen	Seminar <input type="checkbox"/> Vorlesung <input checked="" type="checkbox"/> Tutorium <input checked="" type="checkbox"/> Praktikum <input type="checkbox"/> Projekt <input type="checkbox"/>								
Lernziele	<p>During this course, you will work in small groups on independent projects. Each group will have to</p> <ul style="list-style-type: none"> <li>• formulate a research question</li> <li>• pick and potentially collect a dataset</li> <li>• pick a suitable operationalisation and method</li> <li>• find and justify the best machine learning model</li> <li>• describe your approach and findings in a report</li> </ul>								
Lerninhalte	<p>From medical decision support systems to automatic language translation, from sorting and prioritizing news on social networks to autonomous cars: Machine learning is woven into the fabric of daily life. Applying machine learning, data science aims to extract knowledge or insights from data.</p> <p>The class will provide an introduction to data science and applied machine learning. For this, the programming language Python will be used (and taught). You will learn about the difference between supervised and unsupervised machine learning, and three machine learning tasks:</p> <ol style="list-style-type: none"> <li>1. classification (e.g. k-NN, Decision Trees, Support Vector Machines)</li> <li>2. regression (Linear Regression, Logistic Regression)</li> <li>3. clustering (k-means, dimensionality reduction with PCA and t-SNE)</li> </ol> <p>We will explore natural language processing for text mining and computer vision. Evaluation, as an integral part of data science, will be taught as well as data processing and data mining. To communicate our findings, we will also look at different visualization techniques.</p>								
Prüfungsformen	i.d.R. Übungsaufgaben und Fachgespräch								
Literatur	<ul style="list-style-type: none"> <li>• Doing Data Science, Cathy O'Neil &amp; Rachel Schutt</li> <li>• Introduction to Machine Learning with Python, Andreas C. Müller &amp; Sarah Guido</li> <li>• Building Machine Learning Systems with Python, Luis Pedro Coelho &amp; Willi Richert</li> </ul>								