Master of Science (M.Sc.)

„Mannheim Master in Data Science“

University of Mannheim

– Module catalog –

Appendix

Academic Year

HWS 23/24

Die folgenden Veranstaltungen wurden nach Veröffentlichung des Modulkatalogs dem Kursprogramm hinzugefügt.

B. Fundamentals

Module No.	Name of Module	Offered	Language	ECTS
DS 100	Statistics for Data Scientists	HWS	E	8

C. Data Management

Module No.	Name of Module	Offered	Language	ECTS
MAC 570	Reinforcement Learning - Coding	Irreg.	E	5

D. Data Analytics Methods

Module No.	Name of Module	Offered	Language	ECTS
IS 515*	Process Management and Analytics*	HWS	E	6
CS 647	Image Processing	HWS/FSS	E	6
CS 646	Higher Level Computer Vision	HWS	E	6
CS 668	Generative Computer Vision Models	FSS	E	6
DS 201	Machine Learning and Causal Inference	FSS	E	9
IE 698	Foundations and Applications of Digital Health Technologies	FSS	E	3
IE 699	Co-creating digital health applications with design methodology	FSS	E	6

* For a detailed description please use the module catalogue of the „Mannheim Master in Management": https://www.bwl.uni-mannheim.de/media/Fakultaeten/bwl/Dokumente/Studium/MMM/Fruehere_Modulkataloge/MMM_Modulkatalog_ab_2022_de.pdf

E. Responsible Data Science

Module No.	Name of Module	Offered	Language	ECTS
DS 203	Responsible AI: Conceptual Foundations, Methods and Applications	HWS	E	6

F. Projects and Seminars

Module No.	Name of Module	Offered	Language	ECTS
CS 717	Master Seminar on Computer Vision	FSS	E	4
IS 752*	Seminar on Process and Management Analytics	FSS	E	4

* For a detailed description please use the module catalog of the „Mannheim Master in Management“:
https://www.bwl.uni-mannheim.de/studium/master/mmm/#c176637

Detailed Descriptions

B. Fundamentals

DS 100	Statistics for Data Scientists
Form of module	Lecture and Tutorial
Type of module	Foundations of Data Science
Level	Master
ECTS	8 (240 hours)
Workload	Hours per semester present: 56 h (4 SWS)
	Self-study: 152 h per semester • 91 h: pre and post lecture/tutorial studying and revision • 42 h: studying for and taking weekly online tests • 40 h: examination preparation • 41 h: preparation and presentation of weekly exercises
Prerequisites	A sound understanding of the linear regression model (OLS) is required. Knowledge in linear algebra and calculus is useful.
Aim of module	The course provides an introduction to causal inference, linear models, and maximum likelihood estimation. The course will cover the following topics: • Causal Inference • Hypotheses testing • Linear Regression · Selected GLM, e.g., binary choice models, models for ordinal data, models multinomial data, models for count data
Learning outcomes and qualification goals	Expertise (MK1, MK3): Understand how to appropriately translate research question into statistical models, be able to apply statistical models appropriate for non-linear problems and learn how to present and interpret estimation results in a substantive meaningful way.
	Methodological competence (MK1, MK3):

	Estimate regression parameters using the maximum likelihood principle; Perform hypothesis tests for regression models using the maximum likelihood principle; Be able to identify violations of the respective regression assumptions of the discussed GLMs; Be able to identify limitations of non-linear regression models.
	Personal competence (MF1, MF2, MF3, MKO1, MKO2): The course supports students to develop competences with regard to choosing the appropriate statistical method(s) to answer respective research questions and how to present and communicate statistical results.
Media	Lecture slides available online, exercises available online
Literature	• Cameron, C.A. and P.K. Trivedi. 1998. Regression Analysis of Count Data. Cambridge: Cambridge University Press. • Greene, W.H. (2008). Econometric Analysis. 6th ed. Upper Saddle River: Prentice Hall. • Long, J.S. (1997). Regression Models for Categorical and Limited Dependent Variables. Thousand Oaks: Sage. • Verbeek, M. 2017. A Guide to Modern Econometrics. 5th ed. Chichester: Wiley. • Wooldridge, J.M. 2002. Econometric Analysis of Cross Section and Panel Data. Cambridge, MA: MIT Press. • Imbens, Guido W., and Donald B. Rubin. Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction. Cambridge: Cambridge University Press, 2015. • Angrist, Joshua D., and Jorn-Steffen Pischke. Mostly Harmless Econometrics: An Empiricist's Companion. Princeton: Princeton University Press, 2009.
Methods	Lecture elements, weekly online tests, literature studies
Form of assessment	Written examination
Admission requirements for assessment	Oral participation, homework, presentations, compulsory attendance
Duration of assessment	90 Minutes
Language	English
Offering	Fall semester

Lecturer	Lecturer of the School of Social Sciences, I.e chair of Social Data Science
Person in charge	Lecturer of the School of Social Sciences, I.e. Chair of social Data Science
Duration of module	1 semester
Further modules	
Range of application	MMDS
Semester	1st semester

C. Data Management

TBA	Reinforcement Learning - Coding
Form of module	Lectures with exercises
Type of module	Mathematics C
Level	Master
ECTS	5
Workload	28 hours lectures 122 hours self-studies
Prerequisites	Reinforcement Learning
Aim of module	Implementation of standard algorithms in reinforcement learning • Bandit algorithms (UCB) • TD algorithms (Q-learning, TD) • Policy gradient algorithms (SAC, PPO)
Learning outcomes and qualification goals	MK1, M02, M03
	MF1, MF3
	(cf, "Erläuterungen zu den Abkürzungen")
Media	Blackboard, Slides
Literature	Original articles
Methods	Lectures, programmig tasks
Form of assessment	written exam
Admission requirements for assessment	-
Duration of assessment	90 min
Language	English
Offering	irregular
Lecturer	Prof. Dr. Leif Döring

Person in charge	Prof. Dr. Leif Döring
Duration of module	1 semester
Further modules	-
Range of application	M.Sc. Wirtschaftsmathematik, B.Sc. Wirtschaftsmathematik, M.Sc. Mathematik, M.Sc. Mannheim Master in Data Science, M.Sc. Wirtschaftsinformatik
Semester	1st, 2nd, 3rd

D. Data Analytics Methods

CS 647	Image Processing
Form of module	Lecture with Exercise
Type of module	Specializaton Course
Level	Master
ECTS	6
Workload	Hours per semester present: 56 (4SWS)
	Self-study: 98h • 70h lecture/exercises • 28h exam preparation
Prerequisites	Basis skills in linear algebra, basis knowledge in python
Aim of module	• Introduction to Imaging (human visual system, optics, sensors) • Noise and basic operations (convolution, correlations, gradients) • Energy minimization • Variational Methods • Feature extraction • Classification • Segmentation • Image Sequences and Motion (Optical Flow) • Stereo Vision
Learning outcomes and qualification goals	Expertise: The students have a detailed understanding of image and video processing techniques. They can evaluate given image processing algorithms. (MK1, MK2, MF1, MF3)
	Methodological competence: Students understand the technical basis of image processing algorithms; they can explain the discussed methods and implement them. (MF1, MF2, MF3)
	Personal competence: Understanding complex Image Processing problems; thorough judgment in the design and use of methods; can work efficiently in a team. (MK01, MK02)

Media	Exercise sheets and lecture slides available online.
Literature	• R. Szeliski: Computer Vision Algorithms and Applications, Springer, 2010. ISBN: 978-1-84882-934-3. (Online available: http://szeliski.org/Book/) • D. Forsyth, J. Ponce: Computer Vision: A Modern Approach, Prentice Hall, 2nd edition, 2012. ISBN: 978-0136085928 (Online available: http://cmuems.com/excap/readings/forsyth-ponce-computer-vision-a-modern-approach.pdf)
Methods	Lecture, weekly exercise, book studies, implementation of algorithms, visualization of results
Form of assessment	Written or oral examination (TBA)
Admission requirements for assessment	-
Duration of assessment	90 minutes (written) or 20 minutes (oral)
Language	English
Offering	Fall Semester/ Spring Semester
Lecturer	Professor Dr.-Ing. Margret Keuper
Person in charge	Professor Dr.-Ing. Margret Keuper
Duration of module	1 Semester
Further modules	Higher Level Computer Vision
Range of application	M. Sc. Wirtschaftsinformatik, M.Sc. Mannheim Master in Data Science, Lehramt Informatik
Semester	1st/2nd/3rd semester

CS 646	**Higher Level Computer Vision**
Form of module	Lecture with Exercise
Type of module	Specialization Course
Level	Master
ECTS	6
Workload	Hours per semester present: 56 (4SWS)
	Self-study: 98h • 70h lecture/exercises • 28h exam preparation
Prerequisites	Basis skills in linear algebra, basis knowledge in python and pytorch
Aim of module	• Point Features and point matching • Object Identification • Deep Learning for Computer Vision • Object Detection • Image Segmentation • Optical Flow • Video and Motion Segmentation
Learning outcomes and qualification goals	Expertise: The students have a detailed understanding of Computer Vision techniques. They can evaluate given Computer Vision algorithms. (MK1, MK2, MF1, MF3)
	Methodological competence: Students understand the technical basis of Computer Vision algorithms; they can explain the discussed methods and implement them. (MF1, MF2, MF3)
	Personal competence: Understanding complex Computer Vision problems; thorough judgment in the design and use of methods; can work efficiently in a team. (MK01, MK02)
Media	Exercise sheets and lecture slides available online.

Literature	• Goodfellow et al..: Deep Learning, MIT Press, 2016. https://www.deeplearningbook.org/ • R. Szeliski: Computer Vision Algorithms and Applications, Springer, 2010. ISBN: 978-1-84882-934-3. (Online available: http://szeliski.org/Book/ • D. Forsyth, J. Ponce: Computer Vision: A Modern Approach, Prentice Hall, 2nd edition, 2012. ISBN: 978-0136085928 (Online available: http://cmuems.com/excap/readings/forsyth-ponce-computer-vision-a-modern-approach.pdf • R. Hartley, A. Zisserman: Multiple View Geometry in Computer Vision, Cambridge University Press, 2nd edition, 2004.
Methods	Lecture, weekly exercise, book studies, implementation of algorithms, visualization of results
Form of assessment	Written or oral examination (TBA)
Admission requirements for assessment	-
Duration of assessment	90 minutes (written) or 20 minutes (oral)
Language	English
Offering	Fall semester
Lecturer	Professor Dr.-Ing. Margret Keuper
Person in charge	Professor Dr.-Ing. Margret Keuper
Duration of module	1 Semester
Further modules	Image Processing
Range of application	M. Sc. Wirtschaftsinformatik, M.Sc. Mannheim Master in Data Science, Lehramt Informatik
Semester	1st/2nd/3rd semester

DS 201	**Machine Learning and Causal Inference**
Form of module	Lecture and Tutorial
Type of module	Data Science Methods: Fundamentals
Level	Master
ECTS	9 (270 hours)
Workload	Hours per semester present: 56 h (2 SWS)
	Self-study: 214 h per semester • 91 h: pre and post lecture studying and revision • 42 h: studying for and taking weekly online tests • 41 h: preparation and presentation of weekly exercises • 40 h: examination preparation
Prerequisites	A sound understanding of basic statistical methods incl. regression analysis, estimation methods (OLS, MLE), and statistical inference is required. Knowledge in linear algebra and calculus is useful.
Aim of module	The course aims to introduce students to advanced causal inference and machine learning methods, discussing models in detail. It first deals with causal inference topics, for instance, synthetic control and its extensions, causal inference in panel and difference-in-difference models. The course also covers estimating mediation effects, controlled direct effects, and gives an introduction to directed acyclic graphs (DAGs). The second part of the course then discusses a theory of causal estimation and the role of machine learning in estimating these effects. Advanced and popular techniques of machine learning are introduced.
Learning outcomes and qualification goals	Expertise: Students are aware of how machine learning can help answer causal questions; they can analyze (large) data sets using popular techniques of machine learning. (MK1)
	Methodological competence: Students are able to translate their research question(s) into a causal framework; they can apply different techniques of machine learning. (MK1, MK3)

	Personal competence: The course supports students to develop competences with regard to choosing the appropriate statistical method(s) to answer respective research questions. (MF1, MF2, MF4, MKO1, MKO2)
Media	Lecture slides available online
Literature	• Angrist, Joshua D., and Jörn-Steffen Pischke. 2009. Mostly Harmless Econometrics: An Empiricist’s Companion. Princeton: Princeton University Press. • Murphy, Kevin P. 2012. Machine Learning: A Probabilistic Perspective. Cambridge: MIT Press. • Hastie, Trevor, Robert Tibshirani, and Jerome Friedman. 2008. The Elements of Statistical Learning. 2nd ed. New York: Springer. • Imbens, Guido W., and Donald B. Rubin. 2015. Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction. Cambridge: Cambridge University Press. • Morgan, Stephen L., and Christopher Winship. 2007. Counterfactuals and Causal Inference. Cambridge: Cambridge University Press.
Methods	Lecture elements, weekly online tests, literature studies
Form of assessment	Written examination
Admission requirements for assessment	Oral participation, homework, presentations, compulsory attendance
Duration of assessment	90 Minutes
Language	English
Offering	Spring semester
Lecturer	Lecturer of the School of Social Sciences, I.e. Chair of Social Data Science
Person in charge	Lecturer of the School of Social Sciences, I.e Chair of Social Data Science
Duration of module	1 semester
Further modules	
Range of application	MMSDS, MMDS

Semester	2^{nd} semester

CS 668	**Generative Computer Vision Models**
Form of module	Lecture with Exercise
Type of module	Specialization Course
Level	Master
ECTS	6
Workload	Hours per semester present: 56 (4SWS)
	Self-study: 98h • 70h lecture/exercises • 28h exam preparation
Prerequisites	Basis skills in linear algebra, basis knowledge in python/pytorch
Aim of module	• Introduction to Clustering and Unsupervised Learning • Introduction to Generative Models • Autoregressive Models for Image Generation • (Normalizing) Flow • Latent Variable Models • Latent Space Visualizations • Generative Adversarial Models • Diffusion Models • Multi-Modal Conditioning
Learning outcomes and qualification goals	Expertise: The students have a detailed understanding of image generation techniques, latent variable models, and their evaluations. (MK1, MK2, MF1, MF3)
	Methodological competence: Students understand the technical basis of generative models; they can explain the discussed methods and implement them. (MF1, MF2, MF3)
	Personal competence: Understanding image generative models, their working principles and training procedures; thorough judgment in the design and use of methods; Students can work efficiently in a team. (MK01, MK02)

Media	Exercise sheets and lecture slides available online.
Literature	• Ian Goodfellow and Yoshua Bengio and Aaron Courville, Deep Learning, An MIT press book, 2016.
Methods	Lecture, weekly exercise, book studies, implementation of algorithms, visualization of results
Form of assessment	Written or oral examination (TBA)
Admission requirements for assessment	-
Duration of assessment	90 minutes (written) or 20 minutes (oral)
Language	English
Offering	Spring Semester
Lecturer	Professor Dr.-Ing. Margret Keuper
Person in charge	Professor Dr.-Ing. Margret Keuper
Duration of module	1 Semester
Further modules	Higher Level Computer Vision
Range of application	M. Sc. Wirtschaftsinformatik, M.Sc. Mannheim Master in Data Science, Lehramt Informatik
Semester	1st/2nd/3rd semester

E. Responsible Data Science

DS 203	**Responsible AI: Conceptual Foundations, Methods and Applications**
Form of module	Lecture with Essay
Type of module	Specialization Course
Level	Master

ECTS	6
Workload	Hours per semester in presence: 28 (2 SWS) Self-study: 56 h lectures; 20 h essay / preparation oral exam
Prerequisites	Basic knowledge about AI systems (knowledge-based systems, machine learning, deep neural networks)
Aim of module	Conceptual foundations: - understanding of important concepts in human-AI interaction and AI ethics (such as trust, autonomy, responsibility) Methods: - e.g., narrative interviews, group discussions, design research methods (prototyping, design thinking, techno-mimesis), (digital) ethnography, participatory action research Applications: - AI in medicine and healthcare - Social robotics - Generative AI - other use cases / real-world AI applications
Learning outcomes and qualification goals	Expertise: Students gain insights and understanding of important concepts in human-AI interaction and AI ethics. They learn modes of transdisciplinary thinking and theorizing. Along sector-specific use cases they learn about ethical, legal and social aspects and challenges of real-world AI application, e.g. for healthcare.
	Methodological competence: Students learn elements of mixed-methods study design for human-AI interaction research
	Personal competence: Students learn to critically assess conceptual, ethical, legal and social aspects of human-AI interaction. They gain skills in transdisciplinary research and theory-building and learn to transfer these insights to real-world human-AI interaction scenarios.
Media	Slides are available online
Literature	- Voeneky, S., P. Kellmeyer, O. Mueller, and W. Burgard, ed. 2022. The Cambridge Handbook of Responsible Artificial Intelligence: Interdisciplinary Perspectives. Cambridge Law Handbooks. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781009207898 (open source) - Coeckelbergh, Mark. AI ethics. (2020). The MIT Press. https://www.gbv.de/dms/bowker/toc/9780262538190.pdf - Heilinger, J.-C. (2022). The Ethics of AI Ethics. A Constructive Critique. Philosophy & Technology, 35(3), 61. https://doi.org/10.1007/s13347-022-00557-9

	- McLennan, S., Fiske, A., Tigard, D., Müller, R., Haddadin, S., & Buyx, A. (2022). Embedded ethics: A proposal for integrating ethics into the development of medical AI. BMC Medical Ethics, 23(1), 6. https://doi.org/10.1186/s12910-022-00746-3 - Schmitt, L. (2021). Mapping global AI governance: A nascent regime in a fragmented landscape. AI and Ethics. https://doi.org/10.1007/s43681-021-00083-y
Methods	Interactive lecture
Form of assessment	Essay
Admission requirements for assessment	--
Duration of assessment	Essays need to be handed in by December 8th
Language	English
Offering	Fall semester
Lecturer	JProf. Dr. Philipp Kellmeyer
Person in charge	JProf. Dr. Philipp Kellmeyer
Duration of module	1 Semester
Further modules	Follow-up (block) seminar planned for summer semester 2024
Range of application	Msc Business Informatics, Msc Data Science, Lehramt Informatik
Semester	All semesters possible

IE 698	**Foundations and Applications of Digital Health Technologies**
Form of module	Lecture with Excercise
Type of module	Specialization Course
Level	Master
ECTS	3
Workload	Hours per semester in presence: 28 h per semester Self-study: 56 h per semester
Prerequisites	Necessary: Basic knowledge about AI systems (knowledge-based systems, machine learning, deep neural networks) Optional: - Participation of Lecture “Responsible AI” Winter Term 2023/24 - Basic knowledge about digital health systems
Aim of module	Conceptual foundations: - Understanding of important concepts in digital health (eHealth, mHealth, telehealth, digital phenotyping, digital twins, and other concepts) Methods: - e.g., interviewing, group discussions, design research methods (prototyping, design thinking, co-design), (digital) ethnography Applications: - AI in digital health apps in medicine and healthcare - AI-based robots - AI-based VR systems
Learning outcomes and qualification goals	Knowledge (MK1): Students gain insights and understanding of important concepts in digital health. They learn modes of transdisciplinary thinking and theorizing on digital health.
	Capabilities (MF1 and MF2): Students learn elements of mixed-methods study design for digital health research and co-design methodology and learn to assess scientific publications in this domain critically.
	Competencies (MKO1): Students learn to critically assess the conceptual, technical, ethical, legal, and social aspects of digital health applications.
Media	Slides and supporting media will be available online.
Literature	- Fagherazzi, G. Deep Digital Phenotyping and Digital Twins for Precision Health: Time to Dig Deeper. Journal of Medical Internet Research 22, e16770 (2020). https://www.jmir.org/2020/3/e16770/

	- Hahn, H. & Schreiber, A. E-Health. in Digital Transformation (ed. Neugebauer, R.) 311–334 (Springer Berlin Heidelberg, 2019). https://doi.org/10.1007/978-3-662-58134-6_19 - Budd, J. et al. Digital technologies in the public-health response to COVID-19. Nat Med 26, 1183–1192 (2020). https://www.nature.com/articles/s41591-020-1011-4 - Voeneky, S., P. Kellmeyer, O. Mueller, and W. Burgard, ed. 2022. The Cambridge Handbook of Responsible Artificial Intelligence: Interdisciplinary Perspectives. Cambridge Law Handbooks. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781009207898 (open source)
Methods	Interactive lecture
Form of assessment	Written exam
Admission requirements for assessment	-
Duration of assessment	45 min
Language	English
Offering	Spring semester
Lecturer	Jun.-Prof. Dr. Philipp Kellmeyer
Person in charge	Jun.Prof. Dr. Philipp Kellmeyer
Duration of module	1 Semester
Further modules	Lecture on Responsible AI, Fall 2024
Range of application	Msc Business Informatics, Msc Data Science, Lehramt Informatik
Semester	All semesters possible

IE 699	**Co-creating digital health applications with design methodology**
Form of module	Excercise
Type of module	Specialization Course
Level	Master
ECTS	6
Workload	Hours per semester in presence: 56 h Self-study: 112 h
Prerequisites	Necessary: Basic knowledge about AI systems (knowledge-based systems, machine learning, deep neural networks) Optional: - Participation of Lecture "Responsible AI" Winter Term 2023/24 - Basic knowledge about digital health systems
Aim of module	Conceptual foundations: Understanding of important concepts in digital health (eHealth, mHealth, telehealth, digital phenotyping, digital twins, and other concepts) Methods: Interviewing, group discussions, design research methods (prototyping, design thinking, co-design), (digital) ethnography Applications: By-design approaches to developing digital health apps and other solutions.
Learning outcomes and qualification goals	Knowledge (MK1): Along with digital health use cases, they learn basic by-design principles for developing digital health applications.
	Capabilities (MF1, MF2, MF3): Students learn elements of mixed-methods study design for digital health research and co-design methodology via design fictions and mockups developed in groups in the exercise
	Competencies (MKO1): Students learn to apply their knowledge and capabilities regarding by-design approaches to solve specific problems in a team context.
Media	Slides and supporting media will be available online.
Literature	- Fagherazzi, G. Deep Digital Phenotyping and Digital Twins for Precision Health: Time to Dig Deeper. Journal of Medical Internet Research 22, e16770 (2020). https://www.jmir.org/2020/3/e16770/ - Hahn, H. & Schreiber, A. E-Health. in Digital Transformation (ed. Neugebauer, R.) 311–334 (Springer Berlin Heidelberg, 2019). https://doi.org/10.1007/978-3-662-58134-6_19 - Budd, J. et al. Digital technologies in the public-health response to COVID-19. Nat Med 26, 1183–1192 (2020). https://www.nature.com/articles/s41591-020-1011-4

	- Voeneky, S., P. Kellmeyer, O. Mueller, and W. Burgard, ed. 2022. The Cambridge Handbook of Responsible Artificial Intelligence: Interdisciplinary Perspectives. Cambridge Law Handbooks. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781009207898 (open source)
Methods	Excercise
Form of assessment	Presentation in course
Admission requirements for assessment	-
Duration of assessment	20 min (15 min. Presentation, 5 min Q&A)
Language	English
Offering	Spring semester
Lecturer	Jun.-Prof. Dr. Philipp Kellmeyer
Person in charge	Jun.Prof. Dr. Philipp Kellmeyer
Duration of module	1 Semester
Further modules	Lecture on Responsible AI, Fall 2024
Range of application	Msc Business Informatics, Msc Data Science, Lehramt Informatik
Semester	All semesters possible

F. Projects and Seminars

CS 717	**Master Seminar on Computer Vision**	
Form of module	Seminar	
Type of module	Seminar	
Level	Master	
ECTS	4	

Workload	120 h per semester
Prerequisites	Higher Level Computer Vision or Image Processing
Aim of module	The student prepares a scientific paper and gives a presentation on a current research topic based on published research. State-of-the-art topics are proposed by the professors. The paper and the presentation are prepared under the guidance of a professor or a research staff member. Active participation in the seminar discussions is expected.
Learning outcomes and qualification goals	Expertise: The student gains a deep understanding of the research topic. He/she is able to describe/summarize the topic in detail in his/her own words. He/she reflects on the topic and judges the contribution of the research papers.
	Methodological competence: The student is able to write a well-structured scientific paper and to present his/her results. He/she is also aware of the need to avoid plagiarism. The key qualification Scientific Research is highly recommended as a prerequisite for the seminar.
	Personal qualification: The student has learned how to write a well-structured, concise paper and give a presentation. This is part of the preparation to write and present a Master's Thesis.
Media	Scientific papers and books
Literature	Depending on the topic of the seminar
Methods	Do scientific reading independently under the guidance of a professor or a research staff member. Active discussions in a group of peers.
Form of assessment	30% Presentation (takes place after one month) 70% Seminar Report (has to be submitted after three month)
Admission requirements for assessment	

Duration of assessment	N/A
Language	English
Offering	FSS
Lecturer	Margret Keuper
Person in charge	Margret Keuper
Duration of module	1 Semester
Further modules	
Range of application	M.Sc. Wirtschaftsinformatik, M.Sc. Mannheim Master in Data Science
Semester	3rd Semester