

Module Description  
Sustainable Mobilities (SUM)

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## Content

Introduction .....	3
I.1 Sustainable Mobilities – Theories, Concepts, Approaches .....	3
I.1.1 Sustainable Mobilities – Theories, Concepts, Approaches .....	7
I.1.2 Basic concepts of social science mobilities research.....	8
I.2 Applied philosophy of science .....	10
I.2.1 Applied philosophy of science.....	13
I.2.2 Introduction to SPSS.....	14
I.3 Research methods .....	15
I.3.1 Research methods (lecture) .....	17
I.3.2 Research methods (practical).....	18
I.4 Mobility solution design 1 .....	20
II.1 Basic knowledge for the mobility transition .....	24
II.2 Urban mobilities .....	26
II.3 Mobility solution design 2 .....	31
II.4 Mobility policies 1 .....	35
III.1 Elective 1 .....	38
III.2 Mobility policies 2 .....	40
III.3 Problem based research project 1 .....	44
III.4 Problem based research project 2 .....	47
III.5 Mobility solution design 3 .....	50
IV.1 Elective “Data Analysis and Visualization” .....	54
IV.2 Master Thesis.....	57
IV.3 Master Kolloquium .....	60

## Introduction

*Sustainable Mobilities* (SUM) is an interdisciplinary, social-science-based master program, which prepares students for the fast moving and changing mobility markets and industries. New mobility concepts, Mobility-as-a-Service (MaaS) and the rising sharing economy (car, bike, scooter sharing, ride hailing etc.) and new modes of transport, autonomous vehicles, volocopters and drone-based logistics will change the landscapes of mobility and transport and the adjacent industries, jobs and professions significantly.

Mobility and transport is moving from a “system of automobility” to a system of multiple mobilities. Sustainable, smart, connected and integrated modes of transport will be shaping the future of cities, rural areas and the everyday lives of people and businesses.

*Sustainable Mobilities* addresses these multiple mobilities and tailors a program deploying key competences, skills and forms of knowledge to work in this fast changing environment and shape the transition towards economically, socially and ecologically sustainable mobility and transport.

The overarching goal is to prepare and educate students for leading positions in mobility research and planning, consultancy and in business. In addition, *Sustainable Mobilities* opens up opportunities for academic careers and in research organizations close to universities. The internationality of the education all in English guarantees the students’ employability in a European and increasingly global job market.

The problem-oriented pedagogical and didactic concept of the master program qualifies for a wide range of professions and jobs in which problem solving, innovative thinking and researching, expertise in methods and the development of research designs and problem solving strategies are essential and demanded. The interdisciplinarity of *Sustainable Mobilities* qualifies in thinking in complexity and identifying the potentials of connected and networked solutions beyond disciplinary limitations.

In addition, students study and learn in an intercultural environment with teachers, students and guest lecturers from different nationalities and disciplines.

## I.1 Sustainable Mobilities – Theories, Concepts, Approaches

### Description of Module

Code: 418-001 I.1	Title of Module Sustainable Mobilities – Theories, Concepts, Approaches
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### Significance of Module for the Goals of the Study Course

#### Qualification Goals

This module introduces to the main theories, concepts and scientific approaches in the field of sustainable mobilities and to the basics in social-science-based research on mobility and transport. It is split into two lectures (I.1.1 and I.1.2). It introduces to the main authors in the field and deals with the quantitative and qualitative aspects of mobility developments and sustainability. By so doing it also gives access to interdisciplinary mobility research from social science and anthropology to planning, design and engineering. The module aims for a deeper understanding of why mobility is a general principle in modern societies and why the current level and organization of mobility and transport is unsustainable and therefore subject to transition and change. Understanding mobility as a social and cultural phenomenon helps to generate better and more sustainable products, services and solutions for modern societies. Both lectures prepare the students to the challenges and opportunities of the current transformation of mobility and transport towards a connected and networked system of multiple mobilities.

The main goal is to develop and strengthen the students' skills and capacities to deal with complex questions of mobility and sustainability. They shall be able to understand and apply theories, concepts and different scientific approaches and be able to work with them individually and independently and in an applied perspective. The module prepares for problem-based and solution-oriented work in projects, teams and applied research throughout all four semesters of the study program. The ability for critical assessment and problem-based investigation will be developed as key expertise. It is a fundamental element of developing the students' employability in the mobility market. SUM teaches how to generate the necessary overview, insight and functional knowledge to handle concrete tasks and to increase the problem solving capacities of the students.

#### Content

The following aspects play a key role in this module:

Social-science based mobilities theories  
 Basic knowledge on mobility, climate change & social inequalities  
 Sustainable mobility and transport  
 Current changes in mobility markets of products and services  
 Social ecology  
 Mobility justice

#### Teaching Methods

The module consists out of two lectures (I.1.1 and I.1.2). Both lectures include knowledge transfer through oral lecturing as well as active and activating elements of group work, individual assignments and the like. Didactic materials such as movies, online teaching materials, newspaper articles etc. will be used to structure the courses interactively and dynamically. Active participation and discussion are essential parts of the teaching method and the students are invited to raise questions and formulate comments to the teaching content. By the use of group work and mobile methods the courses introduce to basic skills of scientific work and different forms of team and project work. The organization of the lecture follows the concept of problem-based learning. Working groups of 3-5 students will be formed to work on specific projects. The students will be prepared for the written exam in I.1.1 and the essay in I.1.2.

### Requirements for Participation

<b>Knowledge, skills, competencies</b>	Basic skills in scientific work are mandatory including working with reference managers (Citavi, Endnote, Mendeley etc.), structured reading of scientific literature, database research etc. Preparations before and after the courses are mandatory.
<b>Preparation for the module</b>	Urry, J. (2004). The 'System' of Automobility. <i>Theory, Culture &amp; Society</i> , 21(4-5), 25–39.  Leinfelder, Reinhold. (2011). The Anthropocene. Video. <a href="http://dx.doi.org/getinfo/emedi1.bsb-muenchen.de/10.5446/4457#t=03:31,03:38">http://dx.doi.org/getinfo/emedi1.bsb-muenchen.de/10.5446/4457#t=03:31,03:38</a>  Nicholas Stern: Why Are We Waiting? The Logic, Urgency and Promise of Tackling Climate Change <a href="https://www.youtube.com/watch?v=4Jq69WWqDnY">https://www.youtube.com/watch?v=4Jq69WWqDnY</a>

	<p>John Urry: Mobilities and societies beyond oil - Hawke Talks: (<a href="https://www.youtube.com/watch?v=Xd86ykg4PC4">https://www.youtube.com/watch?v=Xd86ykg4PC4</a>)</p> <p>World Business Council for Sustainable Development (2004). Mobility 2030: Meeting the Challenges to Sustainability. The Sustainable Mobility Project. Full Report 2004. Retrieved from <a href="http://www.wbcd.org/web/publications/mobility/mobility-full.pdf">http://www.wbcd.org/web/publications/mobility/mobility-full.pdf</a>.</p>
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## Practicability of Module

Relationship to other modules within this study course	Module I.1 builds up key knowledge for all following modules.
Relevance to other study courses	Module I.1 is relevant for all study courses.

## Contribution of the Module to Sustainable Development

<p><b>Content</b></p> <p>The module directly relates to sustainable development since it introduces to the basics of social-science-based research on sustainable mobilities.</p>
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Seminar Paper) + K90 (Written Exam)	60% + 40 %

## Organization

<p><b>Responsible for Module</b> Prof. Dr. Sven Kesselring</p>		
<p><b>Type of Module</b> Mandatory</p>	<p><b>Recurrence</b> Every Semester</p>	<p><b>Duration</b> 1 Semester</p>
<p><b>Admission Criteria</b> none</p>	<p><b>ECTS Points</b> 8</p>	<p><b>Weekly Attendance (SWS)</b> 4</p>
<p><b>Workload</b> 8 x 25 h = 200 h, distributed as follows:</p>		
<p><b>Attendance/Contact Hours</b> 60 hrs / 30 %</p>	<p><b>Preparation/Homework/Self-Study</b> 70 hrs / 35 %</p>	<p><b>Time for Exercises/Group Work</b> 70 hrs / 35 %</p>

## Content Structure

Module Element	
Code I.1.1	Sustainable Mobilities – Theories, Concepts, Approaches
Code I.1.2	Basic concepts of social science mobilities research

## I.1.1 Sustainable Mobilities – Theories, Concepts, Approaches

### Description of the Module Element

Code: 418-001 I.1.1	Title of Module Element Sustainable Mobilities – Theories, Concepts, Approaches
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### Content Structure

<b>Qualification Goals (vgl. Leitfaden Punkt 3)</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X		
Self	X	X	X
Social		X	X
<b>Content</b> The lecture introduces to what it means to study mobility and transport from a “mobilities perspective” (Urry 2007). Students learn basic knowledge, skills and competencies for the study program Sustainable Mobilities. This includes knowledge on sustainable development, mobility and transport, sustainable mobility and social science. The students will be introduced to social-science-based mobilities research and learn how to do research, how to find literature and data individually and in groups and how to deal with interdisciplinary and transsectoral knowledge, methods and skills.			
<b>Teaching Forms (vgl. Leitfaden Punkt 5)</b> Most learning happens in class with lecturing elements and group work. Some of the group work will be held in the library where the relevant books and journals are available. Key element of the teaching concept is active participation, intense discussion and interactive settings.			
<b>Teaching Methods (vgl. Leitfaden Punkt 6)</b> Lecture, case study, media work and project work.			
<b>Literature/Learning Materials</b> Literature and examples from practice.			
<b>Specifics</b> Guest lectures			

### Organization

<b>ECTS Points</b> 4	<b>Hours/Week</b> 2	<b>Group work</b> Yes	<b>Recommended Semester</b> 1	<b>Language</b> English
<b>Workload</b> 4 x 25 h = 100 h, distributed as follows:				
<b>Attendance/Contact Hours</b> 30 hrs / 30 %		<b>Preparation/Homework/Self-Study</b> 35 hrs / 35 %		<b>Exercises/Group Work</b> 35 hrs / 35 %

## I.1.2 Basic concepts of social science mobilities research

### Description of the Module Element

Code: 418-001 I.1.2	Title of Module Element Basic concepts of social science mobilities research
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### Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X		
Self	X	X	X
Social		X	X
<b>Content</b>			
<p>The lecture deepens the knowledge of what it means to study mobility and transport from a “mobilities perspective” (Urry 2007). Students get familiar with the main authors in the field and learn basic knowledge, skills and competencies for the study program Sustainable Mobilities. This includes knowledge on sustainable development, mobility and transport, sustainable mobility and social science. The students will be introduced to social-science-based mobilities research and learn how to do research, how to find literature and data individually and in groups and how to deal with interdisciplinary and transsectoral knowledge, methods and skills.</p>			
<b>Teaching Forms</b>			
<p>Most learning happens in class with lecturing elements and group work. Some of the group work will be held in the library where the relevant books and journals are available. Key element of the teaching concept is active participation, intense discussion and interactive settings.</p> <p>Specific emphasize lies on working with interdisciplinary texts as key expertise of a research-oriented master program. Students work individually and in groups on specific texts and by so doing they gain the essential knowledge, skills and competencies to write scientific papers.</p>			
<b>Teaching Methods</b>			
Lecture, case study, media work and project work.			
<b>Literature/Learning Materials</b>			
Literature, media materials, newspapers etc.			
<b>Specifics</b>			
none			



## Organization

<b>ECTS Points</b> 4	<b>Hours/Week</b> 2	<b>Group work</b> Yes	<b>Recommended Semester</b> 1	<b>Language</b> English
<b>Workload</b> 4 x 25 h = 100 h, distributed as follows:				
<b>Attendance/Contact Hours</b> 30 hrs / 30 %	<b>Preparation/Homework/Self-Study</b> 30 hrs / 30 %		<b>Exercises/Group Work</b> 40 hrs / 40 %	

## I.2 Applied philosophy of science

### Description of Module

<b>Code: 418-022</b> I.2	<b>Title of Module</b> Applied philosophy of science
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### Significance of Module for the Goals of the Study Course

<p><b>Qualification Goals</b></p> <p>This module introduces to the main epistemological principles of scientific practice. It discusses aspects such as 'What is science?' and 'What qualifies a proposition as scientific?'. The lecture also shows that there is not one single understanding of this but different philosophies and also methodological concepts of science and scientific knowledge.</p> <p>The main goal of the lecture is to enable students to understand the background for formulating their own research questions and to operationalize them into a reliable and valid research design and concept.</p> <p>To obtain this, the lecture shows and discusses different approaches and concepts from mobilities research and illustrates this with examples from applied science.</p> <p>This module provides the methodological basis for the research-oriented master in Sustainable Mobilities and qualifies the student to be able to develop theory driven applied research designs.</p>
<p><b>Content</b></p> <p>This lecture conveys the necessary skills to understand that and why scientific practice mainly builds upon ordered, controlled, verifiable and transparent procedures, which help to understand how the researchers and authors of a text come to their conclusions. This enables the student to distinguish between scientific and non-scientific work and how to ground research in reliable methodological concepts.</p> <p>The concept of the lectures is to create an understanding of how to work with sustainable mobilities in a social sciences framework and reflecting on the meaning and significance of the different outset people working in this area have. The course is also a preparation for the research projects and the master thesis later on in the education where it is expected that the student is able to reflect on his/her outset for doing the work and the significance it can have for practice.</p>
<p><b>Teaching Methods</b></p> <p>Lecture; the exercise in module 1.3 is connected to this lecture and applies some of its contents in relation to research methods and applications.</p>

## Requirements for Participation

<b>Knowledge, skills, competencies</b>	The students should have basic knowledge in the philosophy of science from their specific disciplinary backgrounds (such as social science, engineering, planning, architecture).
<b>Preparation for the module</b>	

## Practicability of Module

<b>Relationship to other modules within this study course</b>	The modules 1.2 and 1.3 are closely connected and refer to each other. It is recommended to attend both modules at the same time.
<b>Relevance to other study courses</b>	

## Contribution of the Module to Sustainable Development

<b>Content</b>
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## Exam Requirements (necessary for the awarding of points)

<b>Type and Duration (min)</b>	<b>Weighting %</b>
StA (Seminar Paper) + e-exam (60 min)	60% + 40%

## Organization

<b>Responsible for Module</b> Prof. Dr. Malene Freudendal-Pedersen		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Each semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 6	<b>Weekly Attendance</b> 4
<b>Workload</b> 6 ECTS x 25 h = 150 h, distributed as follows:		
<b>Attendance/Contact Hours</b> 60 hrs / 40 %	<b>Preparation/Homework/Self-Study</b> 40 hrs / 27 %	<b>Exercises/Group Work</b> 50 hrs / 33 %

## Content Structure

Module Element	
Code I.2.1	Applied philosophy of science
Code I.2.2	Introduction to "SPSS"

## I.2.1 Applied philosophy of science

### Description of the Module Element

Code: 418-022 I.1.2.1	Title of Module Element Applied philosophy of science
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### Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self	X	X	X
Social			
<b>Content</b>			
The course introduces into the basics of philosophy of science and enables students to critically reflect upon all sorts of scientific content, assess the quality of research and knowledge and their own scientific work including the practicalities of research and investigation			
<b>Teaching Forms</b>			
Lecture and group work.			
<b>Teaching Methods</b>			
Active learning with input elements, group work and self-directed learning.			
<b>Literature/Learning Materials</b>			
Lewens, T. (2016). <i>The meaning of science: An introduction to the philosophy of science</i> . New York: Basic Books.			
<b>Specifics</b>			
Field trips.			

### Organization

ECTS Points 3	Hours/Week 2	Group Work Yes	Recommended Semester 1	Language English
<b>Workload</b> 3 ECTS x 25 h = 75 h distributed as follows:				
<b>Attendance/Contact Hours</b> 30 h / 40%		<b>Preparation/Homework/Self-Study</b> 20 h / 27%		<b>Exercises/Group Work</b> 25 h / 33%

## I.2.2 Introduction to SPSS

### Description of the Module Element

Code: 418-022 I.1.2.2	Title of Module Element Introduction to SPSS
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### Content Structure

<b>Qualification Goals (vgl. Leitfaden Punkt 3)</b>			
Know-how	Knowledge	Skills	Competencies
Subject	x	x	x
System	x	x	x
Self			
Social			
<b>Content</b>			
<b>Teaching Forms</b>			
<b>Teaching Methods (vgl. Leitfaden Punkt 6)</b>			
<b>Literature/Learning Materials</b>			
<b>Specifics</b>			

### Organization

<b>ECTS Points</b> 3	<b>Hours/Week</b> 2	<b>Group Work</b> No	<b>Recommended Semester</b> 1	<b>Language</b> English
<b>Workload</b> 3 ECTS x 25 h = 75 h distributed as follows:				
<b>Attendance/Contact Hours</b> 30 hrs / 30 %		<b>Preparation/Homework/Self-Study</b> 15 hrs / 30 %		<b>Exercises/Group Work</b> 30 hrs / 40 %

## I.3 Research methods

### Description of Module

Code: 418-003 I.3	Title of Module Research methods
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  This module presents and introduces different qualitative research methods which can be applied in studies of sustainable mobilities.
<b>Content</b>  The module introduces and elaborates basic but vital methods that students can apply in problem-based research and master thesis research project. The module transfers knowledge but uses also active participation and applied learning techniques. Students learn to work independently and self-organized in ethnography and participant observation, interviews, visual based research, case-study method etc.. Potentials of other methods such as mobile methods, discourse analysis and action research are also discussed.
<b>Teaching Methods (vgl. Leitfaden Punkt 5)</b>  Teaching methods include lectures and practical lessons. In both modalities students receive theoretical and practical knowledge from practicing and experienced social science researchers. The main goal is to enable students to work self-structured and organized and prepare them to conduct their own research and apply problem-solving skills and competencies.

### Requirements for Participation

<b>Knowledge, skills, competencies</b>	Basic understanding of research design, willingness to work creatively with data collection and analysis.
<b>Preparation for the module</b>	Students should be prepared to work with research literature and participate actively in class discussions and literature reviews.

### Practicability of Module

<b>Relationship to other modules within this study course</b>	The module is essential for undertaking an independent study as it deals with the intricacies of research project design, data collection and data analysis. Specifically the problem-based research project (III.3 and III.4) and the master thesis will directly benefit from the gained expertise.
<b>Relevance to other study courses</b>	Relevant to all courses.

## Contribution of the Module to Sustainable Development

### Content

The module contributes to a deeper understanding of social sustainability and inclusion of different social groups in resolving issues related to environmental justice.

## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Seminar Paper) + K90 (Written Exam)	60% + 40%

## Organization

<b>Responsible for Module</b> Dr. Dennis Zuev		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Each Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 8	<b>Weekly Attendance</b> 4
<b>Workload</b> 8 ECTS x 25 h = 200 h with the following distribution		
<b>Attendance/Contact Hours</b> 60 hrs / 30 %	<b>Preparation/Homework/Self-Study</b> 60 hrs / 30 %	<b>Exercises/Group Work</b> 80 hrs / 40 %

## Content Structure

Module Element	
Code I.3.1	Research Methods (lecture)
Code I.3.2	Research Methods (practical)



## I.3.1 Research methods (lecture)

### Description of the Module Element

Code: 418-003 I.3.1	Title of Module Element Research methods (lecture)
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### Content Structure

<b>Qualification Goals (vgl. Leitfaden Punkt 3)</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System		X	X
Self	X	X	X
Social		X	X
<b>Content</b>			
<b>Teaching Forms</b>			
Lecture, practical lessons			
<b>Teaching Methods</b>			
<b>Literature/Learning Materials</b>			
<b>Specifics</b>			
.			

### Organization

<b>ECTS Points</b> 4	<b>Hours/Week</b> 2	<b>Group work</b> Yes	<b>Recommended Semester</b> 1	<b>Language</b> English
<b>Workload</b> 4 ECTS x 25 h = 100 h distributed as follows:				
<b>Attendance/Contact Hours</b> 30 hrs / 30 %		<b>Preparation/Homework/Self-Study</b> 30 hrs / 30 %		<b>Exercises/Group Work</b> 40 hrs / 40 %

## I.3.2 Research methods (practical)

### Description of the Module Element

Code: 418-003 I.3.2	Title of Module Element Research methods (practical)
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### Content Structure

<b>Qualification Goals</b>  This module prepares students to apply key knowledge and expertise in how to conduct research. It introduces them to different research methods in social science based mobilities research. Students learn the main aspects and strengths of different research methods and approaches. Further, they will develop and deepen their knowledge and skills in at least one specific method, which will be applied in small-scale research in individual work.
<b>Content</b>  The module focuses on four topics: Interviews, action research, visual analysis and mobile methods. It furthermore introduces the students to literature management software and gives a brief introduction in research design and the structure for research papers. The module thereby introduces the main qualitative types of research, which are interviews and ethnographic fieldwork. Interviews are the main focus method-wise and the whole process of conducting an interview (finding a topic/research question, preparing a guideline, finding participants, conducting the interview, transcription and analysis) is gone through during the semester. The course also introduces the qualitative data analysis software MAXQDA, where students analyze their own interviews.
<b>Teaching Forms</b>  This module mixes lectures with individual and group work and discussions. It also includes one research excursion for ethnographic fieldwork and one excursion to an institution providing access to hardware and software for qualitative (and quantitative) methods.
<b>Teaching Methods (vgl. Leitfaden Punkt 6)</b>  The teaching methods feature presentations, discussions, in-course group work and the individual conduct of research in the forms of an interview, auto-ethnographic fieldwork and the preparation of vignettes. It includes the in-course reading and discussion of articles relevant to the topics. The software MAXQDA is taught and learned using own interview material, thereby representing the whole process of data collection and analysis in a small-scale research.
<b>Literature/Learning Materials</b>  Brydon-Miller, M., Greenwood, D., Maguire, P., 2003. Why action research? Action Research 1, 9–28. Charmaz, K., 2006. Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis, 1st ed. ed. SAGE Publications Ltd., London. Fahy, F., 2015. Participatory Action Research in Environmental and Ecological Studies, Second Edi. ed, International Encyclopedia of the Social & Behavioral Sciences. Elsevier. Flick, U. (Ed.), 2014. The SAGE Handbook of Qualitative Data Analysis, Sage. Sage Publications, Los Angeles, London, New Delhi, Singapore, Washington D.C.

Leech, B.L., 2002. Asking Questions: Techniques for Semistructured Interviews. *PS: Political Science and Politics* 35, 665–668.

Maxwell, J.A., 2012. *A realist approach for qualitative research*. Sage, Thousand Oaks, CA.

Merriman, P., 2014. Rethinking Mobile Methods. *Mobilities* 9, 167–187.

Parent, L., 2016. The wheeling interview: mobile methods and disability. *Mobilities* 11, 521–532.

Spinney, J., 2011. A Chance to Catch a Breath: Using Mobile Video Ethnography in Cycling Research. *Mobilities* 6, 161–182.

**Specifics**

One visit is undertaken to the mlab in Nürtingen, in order to show the students where they can get help and resources for their upcoming group and individual research.

**Organization**

<b>ECTS Points</b> 4	<b>Hours/Week</b> 2	<b>Group work</b> Yes	<b>Recommended Semester</b> 1	<b>Language</b> English
<b>Workload</b> 4 ECTS x 25 h = 100 h distributed as follows:				
<b>Attendance/Contact Hours</b> 30 hrs / 30 %	<b>Preparation/Homework/Self-Study</b> 30 hrs / 30 %		<b>Exercises/Group Work</b> 40 hrs / 40 %	

## I.4 Mobility solution design 1

### Description of Module

Code: 418-023 I.4	Title of Module Mobility solution design 1
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals (vgl. Leitfaden Punkt 3)</b>  Participants know what a (sustainable) mobility solution could be and how it could be developed
<b>Content</b> <ul style="list-style-type: none"><li>• What are mobility solutions?</li><li>• What to do for the research paper?</li><li>• How can mobility solutions be developed?<ul style="list-style-type: none"><li>• How to define the problem?</li><li>• How to research stakeholders?</li><li>• How to ideate solutions?</li><li>• How to prototype solutions?</li><li>• How to test prototypes?</li></ul></li><li>• What has to be done till launch?</li></ul>
<b>Teaching Methods</b>  Lecture, Group Exercises

### Requirements for Participation

Knowledge, skills, competencies	None
Preparation for the module	Will be provided in the lecture

### Practicability of Module

Relationship to other modules within this study course	Module II.3, Module III.5
Relevance to other study courses	None

### Contribution of the Module to Sustainable Development

<b>Content</b> Knowledge of negative and positive impacts of sustainable mobility solutions Knowledge of implementing sustainable mobility solutions
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Seminar Paper)	100%

## Organization

<b>Responsible for Module</b> Prof. Dr. Rainer Erne		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Every Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 8	<b>Weekly Attendance</b> 2
<b>Workload</b> 8 ECTS x 25 h = 200 h distributed as follows:		
<b>Attendance/Contact Hours</b> 30 hrs. / 15%	<b>Preparation/Homework/Self-Study</b> 110 hrs. / 55%	<b>Time for Exercises/Group Work</b> 60 hrs. / 30%

## Content Structure

Module Element	
Code I.4	Mobility Solution Design I (Part 1)
Code I.4	Mobility Solution Design I (Part 2)

## Description of the Module Element

Code: 418-023 I.4	Title of Module Element Mobility Solution Design I (Part 1)
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self			
Social			
<b>Content</b>			
<ul style="list-style-type: none"> <li>• What are mobility solutions?</li> <li>• What to do for the research paper?</li> <li>• How can mobility solutions be developed?             <ul style="list-style-type: none"> <li>• How to define the problem?</li> <li>• How to research stakeholders?</li> <li>• How to ideate solutions?</li> <li>• How to prototype solutions?</li> <li>• How to test prototypes?</li> </ul> </li> <li>• What has to be done till launch?</li> </ul>			
<b>Teaching Forms</b>			
Lecture, Group Exercises			
<b>Teaching Methods</b>			
Presentations, Assignments, Group Work, Case Studies			
<b>Literature/Learning Materials</b>			
Will be provided in the lecture			
<b>Specifics</b>			
none			

## Organization

ECTS Points 4	Hours/Week 2	Group Work Yes	Recommended Semester 1	Language English
<b>Workload</b>				
4 ECTS x 25 h = 100 h distributed as follows:				
<b>Attendance/Contact Hours</b> 15 hrs. / 15%		<b>Preparation/Homework/Self-Study</b> 50 hrs. / 50%		<b>Exercises/Group Work</b> 35 hrs. / 35%

## Description of the Module Element

<b>Code</b> I.4	<b>Title of Module Element</b> Mobility Solution Design I (Part 2)
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## Content Structure

<b>Qualification Goals</b>			
<b>Know-how</b>	<b>Knowledge</b>	<b>Skills</b>	<b>Competencies</b>
Subject	X	X	
System	X		X
Self			
Social	X		
<b>Content</b>			
<ul style="list-style-type: none"> <li>• Knowledge of international sustainability programs</li> <li>• Steps for implementing sustainability in organizations</li> <li>• Knowledge of relevant negative and positive impacts of sustainability solutions</li> <li>• Processes for developing mobility solutions with positive sustainability impacts</li> </ul>			
<b>Teaching Forms</b>			
Lecture, Group Exercises, Individual Exercises			
<b>Teaching Methods</b>			
Readings, Presentations, Discussions, Group Exercises, Role Plays, Case Studies			
<b>Literature/Learning Materials</b>			
Will be provided in the lecture			
<b>Specifics</b>			
None			

## Organization

<b>ECTS Points</b> 4	<b>Hours/Week</b> 1	<b>Group Work</b> no	<b>Recommended Semester</b> 1	<b>Language</b> English
<b>Workload</b> 4 ECTS x 25 h = 100 h distributed as follows:				
<b>Attendance/Contact Hours</b> 15 hrs. / 15%		<b>Preparation/Homework/Self-Study</b> 60 hrs. / 60%		<b>Exercises/Group Work</b> 25 hrs. / 25%

## II.1 Basic knowledge for the mobility transition

### Description of Module

Code 418-005 II.1	Title of Module Basic knowledge for the mobility transition
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### Significance of Module for the Goals of the Study Course

<p><b>Qualification Goals</b></p> <p>This module provides basic knowledge for the transition towards sustainable mobilities. It helps to understand the obstacles, the power relations at work and the risks of redirecting the mobility sector towards sustainability.</p> <p>It introduces students to inter- and transdisciplinary research related to sociotechnical transitions. Students will be able to assess the potentials, obstacles and risks of redirecting the mobility sector towards sustainability. Students will be given an opportunity to compare different case-studies as well as to conduct data-analysis for their case of choice. In-depth examination of South American, European and Chinese contexts will be given from diverse theoretical perspectives and with the live fieldwork experience of the lecturers.</p>
<p><b>Content</b></p> <p>Not only social sciences, but also engineering and economic literature will be used to frame case studies and discussions of current best practice. Every lecture deals with an important concept or perspective and a case related to sociotechnical transitions in transportation. Teachers and students apply theoretical knowledge from the new mobilities paradigm to sociotechnical transition studies to develop a better and deeper understanding of the current situation in automotive industry and urban transportation specifically, and sustainable development in general.</p>
<p><b>Teaching Methods</b></p> <p>The module consists out of one lecture and one practice-oriented seminar (Übung) where learning happens in group work, as well as via discussions based on analysis of lecture material and individual reading. Lectures are not based on monological speech but rather on the interactive question and answer modality as well as provocative debates generated by lecturer-instructor.</p> <p>Together with the instructors the students develop their individual approach to the field and develop problem-based presentations at the end of the lecture. Different media are used from short videos and films to popular publications and academic articles. Students also have a chance to engage with invited guest speakers, experts in the field of sustainable mobilities.</p>

### Requirements for Participation

Knowledge, skills, competencies	Basic skills in literature review and presentation techniques and the willingness to work in groups and prepare small projects for work in class. Analytical skills are highly desired.
Preparation for the module	Non special preparation is needed



## Practicability of Module

Relationship to other modules within this study course	Module relates to the modules on project based research work, research methods.
Relevance to other study courses	Module relates to transportation and tourism study courses.

## Contribution of the Module to Sustainable Development

<p><b>Content</b></p> <p>The module covers diverse aspects of sustainable development: environmental politics, access to transportation, sustainable tourism. And thus covers the triple bottomline of sustainability (economic, environmental and social) as well as cultural aspects of sustainability.</p>
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Study Paper)+ R (Presentation)	60% + 40%

## Organization

<p><b>Responsible for Module</b> Prof. Dr. Dennis Zuev</p>		
Type of Module Mandatory	Recurrence Every semester	Duration 1 Semester
Admission Criteria none	ECTS Points 8	Weekly Attendance 4
<p><b>Workload</b> 8 ECTS x 25 h = 200 h distributed as follows:</p>		
Attendance/Contact Hours 60 hrs / 30 %	Preparation/Homework/Self-Study 60 hrs / 30 %	Exercises/Group Work 80 hrs / 40 %

## Content Structure

<b>Module Element</b>	
Code: II.1 (Part 1)	Understanding the mobility transition (lecture; partly in e-learning)
Code: II.1 (Part 2)	Main concepts and approaches in mobility transition research (seminar)

## II.2 Urban mobilities

### Description of Module

<b>Code:</b> 418-024 II.2	<b>Title of Module</b> Urban mobilities
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### Significance of Module for the Goals of the Study Course

<p><b>Qualification Goals</b></p> <p>This module focusses on the different characteristics of the networks of mobilities and how they constitute the opportunity spaces of individuals and organizations. Specific focus is different types of sustainable mobility systems which is examined through a four-day field trip.</p> <p>The main goal of the module is to enable the students to formulate their own research questions and to operationalize them into a reliable and valid research design and concept.</p> <p>To obtain this, the lecture and the field trip shows and discusses different approaches and concepts from mobilities research and relevant methodologies.</p> <p>This module provides the methodological basis for the research-oriented master in Sustainable Mobilities and qualifies the student to be able to develop theory driven applied research designs.</p>
<p><b>Content</b></p> <p>This module teaches the basic conceptual knowledge and skills for the module II.3. and II.4. It specifically develops the capacity to open up interdisciplinary knowledge and builds up the expertise to connect different resources and traditions in mobility research and practice. The module is built around a 4 days field trip where the students visits a city where sustainable mobilities is important for the city strategy. The students prepare for the field course through building upon the acquired skills from the first semester in the methodology course as well as the lecture series. Before the field course the student have to study their chosen research question and the context of the city they are visiting. At the field course the student will be introduced to the networked mobility of the city through guided tours around the city as well as through meetings with relevant actors related to their chosen research. After the field course the students have to work on their field trip report and make a presentation of their findings.</p>
<p><b>Teaching Methods</b></p> <p>The module is centered around a lecture which is accompanied by a practice seminar. The main concepts for a deeper understanding of networked urban mobilities are taught in the lecture. The seminar deepens the concepts and gives space for practice-oriented examples and open questions.</p>

## Requirements for Participation

Knowledge, skills, competencies	None
Preparation for the module	<p>Freudental-Pedersen, M., &amp; Kesselring, S. (2018). Networked urban mobilities. In M. Freudental-Pedersen &amp; S. Kesselring (Eds.), <i>Networked urban mobilities series: volume 1. Exploring networked urban mobilities: Theories, concepts, ideas</i> (1st ed., pp. 1–18). New York, NY: Routledge.</p> <p>Freudental-Pedersen, M., &amp; Kesselring, S. (2018). Sharing mobilities. Some propaedeutic considerations. <i>Applied Mobilities</i>, 3(1), 1–7. <a href="https://doi.org/10.1080/23800127.2018.1438235">https://doi.org/10.1080/23800127.2018.1438235</a></p> <p>Freudental-Pedersen, M., Hartmann-Petersen, K., &amp; Fjalland, E. L. P. (Eds.). (2018). <i>Experiencing networked urban mobilities: Practices, flows, methods</i> (1st). <i>Networked urban mobilities series: volume 2</i>. New York, New York, London, [England]: Routledge.</p> <p>Hajer, M. A., &amp; Dassen, T. (2014). <i>Smart about cities: Visualising the challenge for 21st century urbanism</i>. Rotterdam: Nai010 Publ. Retrieved from <a href="http://www.nai010.com/en/component/zoo/item/smart-about-cities">http://www.nai010.com/en/component/zoo/item/smart-about-cities</a></p> <p>Blokland, T., &amp; Savage, M. (Eds.). (2016). <i>Networked urbanism: Social capital in the city</i>. London, New York: Routledge.</p>

## Practicability of Module

Relationship to other modules within this study course	I.1.1; I.1.2; III.3; III.4
Relevance to other study courses	

## Contribution of the Module to Sustainable Development

<p><b>Content</b></p> <p>The module directly contributed to understanding sustainable development in urban environments and illustrates sustainable mobility in one of the leading cities in the field (Kopenhagen).</p>
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Study Paper)+	60% +
K90 (written exam)	40%

## Organization

<b>Responsible for Module</b> Prof. Dr. Malene Freudendal-Pedersen		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Every Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 8	<b>Weekly Attendance</b> 4
<b>Workload</b> 8 ECTS x 25 h = 200 h, distributed as follows:		
<b>Attendance/Contact Hours</b> 70 hrs / 35 %	<b>Preparation/Homework/Self-Study</b> 70 hrs / 35 %	<b>Time for Exercises/Group Work</b> 60 hrs / 30 %

## Content Structure

<b>Module Element</b>	
<b>Code</b> II.2	Urban mobilities

## Description of the Module Element

Code 418-024 II.2	Title of Module Element Urban mobilities
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## Content Structure

<b>Qualification Goals</b>			
	.		
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self	X	X	X
Social	X	X	X
<b>Content</b>			
<p>This module teaches the basic conceptual knowledge and skills for the module II.3. and II.4. It specifically develops the capacity to open up interdisciplinary knowledge and builds up the expertise to connect different resources and traditions in mobility research and practice. The module is built around a 4 days field trip where the students visits a city where sustainable mobilities is important for the city strategy. The students prepare for the field course through building upon the acquired skills from the first semester in the methodology course as well as the lecture series. Before the field course the student have to study their chosen research question and the context of the city they are visiting. At the field course the student will be introduced to the networked mobility of the city through guided tours around the city as well as through meetings with relevant actors related to their chosen research. After the field course the students have to work on their field trip report and make a presentation of their findings.</p>			
<b>Teaching Forms</b>			
Preparing lectures, field trip, guest lectures, field work and interviews with practitioners.			
<b>Teaching Methods</b>			
Different forms of activating and problem-based learning			
<b>Literature/Learning Materials</b>			
<p>Freudendal-Pedersen, M., &amp; Kesselring, S. (2018). Networked urban mobilities. In M. Freudendal-Pedersen &amp; S. Kesselring (Eds.), <i>Networked urban mobilities series: volume 1. Exploring networked urban mobilities: Theories, concepts, ideas</i> (1st ed., pp. 1–18). New York, NY: Routledge.</p> <p>Freudendal-Pedersen, M., &amp; Kesselring, S. (2018). Sharing mobilities. Some propaedeutic considerations. <i>Applied Mobilities</i>, 3(1), 1–7. <a href="https://doi.org/10.1080/23800127.2018.1438235">https://doi.org/10.1080/23800127.2018.1438235</a></p>			
<b>Specifics</b>			
Field Trip to Copenhagen.			

## Organization

<b>ECTS Points</b> 8	<b>Hours/Week</b> 4	<b>Group works</b> Yes	<b>Recommended Semester</b> 2	<b>Language</b> English
<b>Workload</b> 8 ECTS x 25 h = 200 h, distributed as follows:				
<b>Attendance/Contact Hours</b> 70 hrs / 35 %	<b>Preparation/Homework/Self-Study</b> 70 hrs / 35 %		<b>Time for Exercises/Group Work</b> 60 hrs / 30 %	

## II.3 Mobility solution design 2

### Description of Module

Code: 418-025 II.3	Title of Module Mobility solution design 2
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  Participants are able to evaluate mobility solutions with respect to sustainability aspects.
<b>Content</b> <ul style="list-style-type: none"><li>• What is an evaluation?</li><li>• Why is evaluation needed?</li><li>• How can sustainable mobility solutions be evaluated?</li><li>• How do diverse perspectives contribute to the evaluation of sustainability impacts?</li></ul>
<b>Teaching Methods</b>  Lecture, Group Exercises

### Requirements for Participation

Knowledge, skills, competencies	Module I.4
Preparation for the module	Will be provided in the lecture

### Practicability of Module

Relationship to other modules within this study course	Module I.4, Module III.5
Relevance to other study courses	none

### Contribution of the Module to Sustainable Development

<b>Content</b>  Evaluation of economic, environmental and social aspects of (alternative) mobility solutions. Sustainability related impact chains and their integration into evaluations. Stakeholder involvement in evaluation processes regarding sustainability aspects of mobility solutions.
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Seminar Paper)	100 %

## Organization

<b>Responsible for Module</b> Prof. Dr. Brigitte Biermann		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Every Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 6	<b>Weekly Attendance</b> 2
<b>Workload</b> 6 ECTS x 25 hours = 150 hours distributed as follows:		
<b>Attendance/Contact Hours</b> 30 hrs. / 20%	<b>Preparation/Homework/Self-Study</b> 90 hrs. / 60%	<b>Time for Exercises/Group Work</b> 30 hrs. / 20%

## Content Structure

Module Element	
Code II.3	Mobility Solution Design 2



## Description of the Module Element

Code: 418-025 II.3	Title of Module Element Mobility Solution Design II
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	
Self			
Social		X	X
<b>Content</b>			
<ul style="list-style-type: none"> <li>• What is an evaluation?</li> <li>• How can mobility solutions be evaluated?</li> <li>• Why is evaluation needed from a Sustainability Perspective?</li> <li>• How can mobility solutions be evaluated from a Sustainability Perspective?</li> <li>• How to make an evaluation in the field of mobilities specific with reference to products / services, solutions and systems?</li> <li>• How can impact chains be considered?</li> <li>• What are relevant evaluation indicators for organizations, local communities, for regions and at global level?</li> <li>• How can diverse perspectives be integrated into evaluations?</li> <li>• How can diverse perspectives contribute to the enhancement of evaluations of sustainability impacts?</li> </ul>			
<b>Teaching Forms</b>			
Lecture, Group Exercises			
<b>Teaching Methods</b>			
Presentations, Assignments, Group Work, Case Studies			
<b>Literature/Learning Materials</b>			
Will be provided in the lecture			
<b>Specifics</b>			
none			

## Organization

<b>ECTS Points</b> 6	<b>Hours/Week</b> 2	<b>Group work</b> Yes	<b>Recommended Semester</b> 2	<b>Language</b> English
<b>Workload</b> 6 ECTS x 25 h = 150 h distributed as follows:				
<b>Attendance/Contact Hours</b> 30 hrs. / 20%	<b>Preparation/Homework/Self-Study</b> 90 hrs. / 60%		<b>Exercises/Group Work</b> 30 hrs. / 20%	

## II.4 Mobility policies 1

### Description of Module

Code: 418-026 II.4	Title of Module Mobility policies 1
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  The role of politics and other stakeholders play an essential role in modern societies. Governance and policy networks need to be understood as power-related factors in modern societies which have a major influence on how mobility is organized and how contemporary mobility patterns, concepts and services look like. Sustainable mobilities cannot be developed in a laboratory but need to be implemented under life conditions.
<b>Content</b>  This module introduces key examples from mobility governance from local, national and supranational levels. The students work on key issues of the mobility transition in Germany and Europe and get insights into up-to-date cases of new mobility policies.
<b>Teaching Methods</b>  Lecture, flipped classroom & seminar

### Requirements for Participation

<b>Knowledge, skills, competencies</b>	Active participation and willingness to take over individual and group assignments.
<b>Preparation for the module</b>	Reading lists will be published prior to each class, depending on the focal topic.

### Practicability of Module

<b>Relationship to other modules within this study course</b>	Module will be followed up in third semester by module III.2 Governig mobilities in economy and society II: projects for the mobility transition (parts 1 and 2)
<b>Relevance to other study courses</b>	

### Contribution of the Module to Sustainable Development

<b>Content</b>  All dimensions of sustainable development (ecological, economic and social) will be addressed by means of impact analysis following guidelines of the European Commission.
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## Exam Requirements (necessary for the awarding of points)

<b>Type and Duration (min)</b>	<b>Weighting %</b>
StA (Seminar Paper) + R (Presentation)	60% + 40%

## Organization

<b>Responsible for Module</b> Prof. Dr. Marc Ringel		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Every Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 8	<b>Weekly Attendance</b> 2
<b>Workload</b> 8 ECTS x 25 h = 200 h to be distributed as follows:		
<b>Attendance/Contact Hours</b> 60 hrs / 30 %	<b>Preparation/Homework/Self-Study</b> 80 hrs / 40%	<b>Time for Exercises/Group Work</b> 60 hrs / 30%

## Content Structure

<b>Module Element</b>	
Code II.4	Mobility policies 1

## Description of the Module Element

Code 418-026 II.4	Title of Module Element Mobility policies 1
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self	X		
Social	X		
<b>Content</b>			
Students will be presented the role of different mobility governance arrangements at national and European level. They will learn to understand the formal and informal coordination mechanisms between European, national, regional and local policy-making and gain insights into EU transport policies. A focal topic will be chosen each semester to highlight the role of regulatory options, measures and projects in the mobility sector(s).			
<b>Teaching Forms</b>			
Lecture, flipped classroom & seminar			
<b>Teaching Methods</b>			
Lecture, flipped classroom & seminar			
<b>Literature/Learning Materials</b>			
Reading lists will be published prior to each class, depending on the focal topic.			
<b>Specifics</b>			
Guest speakers and co-lecturers will be invited, depending on the topic.			

## Organization

<b>ECTS Points</b> 8	<b>Hours/Week</b> 2	<b>Group Work</b>	<b>Recommended Semester</b> 2	<b>Language</b> English
<b>Workload</b> 8 ECTS x 25 h = 200 h to be distributed as follows:				
<b>Attendance/Contact Hours</b> 60 hrs / 30 %		<b>Preparation/Homework/Self-Study</b> 80 hrs / 40%		<b>Time for Exercises/Group Work</b> 60 hrs / 30%

### III.1 Elective 1

#### Description of Module

Code 900-004 III.1	Title of Module Elective 1: Digital Transformation
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#### Significance of Module for the Goals of the Study Course

<p><b>Qualification Goals</b></p> <p>The emergence and proliferation of digitisation and networked technologies have a profound impact on how we work, learn, live, and do business. Arguably, we are undergoing a range of cultural transformations that require individuals (and organisations alike) to challenge their status quo, experiment often, and get somewhat comfortable with the emergence and ongoing development of digitally mediated practices.</p> <p>In this course we are exploring and building up “skillsets, toolsets and mindsets” for working and collaborating within an increasingly networked society. We do this from a conceptual and from a decidedly practical perspective that allows for in-depth project work in various areas of interest and application.</p> <p>Our main interest in this semester is a range of methods and concepts that are often labeled as “User Experience Design” (UX). The field of User Experience Design is a conceptual design discipline. It focuses on the interaction between human users/actors, machines &amp; devices, (user-) interfaces, and the contextual environments of particular human activities. With the proliferation of networked devices in the workplace and all-day life, user experience has become an increasingly significant concern for the design of products, services, (user) interfaces, and so forth. UX Design is a multi-disciplinary field and includes elements of interaction design, information architecture, user research, applied psychology, and other disciplines. It is thus accessible for students from a wide range of disciplinary backgrounds who want to develop their personal competencies for working within the unfolding “digital transformation”.</p>
<p><b>Content</b></p> <ul style="list-style-type: none"><li>- what is User Experience Design (UX)?</li><li>- selected methods and tools for User Experience Design and User Research</li><li>- concepts of applied psychology in UX</li><li>- the role of User Experience Design for business innovation</li><li>- the rise of the Experience Economy</li></ul>
<p><b>Teaching Methods</b></p> <p>8 face-to-face sessions, one joint design workshop, active participation in weekly online activities/sessions, and self-directed project work.</p>

#### Requirements for Participation

Knowledge, skills, competencies	None.
Preparation for the module	

## Practicability of Module

Relationship to other modules within this study course	
Relevance to other study courses	Elective for all HfWU study programs

## Contribution of the Module to Sustainable Development

<p>Content</p> <p>Welche Aspekte nachhaltiger Entwicklung (ökonomische, ökologische, soziale) werden behandelt?</p>
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Seminar Paper)	100%

## Organization

<p>Responsible for Module Prof. Dr. Sebastian Fiedler</p>		
<p>Type of Module Elective</p>	<p>Recurrence Every Semester</p>	<p>Duration 1 Semester</p>
<p>Admission Criteria none</p>	<p>ECTS Points 2</p>	<p>Weekly Attendance 2</p>
<p>Workload 8 ECTS x 25 h = 200 h</p>		

## Content Structure

Module Element	
Code III.1	Digital Transformation

## III.2 Mobility policies 2

### Description of Module

<b>Code:</b> 418-027 III.2	<b>Title of Module</b> Mobility policies 2
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  Following the in-depth understanding of governance structures established in module II.4, students will learn about ways to analyse and influence mobility policies in both (a) a research and (b) a political dimension.
<b>Content</b>  Part 1: The development of mobility policies cannot be understood without a firm knowledge of policy processes, especially at European level. The class will introduce the European co-legislators, actors and policy-makers and their interplay. Influencing strategies and methods of lobbying will be presented to understand the participation of stakeholder groups in policy shaping. In a self-learning unit, students will train themselves to analyse mobility policies following the concept of Impact Assessments as performed by the European Union.  Part 2: The assessment of economic, social and environmental impacts constitutes the basis for an in-depth methodological workshop and research working methods, deepening the understanding of (a) governance policies and (b) business models to implement new forms of mobilities.
<b>Teaching Methods</b>  Lecture, flipped classroom, self-learning unit & seminar

### Requirements for Participation

<b>Knowledge, skills, competencies</b>	Active participation and willingness to take over individual and group assignments.
<b>Preparation for the module</b>	Reading lists will be published prior to each class, depending on the focal topic.

### Practicability of Module

<b>Relationship to other modules within this study course</b>	Module builds on II.4 (Governing mobilities in economy and society I: Concepts and Case Studies )
<b>Relevance to other study courses</b>	



## Contribution of the Module to Sustainable Development

<p><b>Content</b></p> <p>All dimensions of sustainable development (ecological, economic and social) will be addressed by means of impact analysis following guidelines of the European Commission.</p>
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Seminar Paper) + R (Presentation)	60% + 40%

## Organization

<p><b>Responsible for Module</b> Prof. Dr. Marc Ringel</p>		
<p><b>Type of Module</b> Mandatory</p>	<p><b>Recurrence</b> Every Semester</p>	<p><b>Duration</b> 1 Semester</p>
<p><b>Admission Criteria</b> none</p>	<p><b>ECTS Points</b> 6</p>	<p><b>Weekly Attendance</b> 2</p>
<p><b>Workload</b> 6 ECTS x 25 h = 150 h distributed as follows:</p>		
<p><b>Attendance/Contact Hours</b> 60 hrs / 40 %</p>	<p><b>Preparation/Homework/Self-Study</b> 40 Std. / 27 %</p>	<p><b>Time for Exercises/Group Work</b> 50 Std. / 33 %</p>

## Content Structure

Module Element	
<p>Code III.2 (Part 1)</p>	<p>Governing mobilities in economy and society II: Projects for the Mobility Transition (Part 1)</p>
<p>Code III.2 (Part 2)</p>	<p>Governing mobilities in economy and society II: Projects for the Mobility Transition (Part 2)</p>

## Description of the Module Element

<b>Code:</b> 418-027 III.2	<b>Title of Module Element</b> Governing mobilities in economy and society II: Projects for the Mobility Transition (Part 1)
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## Organization

<b>ECTS Points</b> 3	<b>Hours/Week</b> 1	<b>Group Work</b> Yes	<b>Recommended Semester</b> 3	<b>Language</b> English
<b>Workload</b> 3 ECTS x 25 h = 75 h distributed as follows:				
<b>Attendance/Contact Hours</b> 30 h / 40%	<b>Preparation/Homework/Self-Study</b> 20 h / 27%		<b>Exercises/Group Work</b> 25 h / 33%	

## Description of the Module Element

<b>Code:</b> 418-027 III.2	<b>Title of Module Element</b> Governing mobilities in economy and society II: Projects for the Mobility Transition (Part 2)
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## Organization

<b>ECTS Points</b> 3	<b>Hours/Week</b> 1	<b>Group Work</b> Yes	<b>Recommended Semester</b> 3	<b>Language</b> English
<b>Workload</b> 3 ECTS x 25 h = 75 h distributed as follows:				
<b>Attendance/Contact Hours</b> 30 h / 40%	<b>Preparation/Homework/Self-Study</b> 20 h / 27%		<b>Exercises/Group Work</b> 25 h / 33%	

### III.3 Problem based research project 1

#### Description of Module

Code: 418-010 III.3	Title of Module Problem based research project 1
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#### Significance of Module for the Goals of the Study Course

<p><b>Qualification Goals</b></p> <p>The overarching goal of the master program is the development of the students' capacities to conduct individual research on the highest quality level. The expertise gained from there can be applied in many different fields such as consultancy, (strategical) planning, product and solution design, market research etc. The concept of the applied academic scholarship builds the basis of this understanding of research. Students are going to be enabled to develop consistent research designs, to conduct systematically and methodologically reliable problem-based research. Their competencies in assessing others research and results and critically reflect their own role and procedures shall be developed and supported.</p> <p>The research conducted in this module will be organized in collaboration with practitioners from business, politics, administration and civil society. Students work in groups, ideally 3-5 students. Ideally, the projects will be developed and managed in collaboration with practice partners such as companies, public authorities and non-profit organizations.</p>
<p><b>Content</b></p> <p>In preparation of the master thesis the students develop a consistent, comprehensive and feasible research design, including the elements of research concept, theory and problem formulation, methodology, methods and expected outcome and practicability. They present the work in a workshop to prepare the second step of the actual research.</p>
<p><b>Teaching Methods</b></p> <p>The module is organized in group work with supervision.</p>

#### Requirements for Participation

Knowledge, skills, competencies	Basic knowledge on mobility, transport and sustainability; methods and experiences in project work and research design.
Preparation for the module	Will be provided at the course.

#### Practicability of Module

Relationship to other modules within this study course	All modules.
Relevance to other study courses	

## Contribution of the Module to Sustainable Development

<p><b>Content</b></p> <p>The module deals with aspects of economic, ecological and social sustainability in a clearly applied and problem-based perspective of mobilities research. In close collaboration with practice students develop research and solution-oriented recommendations for practice partners.</p>
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## Exam Requirements (necessary for the awarding of points)

<b>Type and Duration (min)</b>	<b>Weighting %</b>
StA (Seminar Paper)	100%

## Organization

<p><b>Responsible for Module</b> Prof. Dr. Sven Kesselring</p>		
<p><b>Type of Module</b> Mandatory</p>	<p><b>Recurrence</b> Every semester</p>	<p><b>Duration</b> 1 semester</p>
<p><b>Admission Criteria</b> none</p>	<p><b>ECTS Points</b> 6</p>	<p><b>Weekly Attendance</b> 2</p>
<p><b>Workload</b> 6 ECTS x 25 h = 150 h with the following distribution:</p>		
<p><b>Attendance/Contact Hours</b> 50 hrs / 33%</p>	<p><b>Preparation/Homework/Self-Study</b> 50 hrs / 33%</p>	<p><b>Time for Exercises/Group Work</b> 50 hrs / 33%</p>

## Content Structure

<b>Module Element</b>	
<p><b>Code</b> III.3</p>	<p>Problem based research project 1</p>

## Description of the Module Element

Code: 418-010 III.3	Title of Module Element Problem based research project 1
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System			
Self	X	X	X
Social		X	X
<b>Content</b>			
Students become holistically familiar with all conceptual steps towards conducting applied research. From theories, concepts and approaches to methodologies and methods and to problem-based and solution-oriented skills and competencies all levels of expertise are required and activated.			
<b>Teaching Forms</b>			
Lectures, group work, team work, field trips, contact with practice, interviews etc.			
<b>Teaching Methods</b>			
Presentations, workshops, supervision,			
<b>Literature/Learning Materials</b>			
Literature, supervision			
<b>Specifics</b>			
Direct contact with practice.			

## Organization

ECTS Points 6	Hours/Week 2	Group Works Yes	Recommended Semester 3	Language English
<b>Workload</b>				
6 ECTS x 25 h = 150 h distributed as follows:				
Attendance/Contact Hours 50 hrs / 33%		Preparation/Homework/Self-Study 50 hrs / 33%		Time for Exercises/Group Work 50 hrs / 33%

## III.4 Problem based research project 2

### Description of Module

Code: 418-011 III.4	Title of Module Problem based research project 2
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  Being able to conduct applied research and to realize the research design developed in III.3.
<b>Content</b>  Designing applied research in a problem-based learning environment. Handling real-world problems in collecting data and knowledge, getting access to stakeholders, working together in teams and with practice, conducting research, presenting and defending the results and reflecting on the challenges, opportunities and limits of applied research.
<b>Teaching Methods</b>  Problem- and practice-oriented method in the field and in collaboration with partners.

### Requirements for Participation

Knowledge, skills, competencies	Successful passing of methods courses in semester 2.
Preparation for the module	Will be provided in form of syllabus and introductory lectures.

### Practicability of Module

Relationship to other modules within this study course	all courses and modules.
Relevance to other study courses	

### Contribution of the Module to Sustainable Development

<b>Content</b>  III.4 integrates all aspects of sustainable mobility and sustainability in general.
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## Exam Requirements (necessary for the awarding of points)

<b>Type and Duration (min)</b>	<b>Weighting %</b>
StA (Seminar Paper)	100%

## Organization

<b>Responsible for Module</b> Prof. Dr. Sven Kesselring		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Every Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 6	<b>Weekly Attendance</b> 2
<b>Workload</b> 6 ECTS x 25 h = 150 h with the following distribution:		
<b>Attendance/Contact Hours</b> 50 hrs / 33%	<b>Preparation/Homework/Self-Study</b> 50 hrs / 33%	<b>Time for Exercises/Group Work</b> 50 hrs / 33%

## Content Structure

<b>Module Element</b>	
<b>Code</b> III.4	Problem based research project 2



## Description of the Module Element

Code: 418-011 III.4	Title of Module Element Problem based research project 2
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X		
Self		X	X
Social	X	X	X
<b>Content</b>			
Being able to work in practice and to handle challenges and obstacles of applied research. Presentation techniques will be applied in internal workshops and public presentations.			
<b>Teaching Forms</b>			
Lectures, project work, case study, field trips, data collection and analysis, writing of scientific reports, presentation of results.			
<b>Teaching Methods</b>			
Group work and supervision, direct support with practice partners.			
<b>Literature/Learning Materials</b>			
Literature, expert interviews, supervision.			
<b>Specifics</b>			
Direct and intense contact with practice partners.			

## Organization

<b>ECTS Points</b> 6	<b>Hours/Week</b> 2	<b>Group work</b> Yes	<b>Recommended Semester</b> Semester 3	<b>Language</b> English
<b>Workload</b> 6 ECTS x 25 h = 150 h with the following distribution:				
<b>Attendance/Contact Hours</b> 50 hrs / 33%		<b>Preparation/Homework/Self-Study</b> 50 hrs / 33%		<b>Time for Exercises/Group Work</b> 50 hrs / 33%

### III.5 Mobility solution design 3

#### Description of Module

Code: 418-028 III.5	Title of Module Mobility solution design 3
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#### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  Participants are able to specify (sustainable) mobility solutions which provide value for different stakeholders
<b>Content</b> <ul style="list-style-type: none"><li>• What should be specified from a Business Perspective?</li><li>• Why specifying a Business Plan?</li><li>• How can a Business Plan be specified?</li><li>• What should be specified from a Responsibility Perspective?</li><li>• Which governance forms do build the framework for a mobility solution?</li><li>• Which governance forms play a role for stakeholder involvement and sustainability impacts of a mobility solution?</li><li>• How to foster positive mid/long term sustainability impacts of a mobility solution by governance processes?</li></ul>
<b>Teaching Methods</b>  Lecture, Group Exercises

#### Requirements for Participation

Knowledge, skills, competencies	Module I.4, Module II.3
Preparation for the module	Will be provided in the lecture

#### Practicability of Module

Relationship to other modules within this study course	Module I.4, Module II.3
Relevance to other study courses	none

## Contribution of the Module to Sustainable Development

<p><b>Content</b></p> <p>Knowledge on Business Plans for realizing sustainable mobility solutions          Knowledge for differentiation between different forms of governance          Analytical skills for identifying governance forms which foster the realization of sustainable mobility solutions.</p>
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## Exam Requirements (necessary for the awarding of points)

<b>Type and Duration (min)</b>	<b>Weighting %</b>
StA (Seminar Paper)	100%

## Organization

<p><b>Responsible for Module</b>          Prof. Dr. Malte Ackemann</p>		
<p><b>Type of Module</b>          Mandatory</p>	<p><b>Recurrence</b>          Every Semester</p>	<p><b>Duration</b>          1 Semester</p>
<p><b>Admission Criteria</b>          none</p>	<p><b>ECTS Points</b>          6</p>	<p><b>Weekly Attendance</b>          2</p>
<p><b>Workload</b>          6 ECTS x 25 hours = 150 hours with the following distribution:</p>		
<p><b>Attendance/Contact Hours</b>          30 hrs. / 20%</p>	<p><b>Preparation/Homework/Self-Study</b>          90 hrs. / 60%</p>	<p><b>Time for Exercises/Group Work</b>          30 hrs. / 20%</p>

## Content Structure

<b>Module Element</b>	
<p>Code          III.5</p>	Mobility Solution Design III (Part 1)
<p>Code          III.5</p>	Mobility Solution Design III (Part 2)

## Description of the Module Element

Code III.5	Title of Module Element Mobility Solution Design III (Part 1)
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self			
Social			
<b>Content</b>			
<ul style="list-style-type: none"> <li>• What should be specified from a Business Perspective?</li> <li>• Case Study</li> <li>• Why specifying a Business Plan?</li> <li>• How can a Business Plan be specified?</li> <li>• How can the Business idea be specified?</li> <li>• How can the Marketing be specified?</li> <li>• How can the Operations be specified?</li> <li>• How can the Financial Projections be specified?</li> <li>• Optional: How can the project be specified?</li> </ul>			
<b>Teaching Forms</b>			
Lecture, Group Exercises			
<b>Teaching Methods</b>			
Presentations, Assignments, Group Work, Case Studies			
<b>Literature/Learning Materials</b>			
Will be provided in the lecture			
<b>Specifics</b>			
none.			

## Organization

ECTS Points 3	Hours/Week 1	Group works Yes	Recommended Semester 3	Language English
<b>Workload</b> 3 ECTS x 25 h = 75 h distributed as follows:				
Attendance/Contact Hours 15 hrs. / 20%	Preparation/Homework/Self-Study 45 hrs. / 60%		Exercises/Group Work 15 hrs. / 20%	

## Description of the Module Element

Code III.5	Title of Module Element Mobility Solution Design III (Part 2)
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X		
System	X	X	
Self			
Social	X	X	
<b>Content</b>			
<ul style="list-style-type: none"> <li>• Which governance forms to build the framework for a mobility solution?</li> <li>• Which governance forms play a role for stakeholder involvement and sustainability impacts of a mobility solution?</li> <li>• How to foster positive mid/long term sustainability impacts of a mobility solution by governance processes?</li> </ul>			
<b>Teaching Forms</b>			
Lecture, Individual and Group Exercises			
<b>Teaching Methods</b>			
Lecture, Analysis of Case Studies, Individual and Group Exercises			
<b>Literature/Learning Materials</b>			
Will be provided in the lecture			
<b>Specifics</b>			
none			

## Organization

ECTS Points 3	Hours/Week 1	Group work No	Recommended Semester 3	Language English
<b>Workload</b> 3 ECTS x 25 h = 75 h distributed as follows:				
Attendance/Contact Hours 15 hours / 20%	Preparation/Homework/Self-Study 45 hours / 60%		Exercises/Group Work 15 hours / 20%	

## IV.1 Elective “Data Analysis and Visualization”

### Description of Module

<b>Code: 418-030</b> IV.1	<b>Title of Module</b> Elective 2: Data Analysis and Visualization
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### Significance of Module for the Goals of the Study Course

<p><b>Qualification Goals</b></p> <p>Today, big data is everywhere. High volume, velocity, and variety of data require high capabilities for organizing, processing, analyzing and visualizing them. The goal is that students can analyze and visualize a huge amount of information to search for patterns and relations..</p>
<p><b>Content</b></p> <p>The aim of this course is to organize, process, analyze and visualize big amounts of data and geodata. The two main components of the course are 1) to have an introduction to analytics and visualization of data through the programming language R and 2) to have an introduction to spatial data processing and visualization through the software QGIS..</p>
<p><b>Teaching Methods</b></p> <p>Lecture, practical exercises, project work, workshop</p>

### Requirements for Participation

<b>Knowledge, skills, competencies</b>	Individual participation, active participation, self-training in data analysis and visualization software
<b>Preparation for the module</b>	

### Practicability of Module

<b>Relationship to other modules within this study course</b>	Introduction to SPSS
<b>Relevance to other study courses</b>	Master Thesis

### Contribution of the Module to Sustainable Development

<p><b>Content</b></p> <p>This course aims to analyze, visualize and play with data to find patterns or relations to further understanding, treating, mitigating, searching for solutions related to economic, ecological, social aspects.</p>
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## Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
StA (Seminar Paper)	100%

## Organization

<b>Responsible for Module</b> Prof. Dr. Sven Kesselring		
<b>Type of Module</b> Elective	<b>Recurrence</b> Every Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> none	<b>ECTS Points</b> 6	<b>Weekly Attendance</b> 2
<b>Workload</b> 6 ECTS x 25 h = 150 h distributed as follows:		
<b>Attendance/Contact Hours</b> 24 h / 16%	<b>Preparation/Homework/Self-Study</b> 63 h / 42%	<b>Exercises/Group Work</b> 63 h / 42%

## Content Structure

Module Element	
Code 418-026	Data Analysis and Visualization

## Description of the Module Element

Code: 418-026 IV.1	Title of Module Element Data Analysis and Visualization
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	XX
Self	X	X	
Social			
<p><b>Content</b> Students will learn to carry out data analysis including data preparations (collection and selection), preprocessing (cleaning, filtering, correction), analysis (visualization, correlation) and post-processing (interpretation, documentation, evaluation).</p> <p>According to the data visualization, students will learn how to make professional-looking maps and graphics.</p>			
<p><b>Teaching Forms</b> Lecture, Seminar (with exercise), Project work.</p>			
<p><b>Teaching Methods</b> Exercises, Project work</p>			
<p><b>Literature/Learning Materials</b></p> <ul style="list-style-type: none"> <li>• Maindonald, John, and John Braun. <i>Data analysis and graphics using R: an example-based approach</i>. Vol. 10. Cambridge University Press, 2010.</li> <li>• Chang, Kang-Tsung. <i>Introduction to geographic information systems</i>. Boston: McGraw-Hill Higher Education, 2006.</li> <li>• Oetiker, Tobias, et al. <i>The Not So Short Introduction to LATEX 2.</i>,2011.</li> </ul>			
<b>Specifics</b>			

## Organization

ECTS Points 6	Hours/Week 2	Group Work Yes	Recommended Semester 3 / 4	Language English
<p><b>Workload</b> 6 ECTS x 25 h = 150 h distributed as follows:</p>				
Attendance/Contact Hours 24 h / 16%		Preparation/Homework/Self-Study 63 h / 42%		Exercises/Group Work 63 h / 42%



## IV.2 Master Thesis

### Description of Module

Code: 418-013 IV.2	Title of Module Master Thesis
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  The aim here is to run a complete research and development process of an individual research project.
<b>Content</b>
<b>Teaching Methods</b>  Individual work with supervision.

### Requirements for Participation

Knowledge, skills, competencies	
Preparation for the module	

### Practicability of Module

Relationship to other modules within this study course	IV.3
Relevance to other study courses	

### Contribution of the Module to Sustainable Development

Content
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### Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
Ma (4 months)	100%

## Organization

<b>Responsible for Module</b> Prof. Dr. Kesselring		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Every Semester	<b>Duration</b> 4 months
<b>Admission Criteria</b>	<b>ECTS Points</b> 22	<b>Weekly Attendance</b> no
<b>Workload</b> 22 ECTS x 25 h = 550 h with the following distribution:		
<b>Attendance/Contact Hours</b>	<b>Preparation/Homework/Self-Study</b> 550 hrs / 100%	<b>Time for Exercises/Group Work</b>

## Content Structure

<b>Module Element</b>	
<b>Code</b> IV.2	Master Thesis

## Description of the Module Element

Code IV.2	Title of Module Element Master Thesis
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject	X	x	X
System	X	X	X
Self	X	X	X
Social	x	X	x
<b>Content</b>			
Students conduct their own research and will be supported by supervision. They apply theoretical, methodological and practical knowledge, skills and competencies they accumulated during the three semesters before.			
<b>Teaching Forms</b>			
<b>Teaching Methods</b>			
<b>Literature/Learning Materials</b>			
<b>Specifics</b>			

## Organization

ECTS Points 22	Hours/Week	Gruppeneinteilung No	Recommended Semester 4	Language English
<b>Workload</b> 22 ECTS x 25 h = 550 h with the following distribution:				
Attendance/Contact Hours	Preparation/Homework/Self-Study 550 hrs / 100%		Exercises/Group Work	

## IV.3 Master Kolloquium

### Description of Module

<b>Code:</b> 418-014 IV.3	<b>Title of Module</b> Master Colloquium
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### Significance of Module for the Goals of the Study Course

<b>Qualification Goals</b>  The colloquium is the place to present and discuss the progress of the master thesis with the lecturer and other master student. The organization of the colloquium is based on the concept of 'critical friends' as developed in Scandinavia. Problems, even crises, obstacles and the feeling of imperfect information etc. belong to the research process and are important for the successful development of the master thesis. In a trustful and confidential atmosphere these issues can be discussed in the colloquium for the benefit of all participants.
<b>Content</b>  The students learn that problems can be shared with others and most of them are not individual but part of the working process of many others, too. They are part of an efficient research process and necessary to make progress. These are key knowledge and key experiences at the same time which are constitutional for a professional education and behavior.
<b>Teaching Methods</b>  Colloquium with master students, teachers and supervisors; individual presentations and group discussions.

### Requirements for Participation

<b>Knowledge, skills, competencies</b>	Self-reflexivity shall be developed and supported as a basis for efficient and effective work and goal-attainment.
<b>Preparation for the module</b>	Work on the master thesis. No specific preparations.

### Practicability of Module

<b>Relationship to other modules within this study course</b>	All modules.
<b>Relevance to other study courses</b>	

## Contribution of the Module to Sustainable Development

<b>Content</b> All aspects of sustainable development.
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## Exam Requirements (necessary for the awarding of points)

<b>Type and Duration (min)</b>	<b>Weighting %</b>
M20 (oral exam)	100%

## Organization

<b>Responsible for Module</b> Prof. Dr. Kesselring		
<b>Type of Module</b> Mandatory	<b>Recurrence</b> Every Semester	<b>Duration</b> 1 Semester
<b>Admission Criteria</b> None	<b>ECTS Points</b> 2	<b>Weekly Attendance</b> 1
<b>Workload</b> 2 ECTS x 25 h = 50 h with the following distribution:		
<b>Attendance/Contact Hours</b> 16 hrs / 32%	<b>Preparation/Homework/Self-Study</b> 34 hrs / 68%	<b>Time for Exercises/Group Work</b>

## Content Structure

<b>Module Element</b>	
<b>Code</b>	Master Colloquium

## Description of the Module Element

Code: 418- 014 IV.3	Title of Module Element Master Colloquium
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## Content Structure

<b>Qualification Goals</b>			
Know-how	Knowledge	Skills	Competencies
Subject			
System	X		
Self	X	X	X
Social		X	X
<b>Content</b>			
Students learn to understand and reflect the process of writing a master thesis as a complex procedure which needs social expertise and self-reflexivity as an essential part besides scientific expertise and practical knowledge.			
<b>Teaching Forms</b>			
Presentations and group discussions			
<b>Teaching Methods</b>			
Collegial consultancy („critical friends“) and group supervision.			
<b>Literature/Learning Materials</b>			
None			
<b>Specifics</b>			
Eventually guests from practice.			

## Organization

ECTS Points 2	Hours/Week 1	Group work No	Recommended Semester 4	Language English
<b>Workload</b> 2 ECTS x 25 h = 50 h with the following distribution:				
Attendance/Contact Hours 16 hrs / 32%		Preparation/Homework/Self-Study 34 hrs / 68%		Time for Exercises/Group Work