Hochschule
für Wirtschaft und Umwelt
Nürtingen-Geislingen

Module Descriptions
M.Sc. Sustainable Mobilities (SUM)

Study and Exam Regulation starting winter semester 2022/23

Sustainable
Mobilities

Content

Introduction

Sustainable Mobilities (SUM) is an interdisciplinary, social-science-based master program, which prepares students for the needs of a fast moving and changing job market from business & consultancy to public services and the non-profit sector. 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 systems 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.

Module Code and Module Name
418-001 SUM I.1 Sustainable mobilities – theories, concepts, approaches

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) and introduces to current debates and the main authors in the field. I.1.1 deals with the quantitative and qualitative aspects of mobility developments and sustainability. I.1.2 teaches a major competence for the education: writing essays and scientific papers. 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, a human need and major demand in modern societies. Students learn why the current level and organization of mobility and transport is unsustainable and 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 teach key competences and skills and 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, problem-based investigation and the capacity to formulate orally and write consistently are being developed as key asset. 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. Didactive 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

Knowledge, skills, competencies	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.
Preparation for the module	Urry, J. (2004). The 'System' of Automobility. Theory, Culture & Society, 21(4-5), 25–39. Leinfelder, Reinhold. (2011). The Anthropocene. Video. http://dx.doi.org.getinfo.emedia1.bsb-muenchen.de/10.5446/4457#t=03:31,03:38 Nicholas Stern: Why Are We Waiting? The Logic, Urgency and Promise of Tackling Climate Change (https://www.youtube.com/watch?v=4Jq69WWqDnY) John Urry: Mobilities and societies beyond oil - Hawke Talks: (https://www.youtube.com/watch?v=Xd86ykq4PC4) World Business Council for Sustainable Development (2004). Mobility 2030: Meeting the Challenges to Sustainability. The Sustainable Mobility Project. Full Report 2004. Retrieved from http://www.wbcsd.org/web/publications/mobility/mobility-full.pdf.

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

Content
The module directly relates to sustainable development since it introduces to the basics of social-science-based research on sustainable mobilities.

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Module Elements

Module Element	
Code 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

Content Structure

Qualification Goals (vgl. Leitfaden Punkt 3)

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X		
Self	X	X	X
Social		X	X

Content

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.
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.

Teaching Forms (vgl. Leitfaden Punkt 5)

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 elements of the teaching concept are active participation, intense discussiona and interactive settings.

Teaching Methods (vgl. Leitfaden Punkt 6)

Lecture, case study, media work and group work.

Literature/Learning Materials

Literature, examples from practice, videos, newspaper articles.

Specifics

Guest lectures

Organization

ECTS Points	Hours/Week	Group work	Recommended Semester	Language
4	2	Yes	1	English

Workload
4 x 25 h = 100 h, distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
30 hrs / 30 %	35 hrs / 35 %	35 hrs / 35 %

Module Code and Module Name
418-034 SUM I.2 Doing social scientific research – basics, concepts and skills

Significance of Module for the Goals of the Study Course

Qualification Goals

The qualification goals of this lecture are diverse and seek fill the gap between the topic area of sustainable mobilities and actually conducting research. Logically, the syllabus fits between the lectures SUM 1 I.1.1 Sustainable Mobilities - theories, concepts, approaches (1 & 2) and SUM 1 I.3.1 Research methods: 1 (& 2) 418-003.

After taking the course, a student should be able to:
- … to write a scientific essay and organise their literature
- … recall the basics of the philosophy of science
- … explain the basic differences between every day knowledge and scientific knowledge
- … name basic steps in planning a research process.
- … explain the difference between a research problem and a research question
- … identify a research problem and a research question when reading a scientific paper
- … find relevant relevant literature for a term paper
- … name key concepts of social scientific research
- … explain some concepts which help to understand mobility and transportation from a social scientific perspective.
- … Understand the basic principles of statistics in research
- … know how to use SPSS in order to analyse data.

Content

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. Further, it helps students to understand, how a scientific 5-paragraph essay is structures and why it is a relevant means to transport knowledge gains into academia and structure their research, as well as finding relevant literature. Building on this, key concepts of social scientific research are presented and a “deep-dive” into the concept of gender is undertaken. The concept of gender, often discussed and very relevant in contemporary social scientific research, also serves as bridging element to the sphere of mobilities research. Hence, the gender differences between in “cycling” are presented as an example for the role of social factors in the mobility behavior.
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. Thus, 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, as well as he or she should be able to analyse and structure statistical data in order to interprete it and communicate his/her findings in the form of an essay.

Teaching Methods
Both courses in this module are structured partly as a lecture and a seminar course. Students receive Input by the lecturers and have to work on matters raised in the lectures autonomously. Preparatory readings, as homework are integral part of the course and shall enable vivid discussions on the topics.

Requirements for Participation

Knowledge, skills, competencies	• Structured reading of scientific literature, • Basic knowledge in working with computers and databases • Preparations before and after the course are mandatory
Preparation for the module	Relevant reading material is handed out before each session, including but not limited to: Field, A. P. (2020). Discovering statistics using IBM SPSS statistics. SAGE Publications. Chapters 1-10. Garrard, Jan (2021): „Women and cycling: Adressing the gender-gap“, in: Ralph Buehler, Susan Handy, John Pucher, Jan Garrard, Chris Rissel, , Adrian Bauman, Billie Giles-Corti, Rune Elvik, Peter G. Furth, Eva Heinen (eds.): Cycling for Sustainable Cities, MIT Press Giddens, Anthony (2006): „What is sociology?“, pp. 4-7. Hulme, Mike (2015): Why do we disagree on climate change? Zygon col. 50, no.4 (Dec 2015), p.893-905. ITDP (2022): Cycling’s Gender Gap: Breaking The Cycle of Inequality, https://www.itdp.org/2022/07/06/cyclings-gender-gap/ Lewens, T. (2016). The meaning of science: An introduction to the philosophy of science. New York: Basic Books. Little, William (2013): “An introduction to sociology”, Chapter 1 in “Introduction to Sociology – 1st Canadian Edition”, (provided on NEO, also available open access at: https://opentextbc.ca/introductiontosociology/chapter/chapter1-an- introduction-to-sociology/) Urry, J. (2004). The 'System' of Automobility. Theory, Culture & Society, 21(4-5), 25–39. Yuill, Chris and Thorpe, Christopher (2018): Heads Up Sociology

Practicability of Module

Relationship to other modules within this study course	The modules 1.1, 1.2 and 1.3 are closely connected and refer to each other. It is recommended to attend all three modules at the same time.
Relevance to other study courses	

Contribution of the Module to Sustainable Development

Content

The module directly relates to sustainable development since it introduces to the basics of social-science-based research on sustainable mobilities, thus contributing to the SDGs:

- 4, quality education
- 5, gender equality
- 8, decent work and economic growth
- 10, reduced inequalities
- 11m sustainable cities and communities

Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	**Weighting %**
K90 (written exam, 90 min) + e-exam (60 min)	60% + 40%

Organization

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

Module Elements

Module Element	
Code I.2.1	Doing social scientific research – basics, concepts and skills
Code I.2.2	Introduction to “SPSS”

Description of the Module Element

Code: 418-034 I.2.1	Title of Module Element Doing social scientific research – basics, concepts and skills

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X		X
System	X		
Self	X	X	X
Social	X	X	

Content

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. Further it aims at teaching basic concepts of social science and the relevance of social science based mobilities research.

Teaching Forms

Lecture and group work.

Teaching Methods

Active learning with input elements, group work and self-directed learning.

Literature/Learning Materials

Garrard, Jan (2021): „Women and cycling: Adressing the gender-gap“, in: Ralph Buehler, Susan Handy, John Pucher, Jan Garrard, Chris Rissel, , Adrian Bauman, Billie Giles-Corti, Rune Elvik, Peter G. Furth, Eva Heinen (eds.): Cycling for Sustainable Cities, MIT Press

Giddens, Anthony (2006): „What is sociology?“, pp. 4-7.

Hulme, Mike (2015): Why do we disagree on climate change? Zygon col. 50, no.4 (Dec 2015), p.893-905.

ITDP (2022): Cycling’s Gender Gap: Breaking The Cycle of Inequality, https://www.itdp.org/2022/07/06/cyclings-gender-gap/

Lewens, T. (2016). *The meaning of science: An introduction to the philosophy of science*. New York: Basic Books.

Little, William (2013): “An introduction to sociology”, Chapter 1 in “Introduction to Sociology – 1st Canadian Edition”, (provided on NEO, also available open access at: https://opentextbc.ca/introductiontosociology/chapter/chapter1-an- introduction-to-sociology/)

Urry, J. (2004). The 'System' of Automobility. Theory, Culture & Society, 21(4-5), 25–39.

Yuill, Chris and Thorpe, Christopher (2018): Heads Up Sociology

Specifics

Organization

ECTS Points	Hours/Week	Group Work	Recommended Semester	Language
3	2	Yes	1	English

Workload
3 ECTS x 25 h = 75 h distributed as follows**:**

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
30 h / 40%	20 h / 27%	25 h / 33%

Description of the Module Element

Code: 418-034 I.2.2	Title of Module Element Introduction to SPSS

Content Structure

Qualification Goals (vgl. Leitfaden Punkt 3)

Know-how	Knowledge	Skills	Competencies
Subject	x	x	x
System	x	x	x
Self			
Social			

Content

Basic knowledge of SPSS to enable students to undergo statistical analysis to
- analyze data
- do research
- understand large and complex data sets quickly with advanced statistical procedures

Teaching Forms

Students gain the ability to work with SPSS and do basic statistical analysis for future projects or the master's thesis.

Teaching Methods

Practical lesson with exercises

Literature/Learning Materials

Field, A. P. (2020). Discovering statistics using IBM SPSS statistics. SAGE Publications. Chapters 1-10.

Specifics

Organization

ECTS Points 3	Hours/Week 2	Group Work No	Recommended Semester 1	Language English

Workload
3 ECTS x 25 h = 75 h distributed as follows:

Attendance/Contact Hours 30 hrs / 30 %	Preparation/Homework/Self-Study 15 hrs / 30 %	Exercises/Group Work 30 hrs / 40 %

Module Code and Module Name
418-003 SUM I.3 Research Methods

Significance of Module for the Goals of the Study Course

Qualification Goals This module presents and introduces different qualitative research methods which can be applied in studies of sustainable mobilities.
Content 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.
Teaching Methods (vgl. Leitfaden Punkt 5) 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 prepare students to conduct their own research and apply problem-solving skills and increase their competencies in data collection and analysis.

Requirements for Participation

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

Practicability of Module

Relationship to other modules within this study course	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 (module III.4) and the master thesis will directly benefit from the gained expertise.
Relevance to other study courses	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

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

Module Elements

Module Element	
Code I.3.1	Research Methods (part 1)
Code I.3.2	Research Methods (part 2)

Description of the Module Element

Code: 418-003 I.3.1	Title of Module Element Research methods (part 1)

Content Structure

Qualification Goals (vgl. Leitfaden Punkt 3)

Know-how	Knowledge	Skills	Competencies
Subject	x	x	
System	x	x	x
Self		x	
Social	x	x	x

Content

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.. A majority of the time will also be spent looking at four lenses of research in the quantitative field: economic, social, environmental, and infrastructure. Students will learn basic data analysis skills using Microsoft Excel, as well as how to take data, or to make quantitative elements into data storytelling. Potentials of other methods such as mobile methods, discourse analysis and action research are also discussed.

The format of the class will be more interactive, and not just continual lecture, be prepared to answer questions and actively engage with the topics and materials presented over the weeks. There will be several longer readings distributed throughout the class. It is not expected that everything will be read word for word, but it is always helpful if the students have a general overview of the texts so that a fruitful discussion can be conducted during the lecture time. The readings that are assigned at the end of class are to make sure you are prepared for the next class, as well as reviewing the materials we went over during that lecture.

Teaching Forms

Lecture, practical lessons (in class and out of class).

Teaching Methods

Group Work and Individual Work (in class and out of class).
Small Individual Projects to be presented in class.
Small group projects to be done in class.

Literature/Learning Materials

Specifics
The content of the lectures is the subject to change due to the group dynamics. Some topics can be adjusted and expanded based on the prior knowledge of the group in both specific content and basic skills such as Excel abilities, and data analysis.

Organization

ECTS Points	Hours/Week	Group work	Recommended Semester	Language
4	2	Yes	1	English

Workload
4 ECTS x 25 h = 100 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
30 hrs / 30 %	30 hrs / 30 %	40 hrs / 40 %

Description of the Module Element

Code: 418-003 I.3.2	Title of Module Element Research methods (part 2)

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System		X	X
Self	X	X	X
Social		X	X

This module prepares students to apply key knowledge and expertise in how to conduct research and how to design a research concept. It introduces them to different research methods in social science based mobilities research. Students learn the main aspects and strengths and weaknesses 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. This is done by a ½ -day workshop and/or field trip, where the students develop a complete research concept based and apply different research methods in the field on an individually develop topic, problem formulation and research question.

Content

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.

During the lecture the students work on different tasks based on different qualitative research methods with the aim to gain in-depth knowledge how to design a whole research concept based on the different methods and how different methods can be combined to achieve a coherent concept.

Teaching Forms

This module mixes lectures with individual and group work and discussions. It also includes one research excursion for ethnographic fieldwork (if possible). Furthermore, a referencing software is applied.

Teaching Methods

The teaching methods feature presentations, discussions, in-course group work and the individual conduct of research in different forms (e.g., interviewing, visual analysis) and application areas. It includes the in-course reading and discussion of articles relevant to the topics. The software MAXQDA is presented, thereby representing the whole process of data collection and analysis in a small-scale research.

Literature/Learning Materials

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

ECTS Points	**Hours/Week**	**Group work**	**Recommended Semester**	**Language**
4	2	Yes	1	English

Workload
4 ECTS x 25 h = 100 h distributed as follows**:**

Attendance/Contact Hours	**Preparation/Homework/Self-Study**	**Exercises/Group Work**
30 hrs / 30 %	30 hrs / 30 %	40 hrs / 40 %

Module Code and Module Name
418-023 SUM I.4 Mobility solution design 1

Significance of Module for the Goals of the Study Course

Qualification Goals (vgl. Leitfaden Punkt 3) Participants know what a (sustainable) mobility solution could be and how it could be developed
Content • What might a mobility solution be? • Credit requirements • How could a mobility solution be developed?
Teaching Methods 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	Modules I.1, I.2, I.3, II.3, III.4
Relevance to other study courses	None

Contribution of the Module to Sustainable Development

Content Knowledge of negative and positive impacts of sustainable mobility solutions Knowledge of implementing sustainable mobility solutions

Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
P (Presentation)	100%

Organization

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

Module Elements

Module Element	
Code I.4	Mobility Solution Design I

Description of the Module Element

Code: 418-023 I.4	Title of Module Element Mobility Solution Design I

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self			
Social			

Content

- What might a mobility solution be?
- Credit requirements
- How could a mobility solution be developed?

Teaching Forms

Lecture, Group Exercises

Teaching Methods

Presentations, Assignments, Group Work, Case Studies

Literature/Learning Materials

Will be provided in the lecture

Specifics

none

Organization

ECTS Points	Hours/Week	Group Work	Recommended Semester	Language
8	2	Yes	1	English

Workload
8 ECTS x 25 h = 200 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
30 hrs. / 15%	110 hrs. / 55%	60 hrs. / 30%

Module Code and Module Name
418-005 SUM II.1 Basic knowledge for the mobility transition

Significance of Module for the Goals of the Study Course

Qualification Goals

Students will be equipped with the essential knowledge regarding theories and practice of transitions towards sustainable mobilities. They understand the obstacles, the power relations at work and the risks of redirecting the mobility sector towards sustainability.

Students will be familiar with different concepts and perspectives of societal transitions and have an insight into inter- and transdisciplinary research related to transitions. They will have the capacity to assess the potentials, obstacles and risks of redirecting the mobility sector towards sustainability.

Content

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.

Teaching Methods

The module consists of one lecture (series) 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 the instructor.

Together with the instructors the students develop their individual projects where they train to approach the field of mobility transitions and elaborate presentations at the end of the lecture course.

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 (online), experts in the field of sustainable mobilities.
Discussions are an essential part of the lectures, and students are stimulated to participate with their short presentations prepared at home (mid-term and at the end of the term).

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	No 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. It also relates to the courses on management of transitions or sociotechnical change.

Contribution of the Module to Sustainable Development Goals

Content

The module covers diverse aspects of sustainable development: environmental politics, access to transportation, sustainable tourism. And thus covers the triple bottom line of sustainability (economic, environmental and social) as well as cultural aspects of sustainability.
The module encourages and trains a systemic approach to thinking required for tackling the problems of sustainable development and decarbonization.

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Module Elements

Module Element	
II.1.1	Basic knowledge of the mobility transition (part 1)
II.1.2	Basic knowledge of the mobility transition (part 2)

Description of the Module Element

Code: 418-005 II.1.1	Title of Module Element Basic knowledge of the mobility transition (part 1)

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject			
System			
Self			
Social			

Content

- Mobility Transitions in Germany
- Mobility Transitions in China, Africa, Latin America
- Social Sustainability in Mobility Transitions
- Mobility Transitions in Rural Areas
- Two-wheeler Mobilities and Sustainability
- Sustainability and Urban Design
- Making food and cargo mobilities sustainable.
- Politics in Energy Transitions
- E-mobility and active mobility (walking, cycling)

Teaching Forms

Lecture material is presented for further discussion with students.
Students Prepare short presentations either at home or in class.
Students work on groups on small presentations related to the topic of the day (and present the results).
Discussions of the visual material (documentaries).

Teaching Methods

Lectures
Students' group work

Literature/Learning Materials

Geels F., R. Kemp, Dudley and G. Lyons 2012 Automobility in Transition? A Socio-Technical Analysis of Sustainable Transportation. Routledge.

Handke, V. and H. Jonuschat (2013) Flexible Ridesharing. New Opportunities and Service Concepts for Sustainable Mobility. Springer.

Hopkins D. and J. Highham (2016) Low Carbon Mobility Transitions Goodfellow Publishers. 2016.

(full list by topic see in Syllabus).

Specifics
The content of the course is adjusted according to the group dynamics (with less students attending – more topic are covered, while with more students more group work in class is aimed for). The content is subject to modification, as the lecturer may elaborate some topics for a more extended time.

Organization

ECTS Points	**Hours/Week**	**Group Work**	**Recommended Semester**	**Language**
8	2	Yes	1	English
Workload 4 ECTS x 25 h = 100 h distributed as follows:				
Attendance/Contact Hours 15 hrs. / 15%	**Preparation/Homework/Self-Study** 55 hrs. / 55%		**Exercises/Group Work** 30 hrs. / 30%	

Description of the Module Element

Code: 418-005 II.1.2	Title of Module Element Basic knowledge of the mobility transition (part 2)

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject			
System			
Self			
Social			

Content

Main concepts and approaches in mobility transition research

The lecture will allow students to identify key factors for mobility transition on a general level as well as in the context of given conditions, with a particular focus on urban and peri-urban environments. A short introduction explains the relevance of urban mobility in time and space. This will be followed by a closer look at the historical development of urban mobility, including social, spatial and technological aspects. With this knowledge at hand, students will be able to identify and evaluate the main drivers of mobility transitions in urban settlements. Furthermore, they will work on the design of strategies that not only trigger these processes but also foster higher levels of sustainability regardless of the local conditions.

Teaching Forms

Block seminars cover the lecture material. This input provides the knowledge and the expertise needed to work on a practical level through individual and grouping tasks that students have to prepare before, during and after the block seminars.

Teaching Methods

The module includes both lecturing and active parts in order to foster problem-based learning.

Literature/Learning Materials

IPCC (2022) Working Group III contribution to the Sixth Assessment Report. Available here: https://www.ipcc.ch/site/assets/uploads/2018/03/AR6_WGIII_outlines_P46.pdf
EC (2021). Amendment of the Regulation setting CO2 emission standards for cars and vans. Available: https://ec.europa.eu/info/sites/default/files/amendment-regulation-co2-emission-standards-cars-vans-with-annexes_en.pdf
EC (2021). Revision of the Directive on deployment of the alternative fuels infrastructure. Available; https://ec.europa.eu/info/sites/default/files/revision_of_the_directive_on_deployment_of_the_alternative_fuels_infrastructure_with_annex_0.pdf
EC (2021). Revision of the EU Emission Trading System Available: https://ec.europa.eu/info/sites/default/files/revision-eu-ets_with-annex_en_0.pdf

Marx, R., de Mello, A. M., Zilbovicius, M., & de Lara, F. F. (2015). Spatial contexts and firm strategies: applying the multilevel perspective to sustainable urban mobility transitions in Brazil. *Journal of Cleaner Production*, 108, 1092-1104.

Terrien, C., Maniak, R., Chen, B., & Shaheen, S. (2016). Good practices for advancing urban mobility innovation: A case study of one-way carsharing. *Research in Transportation Business & Management*, 20, 20-32.
Specifics One session will be dedicated to discussing with participants of their topic of interest for the seminar paper. Students should prepare key research question and identified literature.

Organization

ECTS Points	**Hours/Week**	**Group Work**	**Recommended Semester**	**Language**
4	2	Yes	1	English
Workload 4 ECTS x 25 h = 100 h distributed as follows:				
Attendance/Contact Hours 15 hrs. / 15%	**Preparation/Homework/Self-Study** 55 hrs. / 55%		**Exercises/Group Work** 30 hrs. / 30%	

Module Code and Module Name
418-024 SUM II.2 Urban mobilities

Significance of Module for the Goals of the Study Course

Qualification Goals

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.

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.

To obtain this, the lecture and the field trip shows and discusses different approaches and concepts from mobilities research and relevant methodologies.

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.

Content

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 visit 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.

Teaching Methods

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.

Requirements for Participation

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

Practicability of Module

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

Contribution of the Module to Sustainable Development

Content The module directly contributes to understanding sustainable development in urban environments and illustrates sustainable mobility in one of the leading cities in the field (Copenhagen).

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Modul Element

Module Element	
Code II.2	Urban mobilities

Description of the Module Element

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

Content Structure

Qualification Goals

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Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self	X	X	X
Social	X	X	X

Content

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 visit 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.

Teaching Forms

Preparing lectures, field trip, guest lectures, field work and interviews with practitioners.

Teaching Methods

Different forms of activating and problem-based learning

Literature/Learning Materials

Freudendal-Pedersen, M., & Kesselring, S. (2018). Networked urban mobilities. In M. Freudendal-Pedersen & S. Kesselring (Eds.), *Networked urban mobilities series: volume 1. Exploring networked urban mobilities: Theories, concepts, ideas* (1st ed., pp. 1–18). New York, NY: Routledge.

Freudendal-Pedersen, M., & Kesselring, S. (2018). Sharing mobilities. Some propaedeutic considerations. *Applied Mobilities*, *3*(1), 1–7. https://doi.org/10.1080/23800127.2018.1438235

Specifics

Field Trip to Copenhagen or Paris.

Organization

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

Module Code and Module Name
418-025 SUM II.3 Mobility solution design 2

Significance of Module for the Goals of the Study Course

Qualification Goals Participants are able to evaluate sustainability aspects of mobility solutions.
Content • Apply design thinking methods • Development of mobility solution/service • Deepening of knowledge of sustainable mobility • Learning how to identify, address and convince different stakeholders
Teaching Methods Lecture, Exercises, Group Exercises, Presentations of work in progress

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.4
Relevance to other study courses	none

Contribution of the Module to Sustainable Development

Content Overview of economic, environmental and social aspects of (alternative / more sustainable) mobility solutions, based on international sustainability standards & charters. Negative and positive sustainability impacts of mobilities. Sustainability related aspects and their integration into the design on mobility solutions. Stakeholder involvement and perspectives of different stakeholder groups on mobility solutions. Sustainability aspects and indicators and how to use them in evaluation processes.

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Module Element

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

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	
Self			X
Social		X	X

Content

- Overview of design thinking methods
- Application of design thinking process (Define, Ideate, Prototype, Test)
- Development of sustainable mobility solutions, including:
  - Sustainability aspects
  - User groups / user needs
  - Business model / economic benefits / other benefits
  - Definition of possible risks
  - Legal aspects
  - Stakeholder analysis
- Documentation:
  - Technical documentation of the solution (target group: client)
  - Creating and holding a presentation (target group: science)
  - Visualization of partial results by means of user story or animation or video or similar (target group: general public)

Teaching Forms

Lecture, Exercises, Group Exercises, Presentations of work in progress

Teaching Methods

Presentations, Active Listening, Assignments, Group Work, Case Studies

Literature/Learning Materials

Will be provided in the lecture

Specifics

None

Organization

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

Module Code and Module Name
418-026 SUM II.4 Mobility policies 1

Significance of Module for the Goals of the Study Course

Qualification Goals and Content

Federal republic politics, federal state, provincial and municipal politics and public policies as well as politics and policies at the supranational level play a major role regarding the future of mobility and transport. At first a systems perspective illustrating the role of the state and state actors will be discussed in the study course. Secondly a systemic perspective will be up-taken, illustrating what authorities and powers, what competences and capacities state and state controlled actors have to intervene in the mobility and transport sector as to shape, coordinate and support pathways towards sustainable mobility and transport futures.

The students learn to understand the role, the authority and powers, the competences and capacities of state and state controlled actors in mobility and transport and traffic infrastructure and policy areas in modern societies in Europe and in other regions across the globe.

In modern democracies as in authoritarian regimes there is a separation of powers, or checks and balances, among different divisions in the respective body politics. Such separations of authority are ruled out by constitutions, in the case of the European Union by a treaty. United Nations (UN) powers in case of climate politics are ruled-out by a intergovernmental treaty. Sustainable Development Goals are based on a voluntary agreement among world nations.

The students learn to understand the division of power and authority from an international perspective. They learn to distinct between the terms and definitions polity, politics and policy illustrated by examples in different body politics around the world. They learn, that the mobility and transport sector is ruled out by multilevel policy and governance arrangements.

In modern national states, in particular in democratic states, there is a regime of horizontal governing relying on a wide range of deliberation and negotiation (politics) and regulation, coordination and support (policy) actions among state (public sector) and civil society actors ranging from private sector companies to households and civic organizations. In these political or policy networks competencies and capacities are continuously re-configured to shape potential pathways towards sustainable mobility and transport futures.

The students learn about horizontal government and governance relations from a present perspective. They learn about and discuss methods how to analyze such relations and make them visible by approaches like policy network analyses and mapping exercises. They learn about the meaning of the term complexity with regard to different relational approaches.

To recap: the significance and aim of the study course is to make the students understand the role of state actors, in particular in liberal democratic body politics, with regard to the mobility and transport area. A second aim is to make the students understand the framework of horizontal governance regimes in democratic body politics and to understand what

authorities and powers, what competences and capacities state and state controlled actors as well as civil society actors hold to jointly shape sustainable mobility and transport futures.
Teaching Methods Lecture, flipped classroom & seminar

Requirements for Participation

Knowledge, skills, competencies	Active participation and willingness to take over individual and group assignments.
Preparation for the module	For future it is foreseen to prepare a script with basic terms and definitions, including a reading list.

Practicability of Module

Relationship to other modules within this study course	The 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)
Relevance to other study courses	The study course gives specific insights regarding the significance of state actors in the mobility and transport area.

Contribution of the Module to Sustainable Development

Content All three pillars of sustainable development (ecological, economic and social) will be addressed. Reference will be up-taken to the 17 dimensions and current 132 single aims of the Sustainable Development Goals (SDG). The history regarding the deployment of sustainable development ideas and concepts and role in national and international polity and politics will be conveyed.

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Module Element

Module Element	
Code II.4	Mobility policies 1

Description of the Module Element

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

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self	X		
Social	X		

Content

Students will learn what role state actors and state controlled actors play from a systems perspective and what intervention capacities and competences they have from a systemic point of view in the mobility and transport area and traffic and transport infrastructure sector.

Students will learn to distinct respective powers and authorities in an international perspective. They learn to differentiate between the terms and definitions polity, politics and policy. They will learn, how the mobility and transport area is ruled by multilevel governance arrangements.

Students will learn about horizontal governance relations including methods how to analyze and make such relations as policy issues visible by concept like policy network analyses and mapping exercises. The meaning of the term complexity will be clarified in this context.

Teaching Forms
Lecture, seminar & study groups

Teaching Methods
Lecture, seminar & study groups

Literature/Learning Materials

For upcoming study courses a script will be allocated including a reading list and access to exemplary policy studies and public policy documents – for example the European White Paper Transport. In addition guidance how to write a policy study or a policy brief will be provided.

Specifics

Organization

ECTS Points	Hours/Week	Group Work	Recommended Semester	Language
8	2		2	English

Workload
8 ECTS x 25 h = 200 h to be distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Time for Exercises/Group Work
60 hrs / 30 %	80 hrs / 40%	60 hrs / 30%

Module Code and Module Name
418-027 SUM III.2 Mobility policies 2

Significance of Module for the Goals of the Study Course

Qualification Goals 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.
Content 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.
Teaching Methods Lecture, flipped classroom, self-learning unit & seminar

Requirements for Participation

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

Practicability of Module

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

Contribution of the Module to Sustainable Development

Content
All dimensions of sustainable development (ecological, economic and social) will be addressed by means of impact analysis following guidelines of the European Commission.

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Module Elements

Module Element	
Code III.2.1	Governing mobilities in economy and society II: European Transport Policies (Part 1)
Code III.2.2	Governing mobilities in economy and society II: Projects for the Mobility Transition (Part 2)

Description of the Module Element

Code: 418-027 III.2.1	Title of Module Element Governing mobilities in economy and society II: Projects for the Mobility Transition (Part 1)

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self			
Social			

Content

- What should be specified from a Business Perspective?
- Case Study
- Why specifying a Business Plan?
- How can a Business Plan be specified?
- How can the Business idea be specified?
- How can the Marketing be specified?
- How can the Operations be specified
- How can the Financial Projections be specified?
- Optional: How can the project be specified?

Teaching Forms

Lecture, Group Exercises

Teaching Methods

Presentations, Assignments, Group Work, Case Studies

Literature/Learning Materials

Will be provided in the lecture

Specifics

none.

Organization

ECTS Points	Hours/Week	Group works	Recommended Semester	Language
3	1	Yes	3	English

Workload
3 ECTS x 25 h = 75 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
15 hrs. / 20%	45 hrs. / 60%	15 hrs. / 20%

Description of the Module Element

Code: 418-027 III.2.2	Title of Module Element Governing mobilities in economy and society II: Projects for the Mobility Transition (Part 2)

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X		
System	X	X	
Self			
Social	X	X	

Content

- Which governance forms to build the framework for a mobility solution?
- Which governance forms play a role for stakeholder involvement and sustainability impacts of a mobility solution?
- How to foster positive mid/long term sustainability impacts of a mobility solution by governance processes?

Teaching Forms

Lecture, Individual and Group Exercises

Teaching Methods

Lecture, Analysis of Case Studies, Individual and Group Exercises

Literature/Learning Materials

Will be provided in the lecture

Specifics

none

Organization

ECTS Points	Hours/Week	Group work	Recommended Semester	Language
3	1	No	3	English

Workload

3 ECTS x 25 h = 75 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
15 hours / 20%	45 hours / 60%	15 hours / 20%

Module Code and Module Name
418-032 SUM III.3 Problem based research project

Significance of Module for the Goals of the Study Course

Qualification Goals 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. Sometimes, 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 and learn basic skills in teamwork, intercultural collaboration and goal attaining. Ideally, the projects will be developed and managed in collaboration with practice partners such as companies, public authorities and non-profit organizations.
Content 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. Following a peer-review among groups, students will apply their research concept and derive results. These are then critically discussed and lead to research or policy conclusions.
Teaching Methods The module is organized in group work with supervision.

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

Content
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.

Exam Requirements (necessary for the awarding of points)

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

Organization

Responsible for Module Prof. Dr. Marc Ringel		
Type of Module Mandatory	**Recurrence** Every semester	**Duration** 1 semester
Admission Criteria none	**ECTS Points** 12	**Weekly Attendance** 4
Workload 12 ECTS x 25 h = 300 h with the following distribution:		
Attendance/Contact Hours 100 hrs / 33%	**Preparation/Homework/Self-Study** 100 hrs / 33%	**Time for Exercises/Group Work** 100 hrs / 33%

Module Elements

Module Element	
Code III.3	Problem based research project

Description of the Module Element

Code: 418-032	Title of Module Element
III.3	Problem based research project

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System			
Self	X	X	X
Social		X	X

Content

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.

They learn how to formulate research questions and design a feasible and concise research design. The also learn how to present the concepts and to convince possible customers and partners.

The learn how to work self-responsible, structured and towards deadlines. Some of the teaching consists in group supervision. The students learn how to drive their own work process and how to activate teachers in case of problems or open questions.

Teaching Forms

Kick-off lecture, group work, team work, contact with practice, interviews etc.

Teaching Methods

Presentations, supervision

Literature/Learning Materials

Literature, group supervision

Specifics

Problem-based learning, activating teaching and direct contact with practice.

Organization

ECTS Points	Hours/Week	Group Works	Recommended Semester	Language
12	4	Yes	3	English

Workload
12 ECTS x 25 h = 300 h with the following distribution:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Time for Exercises/Group Work
100 hrs / 33%	100 hrs / 33%	100 hrs / 33%

Module Code and Module Name
418-033 SUM III.4 Mobility solution design 3

Significance of Module for the Goals of the Study Course

Qualification Goals

Participants are able to understand, evaluate and specify digitalization and innovation in the context of mobility.

Content

Understanding Digital Transformation & Innovation

- What are the drivers and enablers of digitalization?
- What means Digital Transformation for business and society?
- What is Innovation and Innovation Management and why do we need it?
- What does sustainability means in the context of digitalization and innovation?
- Understand and evaluate frameworks in digitalization and innovation.
- Digitalization in the context of the automotive and mobility industry

Recommended Readings:

- The Digital Transformation Playbook – David Rogers
- Digital Compass – Statista
- Internet Trends (*yearly updated*) - Marry Meeker
- The Digital Transformation of the Automotive Industry – Catalysts, Roadmap, Practice, Uwe Winkelhake
- Digital Transformation of the Automotive Industry – Frost & Sullivan, March 2017
- Digital Transformation of Industries: Automotive Industry – World Economic Forum 2016

Teaching Methods

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

Content
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.

Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
K60 (Written exam 60 min)	100%

Organization

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

Module Elements

Module Element	
Code III.5.1	Mobility Solution Design III (Part 1)
Code III.5.2	Mobility Solution Design III (Part 2)

Description of the Module Element

Code	Title of Module Element
III.5.1	Mobility Solution Design III (Part 1)

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self			
Social			

Content

- What should be specified from a Business Perspective?
- Case Study
- Why specifying a Business Plan?
- How can a Business Plan be specified?
- How can the Business idea be specified?
- How can the Marketing be specified?
- How can the Operations be specified
- How can the Financial Projections be specified?
- Optional: How can the project be specified?

Teaching Forms

Lecture, Group Exercises

Teaching Methods

Presentations, Assignments, Group Work, Case Studies

Literature/Learning Materials

Will be provided in the lecture

Specifics

none.

Organization

ECTS Points	Hours/Week	Group works	Recommended Semester	Language
3	1	Yes	3	English

Workload

3 ECTS x 25 h = 75 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
15 hrs. / 20%	45 hrs. / 60%	15 hrs. / 20%

Description of the Module Element

Code	Title of Module Element
III.5.2	Mobility Solution Design III (Part 2)

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X		
System	X	X	
Self			
Social	X	X	

Content

- Which governance forms to build the framework for a mobility solution?
- Which governance forms play a role for stakeholder involvement and sustainability impacts of a mobility solution?
- How to foster positive mid/long term sustainability impacts of a mobility solution by governance processes?

Teaching Forms

Lecture, Individual and Group Exercises

Teaching Methods

Lecture, Analysis of Case Studies, Individual and Group Exercises

Literature/Learning Materials

Will be provided in the lecture

Specifics

none

Organization

ECTS Points	Hours/Week	Group work	Recommended Semester	Language
3	1	No	3	English

Workload

3 ECTS x 25 h = 75 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
15 hours / 20%	45 hours / 60%	15 hours / 20%

Module Code and Module Name
418-013 SUM IV.2 Master's Thesis

Significance of Module for the Goals of the Study Course

Qualification Goals The aim here is to run a complete research and development process of an individual research project, preferably in close collaboration with practice partners.
Content Case specific research.
Teaching Methods 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	Module IV.3
Relevance to other study courses	

Contribution of the Module to Sustainable Development

Content

Exam Requirements (necessary for the awarding of points)

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

Organization

Responsible for Module Prof. Dr. Kesselring		
Type of Module Mandatory	**Recurrence** Every Semester	**Duration** 4 months
Admission Criteria none	**ECTS Points** 22	**Weekly Attendance** no
Workload 22 ECTS x 25 h = 550 h with the following distribution:		
Attendance/Contact Hours	**Preparation/Homework/Self-Study** 550 hrs / 100%	**Time for Exercises/Group Work**

Module Elements

Module Element	
Code IV.2	Master‘s Thesis

Description of the Module Element

Code: 418-013 IV.2	Title of Module Element Master's Thesis

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	x	X
System	X	X	X
Self	X	X	X
Social	X	X	X

Content

Students conduct their own research supported by supervisors. They apply theoretical, methodological and practical knowledge, skills and competencies accumulated during the three semesters before.
The master thesis topic should be problem-based and in an applied perspective.

Teaching Forms

Self-diven research project with supervision.

Teaching Methods

Literature/Learning Materials

Bogner, Alexander; Littig, Beate; Menz, Wolfgang (Eds.) (2009): Interviewing experts. New York: Palgrave Macmillan (Research methods series).

Büscher, Monika; Freudendal-Pedersen, Malene; Kesselring, Sven; Kristensen, Nikolaj Grauslund (Eds.) (2020): Handbook of research methods and applications for mobilities. Northampton: Edward Elgar Publishing (Handbooks of research methods and applications series).

Specifics

Self-responsible and self-driven, teacher suported and supervision-led research project.

Organization

ECTS Points 22	Hours/Week	Group Work No	Recommended Semester 4	Language English

Workload
22 ECTS x 25 h = 550 h with the following distribution:

Attendance/Contact Hours	Preparation/Homework/Self-Study 550 hrs / 100%	Exercises/Group Work

Module Code and Module Name
418-013 SUM IV.3 Master Colloquium

Significance of Module for the Goals of the Study Course

Qualification Goals 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.
Content 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.
Teaching Methods Colloquium with master students, teachers and supervisors; individual presentations and group discussions.

Requirements for Participation

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

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

Content All aspects of sustainable development.

Exam Requirements (necessary for the awarding of points)

Type and Duration (min)	Weighting %
M20 (oral exam)	100%

Organization

Responsible for Module Prof. Dr. Kesselring		
Type of Module Mandatory	**Recurrence** Every Semester	**Duration** 1 Semester
Admission Criteria None	**ECTS Points** 2	**Weekly Attendance** 1
Workload 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**

Content Structure

Module Element	
Code	Master‘s Colloquium

Description of the Module Element

Code: 418- 014 IV.3	Title of Module Element Master's Colloquium

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject			
System	X		
Self	X	X	X
Social		X	X

Content

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.

Teaching Forms

Presentations and group discussions

Teaching Methods

Collegial consultancy („critical friends") and group supervision.

Literature/Learning Materials

None

Specifics

Eventually guests from practice.

Organization

ECTS Points 2	Hours/Week 1	Group work No	Recommended Semester 4	Language English
Workload 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

Module Code and Module Name
418-030 Elective: Data Analysis and Visualization

Significance of Module for the Goals of the Study Course

Code: 418-030	Title of Module Elective: Data Analysis and Visualization

Significance of Module for the Goals of the Study Course

Qualification Goals
Decision making depends on the development of knowledge through data. The goal is to enable students to assess the potential of data sources, analyze them further, and visualize the results. Participants will utilize methods and tools for handling both classical and spatial data.
Content
The aim of this course is to organize, process, analyze and visualize (geo-)data. The two main components of the course are 1) to have an introduction to analytics and visualization of data through the programming language Python and 2) to have an introduction to spatial data processing and visualization through the software QGIS.
Teaching Methods
Lecture, practical exercises, project work, workshop

Requirements for Participation

Knowledge, skills, competencies	Individual participation, active participation, self-training in data analysis and visualization software
Preparation for the module	E.g. References to literature or multimedia-based teaching and learning programs

Practicability of Module

Relationship to other modules within this study course	Introduction to SPSS
Relevance to other study courses	Master's Thesis

Contribution of the Module to Sustainable Development

Content
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.

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Module Elements

Module Element	
Code 418-030	Data Analysis and Visualization

Description of the Module Element

Code: 418-030	Title of Module Element Data Analysis and Visualization

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject	X	X	X
System	X	X	X
Self	X	X	
Social			

Content

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).

According to the data visualization, students will learn how to make professional-looking maps and graphics.

Teaching Forms

Lecture, Seminar (with exercise), Project work.

Teaching Methods

Exercises, Project work

Literature/Learning Materials

Sweigart, A. (2019). *Automate the boring stuff with Python: practical programming for total beginners*.
No Starch Press.
Menke, K., Smith Jr, R., Pirelli, L., & Van Hoesen, J. (2016). *Mastering QGIS*. Packt Publishing Ltd.

Specifics

Organization

ECTS Points	Hours/Week	Group Work	Recommended Semester	Language
6	2	Yes	3 / 4	English

Workload

6 ECTS x 25 h = 150 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
24 h / 16%	63 h / 42%	63 h / 42%

Module Code and Module Name
418-016 Elective: Knowledge transfer and consulting

Significance of Module for the Goals of the Study Course

Qualification Goals

Students will learn how to analyse a car manufacturer's business model, production system, and societal impact in the context of electrification. Theoretical models from economics and sociology will be introduced to deepen that understanding and analytical capabilities of the students.
Students will learn to navigate through expert and jounalistic information and be able to assess the impact of a company's actions for a societal change in mobility.

Content

Disruptive Electrification. The Effect of Tesla on the field of Mobility in Germany

The US-based electric car maker is currently ramping up production in its factory near Berlin. Notable effects on the German auto industry, the German car market, and even social relations between social groups as well as regions are to be expected.

In this course we will study the impact of Tesla for Germany's economic, social and political landscape in relation to the automotive industry, the transportation sector, and the field of mobility. The question looming on the horizon is the following: Which role is Tesla playing in the "Verkehrswende" (turnaround in traffic), i.e. the paradigmatic shift in mobility – besides its disruptive effect on the German auto industry?

We will focus on Tesla as a digital company, as a disruptor of the established industry, and as one key player driving forward the electrification of privately owned cars.

Will the advent of Tesla result in an ecological update of the automobility dispositif?

We will examine Tesla as a facilitator of a socio-technical change, as a factor in the digitization of social structures.

We will analyze Tesla's production system in comparison to Fordism and Lean production, the dominant role model in automotive industry.

We will analyze the Tesla ecosystem comprised of software-centered product, platform-shaped business model and its customer relations.

We will examine the effect on German work relations, unions, and the land of Brandenburg as projected third largest site in car industry.

We will study theory around digital economy and try to understand Tesla's history, product politics and customer relations. We will debate current developments in the German car industry leaning on economic and sociological publications.

We will study both scholarly sources as well as business and media publications.

Through the conduction of interviews with relevant figures for the research question we will further enrich our knowledge base.

Teaching Methods
Lecture, Group Exercises, Research & Interviews with experts, critical reading

Requirements for Participation

Knowledge, skills, competencies	Active participation and willingness to take over individual and group assignments.
Preparation for the module	Reading lists will be published prior to the course. A general knowledge about Tesla, electrification and the political situation around electrification in Germany should be acquired prior to visiting the course.

Practicability of Module

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

Contribution of the Module to Sustainable Development

Content

Exam Requirements (necessary for the awarding of points)

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

Organization

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

Module Elements

Module Element	
Code: 418-016	Knowledge transfer and consulting

Description of the Module Element

Code: 418-016	Title of Module Element Knowledge transfer and consulting

Content Structure

Qualification Goals

Know-how	Knowledge	Skills	Competencies
Subject			
System			
Self			
Social			

Content

Teaching Forms

Literature/Learning Materials

Specifics

none.

Organization

ECTS Points	Hours/Week	Group works	Recommended Semester	Language
6	2	Yes	3 / 4	English

Workload

6 ECTS x 25 h = 150 h distributed as follows:

Attendance/Contact Hours	Preparation/Homework/Self-Study	Exercises/Group Work
24 h / 16%	63 h / 42%	63 h / 42%