

# MADS-MMS - Mathematics and Multivariate Statistics

## MADS-MMS - Mathematics and Multivariate Statistics

General information	
<b>Module Code</b>	MADS-MMS
<b>Unique Identifier</b>	MathMultivar-01-MA-M
<b>Module Leader(s)</b>	Prof. Dr. Doerfel, Stephan (stephan.doerfel@haw-kiel.de)
<b>Lecturer(s)</b>	Prof. Dr. Doerfel, Stephan (stephan.doerfel@haw-kiel.de)
<b>Offered in Semester</b>	Wintersemester 2021/22
<b>Module duration</b>	1 Semester
<b>Occurrence frequency</b>	Regular
<b>Module occurrence</b>	In der Regel jedes Semester
<b>Language</b>	Englisch
<b>Recommended for international students</b>	Yes
<b>Can be attended with different study programme</b>	No

Curricular relevance (according to examination regulations)
Study Subject: M.Sc. - DS - Data Science Module type: Pflichtmodul Semester: 1

Qualification outcome
<i>Areas of Competence: Knowledge and Understanding; Use, application and generation of knowledge; Communication and cooperation; Scientific self-understanding / professionalism.</i>
Students know - fundamental statistical concepts and methods relevant for modern data science and understand for which type of tasks they are most suitable. - the connection between the covered statistical methods and algorithms and their mathematics foundations.
Students are able to - apply statistical methods to real-world problems. - reflect on advantages and limitations of algorithms in practical terms - derive insights and build on the related scientific literature
Students are able to - correctly interpret and communicate the approach and results both in technical and functional terms - work professionally with standard data mining methodology.

Content information	
<b>Content</b>	<p>Statistics:</p> <ul style="list-style-type: none"> <li>- Clustering</li> <li>- Frequent Itemset Mining</li> <li>- Dimensionality Reduction</li> </ul> <p>Mathematics:</p> <ul style="list-style-type: none"> <li>- Basic linear algebra and calculus</li> <li>- Similarity and distance measures</li> <li>- Matrix decomposition techniques</li> <li>- Gradient descent</li> </ul>

<b>Literature</b>	<ul style="list-style-type: none"> <li>- Lecture Slides</li> <li>- Additional Literature:           <ul style="list-style-type: none"> <li>- Leskovec, Rajaraman and Ullman: Mining of Massive Datasets. Cambridge University Press; third edition. Available online: <a href="#">BLOCKEDmmds[.]orgBLOCKED</a></li> <li>- Boyd and Vandenberghe: Introduction to Applied Linear Algebra. Cambridge University Press. Available online: <a href="https://web.stanford.edu/~boyd/vmls/vmls.pdf">https://web.stanford.edu/~boyd/vmls/vmls.pdf</a></li> <li>- Raschka and Mirjalili: Python Machine Learning. Packt (2017).</li> </ul> </li> </ul>
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### Teaching formats of the courses

Teaching format	SWS
Lehrvortrag + Übung	4

### Workload

<b>Number of SWS</b>	4 SWS
<b>Credits</b>	5,00 Credits
<b>Contact hours</b>	48 Hours
<b>Self study</b>	102 Hours

### Module Examination

<b>Examination prerequisites according to exam regulations</b>	None
<b>MADS-MMS - Portfolioprüfung</b>	Method of Examination: Portfolioprüfung Weighting: 100% wird angerechnet gem. § 11 Absatz 2 PVO: No Graded: Yes