



Ruhr Master School  
of Applied Sciences

Dieses Wahlpflichtmodul ist ein Angebot der:

**Fachhochschule  
Dortmund**

University of Applied Sciences and Arts

**Master Digital Transformation**

# Information Processing and Data Analytics

[daniel.vonfalkenhayn@fh-dortmund.de](mailto:daniel.vonfalkenhayn@fh-dortmund.de)

Prof. Dr. Christian Reimann  
[christian.reimann@fh-dortmund.de](mailto:christian.reimann@fh-dortmund.de)

Hochschule Bochum  
Bochum University  
of Applied Sciences



Fachhochschule  
Dortmund  
University of Applied Sciences and Arts



Westfälische  
Hochschule  
Gelsenkirchen Bocholt Recklinghausen  
University of Applied Sciences

STIFTUNG  
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## Compulsory Elective

<b>Information Processing and Data Analytics (MOD-E07)</b>					
<b>Code Number</b>	<b>Workload</b>	<b>Credits</b>	<b>Semester</b>	<b>Frequency</b>	<b>Duration</b>
48207	180 h	6	3	winter semester	1 Semester
<b>1</b>	<b>Course Title</b>		<b>Contact hours</b>	<b>Self-Study</b>	<b>Planned Group Size</b>
	Information Processing and Data Analytics		4 SWS / 60 h	120 h	25 students
<b>2</b>	<b>Course Description</b>				
	Modern management is based on facts and on data. Dealing with data, analyzing data and deriving conclusions and decisions from data is crucial for management. The module is developing the topics of information processing and data analytics along a case study.				
<b>3</b>	<b>Course Structure</b>				
	<p><i>1. Information processing and data collection</i></p> <p>1.1 Development of indicator systems 1.2 Design of data collection experiments with online tools 1.3 IT tools for data collection 1.4 Advanced MS Excel</p> <p><i>2. Data bases and data warehouses</i></p> <p>2.1 Introduction to databases, SQL 2.2 Data warehouse systems 2.3 Cloud based systems 2.3 Analysis of Case Studies</p> <p><i>3. Data analytics</i></p> <p>3.1 Data refinement 3.2 Data analytics and business intelligence 3.3 Probabilistic methods 3.4 Artificial intelligence and learning (introduction to IBM Watson)</p>				
<b>4</b>	<b>Application Focus</b>				
	<p>Students will be guided through a case study project where they set up a small experiment for data collection, data storage and query and data processing for an example case. They form teams and set up IT tools.</p> <p>Trainings: students attend an Excel training and an IBM Watson training</p>				
<b>5</b>	<b>Scientific Focus</b>				
	Students work in teams and set up data analytics experiments and tools for their respective case study project.				
<b>6</b>	<b>Parameters</b>				
	<ul style="list-style-type: none"> <li>ECTS: 6</li> </ul>				

	<ul style="list-style-type: none"> <li>• Hours of study in total: 180</li> <li>• Weekly hours per semester: 4             <ul style="list-style-type: none"> <li>– Contact hours: 60</li> <li>– Self-Study hours: 120</li> </ul> </li> <li>• Course characteristics: elective</li> <li>• Course frequency: every year - winter semester</li> <li>• Maximal capacity: 25 students</li> <li>• Course admittance prerequisites: none</li> <li>• Skills trained in this course: theoretical knowledge, practical skills and scientific competences</li> <li>• Assessment of the course: Theoretical knowledge (30%): Written or oral Exam at the end of the course, Practical Skills (50%): contributions within case study project (team presentation) and Scientific Competences (20%): written paper (report, approx. 10 pages) and presentation (in class or at a student conference, e.g. International Research Conference Dortmund)</li> <li>• Teaching staff: Prof. Dr. Christian Reimann, PhD students from IDiAL, guest lecturers from partner universities (e.g.. FH Krems)</li> </ul>
<p><b>7</b></p>	<p><b>Learning outcomes</b></p> <p>7.1 Knowledge Student can</p> <ul style="list-style-type: none"> <li>• explain the basic characteristics of data and data collection</li> <li>• explain advanced functionality of Excel</li> <li>• explain database and data warehouse concepts</li> <li>• explain the core concepts of data analytics and business intelligence</li> </ul> <p>7.2 Skills</p> <ul style="list-style-type: none"> <li>• develop data collection experiments with online tools</li> <li>• apply MS Excel for data analytics</li> <li>• set up and use simple SQL databases</li> <li>• set up and use tools for statistical data analysis</li> <li>• use IBM Watson for AI experiments</li> </ul> <p>7.3 Competence – attitude</p> <ul style="list-style-type: none"> <li>• students train to do surveys with people from different cultural backgrounds</li> <li>• in discussion students develop a critical attitude to data based decision making and to issues like privacy and data protection</li> </ul>
<p><b>8</b></p>	<p><b>Teaching and training methods</b></p> <ul style="list-style-type: none"> <li>• Theoretical knowledge: (video-)lectures introducing concepts, methods and tools, tool tutorials</li> <li>• Practical Skills: group work in the case study project to practice concepts and methods, to develop skills and to work on case studies</li> <li>• Scientific Competences: presentations to communicate results and do a scientific discussion and reflection</li> </ul>
<p><b>9</b></p>	<p><b>Course mapping</b></p> <p>Input for: none</p> <p>Input from: none</p>

<b>10</b>	<b>References</b>  <u>Basics &amp; Practitioner</u>  Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, Bob Becker: The Kimball Group Reader: Relentlessly Practical Tools for Data Warehousing and Business Intelligence, John Wiley & Sons 2010  Steven S. Skiena, The Data Science Design Manual (Texts in Computer Science), Springer 2017  Galit Shmueli, Peter C. Bruce, Inbal Yahav, Nitin R. Patel, Kenneth C. Lichtendahl, Data Mining for Business Analytics: Concepts, Techniques, and Applications in R, Wiley & Sons, 2017  Thomas A. Runkler, Data Analytics: Models and Algorithms for Intelligent Data Analysis, 3 <sup>rd</sup> Edition, Springer Vieweg, 2020  Alan Beaulieu, Learning SQL: Generate, Manipulate, and Retrieve Data, O'Reilly, 2020  John D. Kelleher and Brendan Tierney, Data Science. The MIT Press, 2018  Alan Said and Vicen Torra, Data Science in Practice (1st. ed.). Springer Publishing Company, Incorporated, 2018  <u>Research (Journals, Conferences and selected papers)</u>  ACM Special Interest Group on Management of Data (SIGMOD)  SIGMOD '19: Proceedings of the 2019 International Conference on Management of Data  Lise Getoor, Responsible Data Science. In Proceedings of the 2019 International Conference on Management of Data (SIGMOD '19), 2019  Longbing Cao, Data Science: A Comprehensive Overview. ACM Comput. Surv. 50, 3, Article 43 (October 2017), 2017
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