TUD Dresden University of Technology
“Friedrich List” Faculty of Transport and Traffic Sciences

Study Regulations for the consecutive Master's degree program Mobility Systems

as of Month DD, 2026

Pursuant to § 14 para. 4 sentence 1 and § 37 para. 1 of the Saxon Higher Education Act of May 31, 2023 (SächsGVBl. p.329), last amended by Article 2 of the Act of January 31, 2024 (SächsGVBl. p. 83), the Faculty Board of the “Friedrich List” Faculty of Transport and Traffic Sciences, after consulting with the Academic Affairs Committee for the Master's degree program in Mobility Systems issued the following Study Regulations as a statute, which have been approved by the University Executive Board:

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§ 1
Scope of application

These Study Regulations govern the objectives, content, structure, and organization of the Master's degree program in Mobility Systems at TUD Dresden University of Technology on the basis of the Saxon Higher Education Act, the General Examination Regulations, and the Specific Examination Regulations for the consecutive Master's degree program in Mobility Systems.

§ 2
Objectives of the degree program

(1) Students will be able to conduct scientific analyses of supply and demand in multimodal transportation systems, develop models of these systems, use these models to formulate strategies for shaping future mobility and transportation systems, and evaluate these strategies in light of societal objectives. They will be able to identify and describe interdisciplinary systemic relationships in the interactions between transportation, economic activity, land use, social factors, and the natural environment, and incorporate these into their own proposed solutions. As a result, students are enabled to conduct a systematic and theoretically sound analysis of socio-politically relevant issues relevant to the design of future mobility and transportation systems, allowing them to act responsibly for society as a whole and to engage in activities that benefit society.

(2) Students will gain the skills needed for intercultural collaboration and develop and strengthen their personality. They will be able to take on societal responsibility and effectively apply the social and personal skills they have acquired. In particular, students will develop the skills of holistic thinking and an awareness of consequences, personal responsibility, decision-making ability, and academic integrity.

(3) Graduates will possess comprehensive general engineering qualifications, as well as methodological and substantive expertise in the planning of mobility and transportation systems, which will particularly equip them to assume leadership roles in their professional careers, including in consulting and transportation firms, industrial companies, relevant associations, local governments, ministries, and government agencies at the state, federal, and European Union levels, as well as in research and educational institutions. They will be able to respond quickly to the demands and changes of the professional world and to pursue more advanced academic qualifications.

§ 3
Admission requirements

(1) To be admitted to the degree program, applicants must hold a first university degree recognized in Germany that qualifies them for a specific profession, or a degree program from a state-run or state-recognized vocational academy in a field of transportation science – specifically in the degree programs for Transport Engineering, Transport Economics, or Mobility and Transport Systems – or a degree in Civil Engineering, Environmental Engineering, or Industrial Engineering and Management, or another university degree demonstrating comparable prior knowledge.

(2) Applicants who do not hold a university degree from an institution in the European Union or the European Economic Area must also provide proof of their scores on the three-part Graduate Record Examination (GRE). They must have achieved a score of at least 162 in the Quantitative

Reasoning section and at least 151 in the Verbal Reasoning section. Proof of examination must not be more than five years old. The deadline is the last possible submission date.

(3) In addition, a special aptitude is required. Proof of this particular aptitude is provided by an aptitude assessment procedure in accordance with the Mobility Systems Aptitude Assessment Regulations.

(4) Knowledge of English at the C1 level of the Common European Framework of Reference for Language (CEFR) is a prerequisite. Proof should be provided using a relevant certificate or language certificate. These may include, in particular, a university entrance qualification that demonstrates the required language proficiency level, or a language proficiency certificate, such as the International English Language Testing System (IELTS) with an overall IELTS band score of at least 7.0, or the Test of English as a Foreign Language (TOEFL) with an Internet-based Test (iBT) score of at least 5.

§ 4
Start of study

The program can be started each winter semester.

§ 5
Teaching and learning methods

(1) The syllabus is structured in modules. In the individual modules, the course content is taught, consolidated and deepened through lectures, practicals, seminars, internships and independent study. The scope of teaching forms is usually specified in hours per week (SWS).

(2) The individual teaching and learning forms according to para. 1 sentence 2 are defined as follows:

1. Lectures introduce the subject matter of the modules,
2. Practicals allow students to apply the subject matter in exemplary sub-areas,
3. Seminars enable students to familiarize themselves under supervision with a selected subject area on the basis of specialist literature or other material, to report on the results of their work, to discuss them within the group and to present them in writing,
4. Laboratory training serves to apply the subject matter taught and to acquire practical skills in potential areas of employment, and
5. Independent study enables students to independently acquire both fundamental and in-depth subject knowledge using various media, such as teaching resources, literature and internet, in individual work or small groups.

§ 6
Structure and organization of the degree program

(1) The program is organized in modules The curriculum is divided into 3 semesters. The fourth semester is dedicated to the preparation of the final thesis including the colloquium. The third semester is particularly suitable for a temporary stay at another university (mobility window). Part-time study is possible in accordance with the regulations on part-time study.

(2) The degree program comprises six compulsory modules and ten or eleven elective compulsory modules, which allow students to choose their concentration. Modules are available in the

areas of strategic mobility planning, road and rail infrastructure, as well as data analysis and traffic modeling. The selection is binding. Modules can be re-selected the student must submit a written request to the Examination Office stating the module to be replaced and the newly selected module.

(3) Learning goals, content, teaching and learning methods included, requirements, applicability, frequency, workload, and duration of the individual modules are all listed in the module descriptions in Annex 1 of these Study Regulations.

(4) In deviation from § 2 para. 1 of the Specific Examination Regulations for the consecutive Master's degree program Mobility Systems, selected courses will be held in German in accordance with the module descriptions.

(5) The appropriate allocation of the modules to the individual semester, the observance of which makes it possible to complete the program within the standard period of study, as well as the type and scope of the respective courses included, and the number and standard time of the required study achievements and examined assessments are defined in the study schedule for full-time studies, attached in Annex 2 of these Study Regulations, and in an individual study schedule for part-time studies approved by the faculty.

(6) Upon proposal of the Academic Affairs Committee, the Faculty Board may change the range of elective compulsory modules as well as the study schedule for full-time studies, attached in Annex 2 of these Study Regulations. The current selection of elective compulsory modules will be announced in the usual manner at the beginning of the semester. The amended study schedule for full-time study shall apply to all students who have been informed about this in the usual manner at the beginning of their studies. The Examination Committee shall decide, upon application by the student, on any exceptions to sentence 3.

(7) If participation in an elective course of a compulsory or elective compulsory module or in a non-elective course of an elective compulsory module or an elective compulsory module is limited by the number of available places as specified in the module description, the participants shall be selected in accordance with the module description, either based on the chronological order of registration or by drawing lots. To this end, students must register for the appropriate elective compulsory module. The form and deadline for registering will be announced to the students in the usual manner. At the end of the registration period, the students will be notified in the usual manner whether they or been selected for the respective course. If the student was selected, the corresponding elective compulsory module is considered to have been selected pursuant to para. 2 sentence 3.

(8) An elective compulsory module or an elective course of a compulsory or elective compulsory module will not be held if the number of participants is less than the minimum number specified in the corresponding module description. To this end, students must register for the appropriate elective compulsory module or course. The form and deadline for registering will be announced to the students in the usual manner. Through the enrollment, the choice of an elective compulsory module according to para. 2 sentence 3 is made, if any. At the end of the registration period, students will be notified in the usual manner whether the elective compulsory module or course will be held.

§ 7
Content of the degree program

(1) Mobility Systems is a research-oriented Master's degree program.

(2) The degree program covers interdisciplinary transportation planning competencies and topics relating to general transportation planning, traffic psychology, transportation ecology, the design of roads and pathways, and public transportation. In addition, the program covers skills in academic research and project management in transportation sciences. In addition, the degree program covers general and specific content and skills in the strategic mobility planning, the design of road and rail infrastructure, data analysis and the modeling of transport systems, as well as the operation and management of transport systems.

§ 8
Credit points

(1) Credit points are awarded in accordance with the European Credit Transfer System. They document the average workload of the students and their individual study progress. One credit point corresponds to a 30-hour workload. Normally, 60 credit points are awarded for a full academic year, i.e. 30 credit points per semester. The total workload for the degree program corresponds to 120 credit points and comprises the teaching and learning methods according to type and scope stipulated in the module descriptions, the study achievements and examined assessments, the Master's thesis and the colloquium.

(2) The module descriptions indicate the number of credits that can be earned by each module. Credits are awarded upon passing the module examination. § 6 of the Specific Examination Regulations for the consecutive Master's degree program in Mobility Systems remain unaffected.

§ 9
Academic advisory and counseling service

(1) General advice will be provided by the Central Student Information and Counseling Service at TU Dresden. It covers questions regarding study options, enrollment modalities and general student affairs. Subject-specific advice during studies will be provided by the "Friedrich List" Faculty of Transport and Traffic Sciences. This subject-specific advisory service assists students with regard to the design of their studies.

(2) At the beginning of the third semester, each student who has not yet provided proof of academic performance shall make use of the subject-specific advisory services.

§ 10
Amendments to module descriptions

(1) In order to adapt them to changed conditions, module descriptions may be amended in a simplified procedure in order to optimize study organization, with the exemption of the fields Module name, Learning goals, Content, Teaching and learning methods, Requirements for earning credit points, Credit points and grades and Module duration.

(2) In a simplified procedure, the Faculty Board adopts the amendments to the module descriptions upon proposal of the Academic Affairs Committee. The amendments must be published in the usual manner.

§11
Entry into force

These Study Regulations enter into force on April 1, 2026.

The foregoing statutes are hereby executed. They shall be published in the official announcements of TU Dresden.

Dresden, Month DD, 2026

The Rector
of TUD Dresden University of Technology

Prof. Ursula M. Staudinger

Annex 1
(ref. § 6 para. 3)
Module descriptions

Module name	**Mobility System Planning and Research**
Module number	VW-MOBS-01-SP
Module coordinator	Prof. Regine Gerike regine.gerike@tu-dresden.de
Learning goals	Students will gain an understanding of the complex interrelationships involved in mobility system planning, as well as the procedures and processes associated with it, including integrated cooperative and consensus-oriented approaches. They will gain a thorough understanding of the various aspects of the planning process and take into account the necessary integrative aspects. They will understand the interrelationships between regional planning, urban planning, and integrated mobility system or transportation planning, and will be able to analyze not only mobility and transportation demand, but also transportation supply, develop strategies and measures, and evaluate the impacts of planned measures. They will acquire specialist knowledge of approaches to solving practical transportation planning problems and a fundamental understanding of scientific methodologies used in the planning of transportation systems.
Content	The module covers: 1. Classification, principles, objectives, measures, and planning frameworks for mobility system planning, 2. The functional organization of road networks, 3. Design of highway infrastructure, 4. Impact analyses and evaluation methods for transportation planning and engineering measures, 5. Understanding and influencing mobility behavior in relation to spatial structures and transportation systems, and 6. Research in mobility system planning.
Teaching and learning methods	Lecture 3 hours per week, practical 1 hour per week, plus independent study.
Prerequisites	None.
Applicability	This module is a compulsory module in the Mobility Systems Master's degree program. It fulfills the requirements for the modules Urban Mobility Workshop Basics, Road Traffic Safety, Road User Behavior and Safety as well as Research Task in Mobility Systems.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio of 60 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.

Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Human Behavior and Environmental Effects in Transportation**
Module number	VW-MOBS-02-SP
Module coordinator	Prof. Jens Borken-Kleefeld verkehrsoekologie@tu-dresden.de
Learning goals	Students will gain a fundamental understanding of human experience and behavior, particularly in the context of transportation and mobility. They will get to know relevant theories, methods, and intervention strategies in psychology and will be able to apply them to traffic planning and design. Students will be able to quantitatively assess the environmental impact of transportation. They will be able to calculate fuel consumption, CO2 emissions, and air pollutant emissions for various modes of transportation, as well as determine noise levels for these modes of transportation. They will have studied life cycle assessments and will be able to compare the environmental impacts of different modes of transportation. They will be familiar with approaches for calculating various external effects.
Content	The module covers: 1. Psychological fundamentals, including perception, information processing, judgment, and decision-making, 2. Research methods in psychology, 3. Traffic psychology, particularly with regard to issues of traffic safety and mobility, 4. Energy and fuel consumption in transportation, exhaust emissions, noise emissions, greenhouse gas emissions from transportation, 5. Environmental comparison of various modes of transportation and propulsion systems, particularly life-cycle analysis and 6. Accounting and planning procedures, particularly environmental assessments and the internalization of external costs.
Teaching and learning methods	Lecture 4 hours per week, plus independent study.
Prerequisites	None.
Applicability	This module is a compulsory module in the Mobility Systems Master's degree program. It fulfills the requirements for the modules Scenarios for Sustainable Mobility, Advanced Tools and Methods of Transportation Ecology, Analysis of Vehicle Emissions and Air Pollution, Road User Behavior and Safety as well as Research Task in Mobility Systems.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a For a written examination 120-minute written test.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.

Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Design and Operation in Public Transportation**
Module number	VW-MOBS-03-SP
Module coordinator	Dean of Studies for Transport Engineering studiendekan-viw@mailbox.tu-dresden.de
Learning goals	Students will learn about the structure, organization, and financing of public transportation, as well as the interests of public transportation users, and will be able to design customer-oriented and cost-effective passenger transportation services in urban and rural areas and integrate them into a comprehensive transportation system. They will be familiar with the laws and principles governing operational procedures and will be able to plan and carry out operations reliably, as well as respond appropriately in the event of malfunctions.
Content	The module covers: 1. Structure, organization, and financing of public transportation; client-contractor relationships; and regional transit authorities, 2. User expectations regarding public transportation, 3. Fundamentals of service and operational planning in urban and rural areas, 4. Basics of operational procedures and 5. Operational control tools for routine and emergency situations.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study.
Prerequisites	Participants require foundational knowledge of public transportation organization and operations planning at the Bachelor's level.
Applicability	This module is a compulsory module in the Mobility Systems Master's degree program. It fulfills the requirements for the modules Module Railway Operation and Research Task in Mobility Systems.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 120-minute written test.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Road Design and Pavements**
Module number	VW-MOBS-04-RR
Module coordinator	Prof. Reinhard Koettnitz kontakt.strasse@mailbox.tu-dresden.de
Learning goals	Students will acquire knowledge of geometric and structural road design for both urban and rural areas, taking into account all road users and land uses, as well as the design of road traffic facilities. They will understand the interrelationships among all relevant boundary conditions and the resulting decision-making processes, be familiar with methods for determining the loads on the road pavement and the construction materials used, and be able to design standard road pavement structures. They will be familiar with testing procedures for the quality assurance of road construction materials and mixtures.
Content	The module covers: 1. Design principles for roads and intersections in urban and rural areas, 2. Design methods for highway infrastructure, 3. Guidelines for the planning and design of road infrastructure in rural and urban areas, 4. Determination of the load conditions and the construction materials used in road structures, 5. The design of standard construction methods for road pavements and 6. Testing procedures for the quality assurance of building materials and building material mixtures.
Teaching and learning methods	Lecture 4 hours per week, practical 1 hour per week, plus independent study.
Prerequisites	None.
Applicability	This module is a compulsory module in the Mobility Systems Master's degree program. It fulfills the requirements for the modules Urban Engineering and Road Drainage Systems, Planning Process and Environmental Protection in Road Design, Building Information Modeling for Transportation Infrastructure as well as Research Task in Mobility Systems.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 150-minute written test.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Data and Models in Transport Planning**
Module number	VW-MOBS-05-DM
Module coordinator	PD Dr. Rico Wittwer rico.wittwer@tu-dresden.de
Learning goals	Students will have in-depth knowledge of concepts related to data preparation, analysis, and utilization for mobility system planning, as well as of basic evaluation and visualization techniques. They will be able to identify research questions, select and prepare appropriate data, design suitable methodological approaches and apply methods, conduct analyses, and present, discuss, and critically evaluate the results within the context of project-based studies using existing data and advanced statistical analysis techniques. They will be able to estimate and interpret simple statistical and econometric models.
Content	The module covers: 1. Methods for processing, analyzing, visualizing, and interpreting data in mobility system planning, 2. Fundamentals of data analysis and data visualization, 3. Techniques for data preparation, 4. Concepts of data analysis, techniques for presenting and communicating results, 5. Modeling approaches in transportation planning, 6. Areas of application and possible uses of models, 7. Input and validation variables in models and 8. Software-assisted estimation and analysis of simple statistical and econometric models.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study.
Prerequisites	None.
Applicability	This module is a compulsory module in the Mobility Systems Master's degree program. It fulfills the requirements for the modules Data Collection and Evaluation Methods for Bicycle Planning, Transport Network Optimization with Emerging Data for Ethical and Sustainable Applications as well as Research Task in Mobility Systems.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 50 hours. The examination language for the portfolio is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.

Module duration	The module runs for the duration of one semester.

Module name	**Research Task in Mobility Systems**
Module number	VW-MOBS-06
Module coordinator	Prof. Regine Gerike regine.gerike@tu-dresden.de
Learning goals	Students will be able to conduct advanced academic research on current core research areas in transportation science. They will be able to independently understand, interpret, and explain problems in a selected area of mobility systems; critically evaluate and implement potential solutions; and independently and comprehensively address a research question in the field of mobility systems, as well as present and reflect on the research findings. They will be familiar with the methods and requirements of academic work, know how to work with academic literature and conduct independent research on specific research questions, and be equipped to act in a socially responsible manner through their engagement with issues relevant to society as a whole. Students will acquire key skills in the areas of rhetoric, public speaking, and presentation techniques, and will develop and strengthen their personality.
Content	The module covers: 1. Independent scholarly analysis, reflection, and discussion of academically relevant issues, 2. Literature review focused on research to contextualize the subject matter within the academic field and to establish a theoretical foundation, 3. Quantitative and qualitative methods for analyzing transportation issues, 4. Analysis of the interrelationships and interdependencies of transportation-related issues, 5. Visualization and presentation techniques for communicating results and 6. Presentation of research projects and their results.
Teaching and learning methods	Seminar 2 hours per week, plus independent study
Prerequisites	The competencies to be acquired in the modules Mobility System Planning and Research, Human Behavior and Environmental Effects in Transportation, Design and Operation in Public Transportation, Road Design and Pavements as well as Data and Models in Transport Planning are a prerequisite.
Applicability	This module is a compulsory module in the Mobility Systems Master's degree program.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 250 hours.
Credit points and grades	The module is worth 10 credit points. The module grade corresponds to the grade of the examined assessment.

Module frequency	The module is offered each winter semester.
Workload	The workload comprises 300 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Urban Mobility Workshop Basics**
Module number	VW-MOBS-10-SP
Module coordinator	Prof. Regine Gerike regine.gerike@tu-dresden.de
Learning goals	Students will be able to conduct urban planning and transportation analyses based on the transportation planning process. In particular, they will be able to illustrate and interpret the current urban planning and traffic conditions of streets and public spaces. They will be able to work in an interdisciplinary team, present and discuss their own research findings in public, and to strengthen their social and communication skills through teamwork.
Content	The module covers: 1. Elements of the transportation planning process, 2. Project studies in a specific urban setting and 3. Analysis and assessment of urban traffic.
Teaching and learning methods	Lecture 1 hours per week, practical 1 hour per week, plus independent study. The lecture and practical will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty. A minimum of five participants is required for the module to take place.
Prerequisites	The competencies to be acquired in the module Mobility System Planning and Research are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules. It fulfills the requirements for the module Urban Mobility Workshop Advanced.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 100 hours. The examination language is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Urban Mobility Workshop Advanced**
Module number	VW-MOBS-11-SP
Module coordinator	Prof. Regine Gerike regine.gerike@tu-dresden.de
Learning goals	Students will have the ability to design and evaluate measures to improve traffic and road conditions based on analyses of the traffic planning process. In particular, they will be able to design streets and public spaces in an application-oriented manner as part of an integrated transportation planning approach. They will be able to work in an interdisciplinary team and to present and discuss their own research findings in public. Students will also have strengthened their social and communication skills through teamwork.
Content	The module covers: 1. Design methods and approaches to the design of traffic spaces, 2. Project studies in a specific urban setting and 3. Evaluation and development of design solutions.
Teaching and learning methods	Lecture 1 hours per week, plus independent study. The lecture will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty. A minimum of five participants is required for the module to take place.
Prerequisites	The competencies to be acquired in the module Urban Mobility Workshop Basics are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 115 hours. The examination language is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Scenarios for Sustainable Mobility**
Module number	VW-MOBS-15-SP
Module coordinator	Prof. Jens Borken-Kleefeld verkehrsoekologie@tu-dresden.de
Learning goals	Students will be able to identify key elements of future sustainable mobility for Germany, based on scientific and societal guidelines. As such, they will understand the related assessment and evaluation processes. They will be familiar with scenario-based thinking and able to develop their own scenarios for future mobility. They will be able to check scenarios for consistency and plausibility and interpret them. Students will be able to work effectively in groups and present information both verbally and in writing, for example in presentations and term papers.
Content	The module covers: 1. Objectives for sustainable and climate-friendly transportation, 2. Obstacles to sustainable and climate-friendly transportation, 3. The components of climate-friendly transportation, 4. Scenarios in forecasting and backcasting for climate-friendly transportation, 5. Examples of future transportation scenarios at the local, national, and European levels and 6. Discussion, analysis, and evaluation of various scenarios.
Teaching and learning methods	Lecture 2 hours per week, seminar 2 hours per week, and independent study. Enrollment in the lecture and seminar is limited to 20 students, who will be selected on a first-come, first-served basis. A minimum of five participants is required for the module to take place.
Prerequisites	The competencies to be acquired in the module Human Behavior and Environmental Effects in Transportation are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 60 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Basics in Psychology and Behavioral Economics**
Module number	VW-MOBS-20-SP
Module coordinator	Dr. Jens Schade jens.schade@tu-dresden.de
Learning goals	Students will understand fundamental psychological concepts in the context of Transport Economics. They will be able to apply basic psychological concepts to address behavioral economic issues. They will have a fundamental understanding of the social and scientifically relevant intersections between psychology and behavioral economics.
Content	The module covers methods, theories, and research areas in psychology, as well as research areas in behavioral economics.
Teaching and learning methods	Seminars 2 hours per week, plus independent study.
Prerequisites	None.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules. It fulfills the requirements for the module Advanced Issues in Psychology and Behavioral Economics.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 100 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Cost-Benefit Evaluation of Infrastructure Projects and Traffic Law**
Module number	VW-MOBS-25-SP
Module coordinator	Prof. Georg Hirte georg.hirte@tu-dresden.de
Learning goals	Students will be familiar with practical economic evaluation methods used in the planning of transportation infrastructure. They will be able to document the legally relevant processes involved in the mobility of people, goods, and information or messages, and classify them into the appropriate legal categories based on the laws and regulations of transportation law. Students will acquire the interpersonal skills needed to assess situations and effectively assert or defend claims, particularly when communicating with government agencies, courts, clients, and third parties in the field of traffic law. They will have knowledge, skills, and abilities in the field of transportation law and will be able to apply this knowledge to resolve minor legal cases involving road traffic law, motor vehicle law, and railway law, while assessing the role of administrative courts.
Content	The module covers evaluation methods used in the federal transportation planning, particularly the standardized evaluation for local public transportation and the guidelines for economic feasibility studies on roads, as well as key principles of transportation law.
Teaching and learning methods	Lecture 4 hours per week, plus independent study. The lectures will be taught in German.
Prerequisites	None.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 120-minute written test. The examination language is German.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Urbanism**
Module number	VW-MOBS-26-SP
Module coordinator	Prof. Angela Mensing-de Jong angela.mensing-de_jong@tu-dresden.de
Learning goals	Students will gain an understanding of historical and contemporary theories of space, including urban space, social space, and landscape, and will be able to explain and articulate contemporary requirements for the development of urban landscapes. They will be able to apply their expertise to urban and landscape architectural contexts, and will be able to analyze and interpret situations in an urban context and develop their own concepts and proposed solutions based on this analysis. They will be able to think conceptually, reflect, and argue critically. Students will develop social and communication skills through teamwork.
Content	The module covers spatial phenomena in the built and unbuilt environment, both in theory and practice, case studies of change processes, particularly regarding regionally varying demographic and economic developments as well as housing and working conditions, infrastructural innovations, criteria for sustainable development, formal and informal development, migration, participation, the relationship between nature and the city, urban planning phenomena in an urban context, and concepts for urban planning and open space planning.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study. The lecture and practical will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty.
Prerequisites	None.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 70 hours. The examination language is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Management of Public Transport Systems and Services**
Module number	VW-MOBS-30-SP
Module coordinator	Prof. Jörn Schönberger joern.schoenberger@tu-dresden.de
Learning goals	Students will be familiar with the decision-making challenges that arise in the design, configuration, and operation of passenger transport systems. They will gain an insight into the algebraic modeling of these situations and will be able to apply techniques and tools for solving complex models. Students will be able to select and apply the modeling and decision-making methods they have learned in a targeted manner. Students will develop and strengthen their personality.
Content	The module covers infrastructure planning, particularly the definition of line routes; timetable development; staff scheduling based on defined service delivery processes; the specification of public transportation products; and an overview of the challenges arising from operational concepts for shared mobility systems. Content is based on the current state of research.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study.
Prerequisites	Students require knowledge of operations research at Bachelor's level, as well as basic programming skills at Bachelor's level, such as VBA, PHP, Java, or C++. Useful reading for this module: Stroustrup, B.: Programming: Principles and Practice Using C++, Addison Wesley, current edition.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 75 hours.
Credit points and grades	The module is worth 5 credit points. The module grade is the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Railway Operation**
Module number	VW-MOBS-35-SP
Module coordinator	Prof. Nikola Bešinović nikola.besinovic@tu-dresden.de
Learning goals	Students will be able to explain the basic principles and framework conditions for the operation of rail systems and will be familiar with the procedures for maintaining train spacing, signaling, and track safety. They will be able to explain and identify the relevant railway operations processes and their time elements. Students will be able to present the process of railway operations planning and its individual stages, describe the concepts used in this process, and apply those concepts to the field of train scheduling. They will be familiar with the causes of delays and how they propagate, as well as with the operations of train scheduling and potential solutions. They will have a deeper understanding of the relationship between quality and capacity in railway systems, be able to explain and apply relevant factors, key metrics, and procedures, and be capable of developing and evaluating operational planning concepts for railways as well as deriving approaches for the qualitative improvement of railway systems. They will be familiar with specific IT tools for planning, managing, and evaluating railway operations and will be able to contribute to their further development.
Content	The module covers: 1. Fundamental characteristics and components of railway systems, 2. Processes and timing in rail operations, particularly spacing, signaling, track safety, train movements on lines and at junctions, train intervals, shunting, and train preparation, 3. Operations and scheduling planning, particularly the stages of operations planning for railways and their associated tasks, demand and service networks, integrated regular-interval timetables, train path design and coordination, 4. Operations and operational control, particularly disruptions and delays, fundamentals and models for scheduling and 5. Quality and capacity in railway systems, particularly terminology, influencing factors, and causal relationships, as well as scientific methods for determining quality and capacity and their application.
Teaching and learning methods	Lecture 2.5 hours per week, practical 1.5 hours per week, seminar 0.5 hours per week, plus independent study.
Prerequisites	Students require knowledge of physics, particularly vehicle dynamics, at the basic upper secondary school level, as well as knowledge of statistics and stochastic at Bachelor's level. In addition, the competencies to be acquired in the module Design and Operation in Public Transportation are a prerequisite.

Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 40 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Urban Engineering and Road Drainage Systems**
Module number	VW-MOBS-40-RR
Module coordinator	Prof. Reinhard Koettnitz kontakt.strasse@mailbox.tu-dresden.de
Learning goals	Students will understand the influence of road design on the selection and sizing of drainage systems for rural and urban roads. They will be able to calculate the dimensions of drainage systems. In the context of urban street design, students will acquire a basic understanding of the utilities and conduits located within the road structure. They will be familiar with system requirements and be able to situate them within a street environment.
Content	The module covers: 1. Selection of rainfall measurement events and calculation of the volume of water runoff from the terrain and road, 2. The sizing and geometric placement of the drainage pipes, 3. The basic guidelines for the approximate sizing of a storm water retention basin, 4. Legal foundations in municipal planning, 5. Municipal utility and waste management networks and 6. The installation and maintenance of municipal utility lines.
Teaching and learning methods	Lecture 3 hours per week, practical 1 hour per week, plus independent study. The lecture and practical will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty.
Prerequisites	Participants require skills acquired in the Road Design and Pavements module.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 120-minute written test. The examination language is German.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Road Traffic Safety**
Module number	VW-MOBS-45-RR
Module coordinator	Prof. Regine Gerike regine.gerike@tu-dresden.de
Learning goals	Students will acquire knowledge of road safety indicators and will be able to apply selected road safety methods. They will gain comprehensive and practical knowledge of safe road traffic operations, including the skills necessary for safe road space planning and road design. Students will be able to design measures to improve road safety and evaluate them independently.
Content	The module covers: 1. Fundamentals of traffic accident investigation, 2. Safe city streets, 3. Safety of pedestrian and bicycle traffic, 4. On-site accident investigation, 5. Safety audit and 6. Traffic safety network analysis.
Teaching and learning methods	Lecture 2 hours per week, practical 1 hour per week, plus independent study. The lecture and practical will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty. Enrollment in the lecture and practical is limited to 30 students, who will be selected on a first-come, first-served basis. A minimum of five participants is required for the module to take place.
Prerequisites	Students require knowledge of geographic information systems at Bachelor's level, as well as competencies acquired in the Mobility System Planning and Research module.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio of 60 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Road User Behavior and Safety**
Module number	VW-MOBS-50-RR
Module coordinator	Prof. Regine Gerike regine.gerike@tu-dresden.de
Learning goals	Students will acquire knowledge of the factors that influence safety-related human behavior in the context of road traffic. In particular, they will understand how road users interact with the transportation infrastructure, become familiar with road safety indicators, and be well-versed in various data collection and analysis methods. They will be familiar with measures to improve traffic safety, particularly those aimed at changing the behavior of road users, and will be able to assess their effectiveness.
Content	The module covers: 1. Indicators and methods for assessing traffic safety, 2. Contextual factors influencing traffic safety and behavior, particularly structural, traffic-related, and operational factors influencing traffic safety and behavior, 3. Personal factors influencing traffic safety and behavior, and 4. Measures for behavior modification and their effectiveness.
Teaching and learning methods	Seminars 4 hours per week plus independent study. Enrollment in the seminar is limited to 30 students, who will be selected on a first-come, first-served basis. A minimum of five participants is required for the module to take place.
Prerequisites	The competencies to be acquired in the modules Mobility System Planning and Research as well as Human Behavior and Environmental Effects in Transportation are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 60 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Rail Design**
Module number	VW-MOBS-55-RR
Module coordinator	Prof. Duo Liu duo.liu@tu-dresden.de
Learning goals	Students will be familiar with the issues and challenges involved in the planning, design, and construction of railway infrastructure, as well as with the construction and maintenance of railway tracks/superstructures. They will gain knowledge of methods for the functional design of railway lines and stations, as well as for route planning, traffic engineering, and structural design, based on traffic and operational requirements. They will be able to understand planning and design tasks and independently and systematically carry out basic tasks related to track layout, station, and route design. Students will be able to use relevant specialized software for basic design tasks. They will be able to assess and take into account structural railway track engineering considerations.
Content	The module covers: 1. Alignment of complex track layouts such as curved switches, curved track connections, and switches in transition curves, 2. Calculation of track spacing, 3. Design of platform structures, 4. Planning and design of complex passenger and freight transport facilities, 5. Construction and maintenance of the track, 6. Noise and vibration and 7. Use of appropriate specialist software.
Teaching and learning methods	Lecture 3 hours per week, practical 1 hour per week, plus independent study. Enrollment in the module is limited to 50 students, who will be selected on a first-come, first-served basis.
Prerequisites	Participants are expected to have a basic understanding of railway alignment at Bachelor's level Useful reading for this module: Jochim/Lademann, *Planung von Bahnanlagen*, Fachbuchverlag Leipzig; Menius/Matthews, *Bahnbau und Bahninfrastruktur*, Springer Vieweg; Profillidis, Railway Planning, Management and Engineering, Publisher Taylor and Francis; Guerriere, Fundamentals of Railway Design, Springer Link.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 30 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.

Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Fundamentals of Traffic System Dynamics and Control**
Module number	VW-MOBS-60-RR
Module coordinator	Prof. Meng Wang meng.wang@tu-dresden.de
Learning goals	Students will gain an understanding of the basic principles of traffic flow across various modes of transportation, particularly for vehicles, pedestrians, cyclists, and public transportation. They will be able to identify the key parameters and how they relate to one another, describe a macroscopic traffic flow model, and use the model to simulate and reproduce typical traffic flow phenomena. Students will be able to describe the generic model structure for vehicle following models, pedestrian models, and bicycle traffic models; analyze the string stability property of a linear vehicle following model; and apply linear control theory to specific traffic problems.
Content	The module covers: 1. Empirical observations of traffic flows, including vehicle, pedestrian, bicycle, and public transportation, 2. The relationship between traffic flow, traffic density, and speed, 3. Disrupted traffic flow and traffic jams, congestion, and gridlock, 4. Cell transfer model, 5. Models for tracking vehicles, 6. Models for pedestrian traffic and bicycle traffic, 7. State-space formulation of traffic dynamics, 8. Introduction to linear control and 9. Linear feedback traffic control.
Teaching and learning methods	Lecture 3 hours per week, practical 1 hour per week, plus independent study.
Prerequisites	Students require knowledge of linear algebra, calculus (including numerical methods for solving ordinary and partial differential equations), and the fundamentals of linear programming at Bachelor's level.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master’s degree program, from which students must select 10 or 11 modules. It fulfills the prerequisites for the module in Advanced Traffic System Dynamics and Control.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 90-minute written test.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.

Module duration	The module runs for the duration of one semester.

Module name	**Advanced Traffic System Dynamics and Control**
Module number	VW-MOBS-61-RR
Module coordinator	Prof. Meng Wang meng.wang@tu-dresden.de
Learning goals	Students will be able to identify and explain the most important nonlinear phenomena and network traffic phenomena, as well as explain and characterize the most important advanced control methods for nonlinear network traffic problems. They will be able to compare and evaluate the latest technology in existing control concepts based on relevant publications and apply an advanced control method to the design of a city grid control system. Students will be able to design an appropriate traffic signal control system for real-world multimodal transportation systems.
Content	The module covers: 1. Network dynamics, in particular the simple and multimodal macroscopic fundamental diagram and network equilibria, 2. Fundamentals of model predictive control, robust and adaptive control, and networked control, 3. Multimodal traffic management, 4. Network traffic control, in particular perimeter control and gating, network partitioning, hierarchical control, multi-agent control, and 5. C-ITS and CAV-based control.
Teaching and learning methods	Lecture 3 hours per week, practical 1 hour per week, plus independent study.
Prerequisites	The competencies to be acquired in the module Traffic System Dynamics and Control are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 90-minute written test.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Agent-based Modeling in Transportation**
Module number	VW-MOBS-65-DM
Module coordinator	Prof. Regine Gerike regine.gerike@tu-dresden.de
Learning goals	Students will be familiar with activity-based approaches to traffic modeling, particularly agent-based simulations. They will be able to create their own traffic simulation models, identify and prepare suitable input data, and use it to determine traffic supply and demand. They will be able to implement traffic planning measures and research questions in simulation models, and generate and interpret results using application software and simple data analysis scripts.
Content	The module covers: 1. Activity-based traffic models and traffic simulation models, as well as their application in traffic planning, 2. Agent-based traffic simulations, 3. Processing of input data for model creation, 4. Development of simulation models for specific application contexts, 5. Submodels and algorithms, 6. Behavioral economic concepts, 7. Creation of simulation models using application software and 8. Model analysis using appropriate analytical tools and methods.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study. The lecture and practical will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty.
Prerequisites	Students require knowledge of linear algebra, single-variable functional analysis, differential equations, and differential calculus for functions of several variables at Bachelor's level.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master’s degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 60 hours. The examination language for the complex assessment is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.

Module duration	The module runs for the duration of one semester.

Module name	**Methods in Data Analytics**
Module number	VW-MOBS-70-DM
Module coordinator	Prof. Pascal Kerschke pascal.kerschke@tu-dresden.de
Learning goals	Students will learn the fundamental methods of data analysis. They will be able to apply these methods and identify and resolve any problems that arise.
Content	They will be able to apply these methods and identify and resolve any problems that arise.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study.
Prerequisites	Students require basic practical skills statistics and data analysis at Bachelor's level.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 90-minute written test.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Advanced Methods in Data Analytics**
Module number	VW-MOBS-71-DM
Module coordinator	Prof. Pascal Kerschke pascal.kerschke@tu-dresden.de
Learning goals	Students will learn advanced data analysis methods that enable them to analyze data in depth. They will be able to apply these methods and identify and resolve any problems that arise.
Content	The module covers theoretical concepts and the application of advanced data analysis methods in the context of current research relevant to the processing of transportation data.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study. Enrollment in the module is limited to 30 students, who will be selected on a first-come, first-served basis.
Prerequisites	Students require basic practical skills statistics and data analysis at Bachelor's level.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 90-minute written test.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Transport Network Optimization with Emerging Data for Ethical and Sustainable Applications**
Module number	VW-MOBS-75-DM
Module coordinator	Prof. Steve Travis Waller Steven_travis.waller@tu-dresden.de
Learning goals	Students will be able to utilize new data sources and network optimization methods – such as routing algorithms, complex network allocation, and location and vehicle optimization – within the framework of metrics and constraints that explicitly take into account the ethical aspects of mobility.
Content	The module covers: 1. Foundations of transport networks, network terminology, computational complexity, network optimization models, and network optimization algorithms, 2. Advanced concepts of network theory and related problems in transportation planning, 3. Advanced variants of static and dynamic user equilibrium, complex network design problems, vehicle routing problems, and facility location problems, 4. Quantifiable approaches that are specifically suited for network optimization with regard to sustainability, equity, and environmental compatibility, 5. Quantifying equity and environmental justice in the context of transportation, 6. Modeling relevant system metrics within algorithmic approaches, 7. Applications of these concepts to transportation planning problems, such as network design problems and 8. Fundamentals of automated planning.
Teaching and learning methods	Lecture 3 hours per week, plus independent study.
Prerequisites	The competencies to be acquired in the module Data and Models in Transport Planning are a prerequisite. Useful reading for this module: Ahuja, Ravindra K., Magnanti, Thomas L., Orlin, James B.: Network Flows: Theory, Algorithms, and Applications, Harlow: Person, current edition; Sheffi, Yosef: Urban Transportation Networks: Equilibrium Analysis with Mathematical Programming Methods, Englewood Cliffs, N. J.: Prentice-Hall, current edition.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 70 hours.
Credit points and	The module is worth 5 credit points. The module grade corresponds to

grades	the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Data Driven Statistics**
Module number	VW-MOBS-82-DM
Module coordinator	Prof. Ostap Okhrin ostap.okhrin@tu-dresden.de
Learning goals	Students will acquire a sound knowledge of data analysis, with a particular focus on unstructured datasets and the handling of missing data. They will gain extensive media skills in the use of statistical software.
Content	The module covers: 1. Graphical interpretation of numerical data, 2. Decision trees, 3. Cluster analysis, 4. Maximum margin classifiers and support vector machines (SVM), 5. Missing data and 6. Neural networks.
Teaching and learning methods	Lecture 2 hours per week, plus independent study. Enrollment in the module is limited to 30 students, who will be selected on a first-come, first-served basis.
Prerequisites	Students require knowledge of statistics and mathematics at basic upper secondary school level.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. If more than 20 students register, the module examination consists of a 120-minute written exam. If up to 20 students register, it consists of a 30-minute non-public oral exam as an individual examination; if so, this will be announced to the registered students in writing at the end of the registration period.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.
Supporting literature	Hastie, T., Tibshirani, R., Friedman, J., The Elements of Statistical Learning: Data Mining, Inference, and Prediction (2nd Edition), Springer Verlag, 2009.

Module name	**Fundamentals of Geoinformatics**
Module number	VW-MOBS-90-DM
Module coordinator	Prof. Lars Bernard Lars.Bernard@tu-dresden.de
Learning goals	Students will learn the key fundamentals of geoinformatics, particularly geodata modeling, geodata analysis, geodatabases, and geographic information systems. They will be able to apply numerous simple application strategies to a specific example in a research area within geoinformatics. They will know how to use the essential tools of geoinformatics effectively and confidently, particularly those of geographic information systems.
Content	The module covers the mathematical and computational foundations of geoinformatics, the fundamentals of geodata modeling and analysis, the basics of geo-databases and geographic information systems (GIS), current research areas in geoinformatics, and practical in-depth exploration of simple geoinformatics applications.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study. The language of instruction for both the lecture and the seminar is German.
Prerequisites	Students require knowledge of mathematics at upper secondary school level, basic computer skills, particularly in data management, MS Office software, internet research, and email communication.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules. It fulfills the requirements for the modules GIS and Geodata Bases as well as Geodata Infrastructures.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a 90-minute written test and a ungraded portfolio of 30 hours. The language of the written exam and the portfolio is German.
Credit points and grades	The module is worth 5 credit points. The module grade is calculated from the weighted average grade of the individual examined assessments pursuant to § 15 para. 1 sentence 6 of the General Examination Regulations. The portfolio is single weighted and the exam is weighted by a factor of two.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**GIS and Geodata Bases**
Module number	VW-MOBS-91-DM
Module coordinator	Prof. Lars Bernard Lars.Bernard@tu-dresden.de
Learning goals	Students will gain an overview of the practical applications of geographic information systems (GIS) and geo-databases and will be able to use them independently. They will have methodological expertise in the development of GIS and geo-database applications, as well as in project-based teamwork. They will be able to present the results of these projects in writing.
Content	The module covers in-depth strategies for researching, collecting, integrating, managing, and analyzing geodata using geo-database systems and GIS; the independent development of geo-databases; the independent translation of complex problems into process models for GIS; and the presentation of the resulting developments.
Teaching and learning methods	Lecture 0.5 hour per week, practical 1.5 hours per week, seminar 2 hours per week plus independent study. The language of instruction for the lecture, practical, and seminar is German.
Prerequisites	Participants require skills acquired in the Fundamentals of Geoinformatics module.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules. It fulfills the requirements for the Geodata Infrastructures module.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 60 hours. The examination language for the complex assessment is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Advanced Tools and Methods of Transportation Ecology**
Module number	VW-MOBS-116-SP
Module coordinator	Prof. Jens Borken-Kleefeld verkehrsoekologie@tu-dresden.de
Learning goals	Students will become familiar with key methods and tools for addressing and quantifying issues related to transportation and the environment. They will be able to independently analyze problems and identify the pros and cons from a transportation and environmental perspective. They are able to analyze current literature relevant to their research question and to present complex issues. Students will develop their teamwork skills and improve their social and communication skills. They will be able to lead written and oral presentations and discussions.
Content	The module covers: 1. Fundamentals of environmental accounting and assessment of the environmental impacts of transportation, 2. More advanced aspects of life cycle assessment, 3. Current issues in the analysis of remote sensing emissions, 4. Selected environmental assessments in transportation planning and 5. Examples of how the methods are applied.
Teaching and learning methods	Seminars 4 hours per week plus independent study. Enrollment in the seminar is limited to 20 students, who will be selected on a first-come, first-served basis. A minimum of five participants is required for the module to take place.
Prerequisites	The competencies to be acquired in the module Human Behavior and Environmental Effects in Transportation are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 70 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Analysis of Vehicle Emissions and Air Pollution**
Module number	VW-MOBS-117-SP
Module coordinator	Prof. Jens Borken-Kleefeld verkehrsoekologie@tu-dresden.de
Learning goals	Students will acquire knowledge of common methods for measuring vehicle emissions, particularly non-contact techniques. They will be able to demonstrate the measurement principle, strengths, and limitations of remote sensing emission measurements, analyze remote sensing measurements for specific purposes, and critically evaluate the validity of the data. They will know how to correct the data, if necessary. Students will be able to determine emission factors from the data on their own, compare them with standard emission models, and understand the basics of big data analysis.
Content	The module covers: 1. Major traffic-related pollution, 2. Characteristics, applications, and limitations of remote sensing emission measurements, 3. Current remote sensing measurement campaigns, 4. Principles of remote sensing data analysis, 5. Handling uncertainty and errors, 6. Exemplary data analysis, 7. Real emissions of today's vehicles and 8. Comparison with emission models.
Teaching and learning methods	Seminars 4 hours per week, plus independent study. Enrollment in the seminar is limited to 15 students, who will be selected on a first-come, first-served basis. A minimum of five participants is required for the module to take place.
Prerequisites	The competencies to be acquired in the module Human Behavior and Environmental Effects in Transportation are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 70 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Data Collection and Evaluation Methods for Bicycle Planning**
Module number	VW-MOBS-118-SP
Module coordinator	Prof. Jens Borken-Kleefeld verkehrsoekologie@tu-dresden.de
Learning goals	Students will acquire in-depth knowledge of bike traffic survey and analysis methods, and will be familiar with related empirical research questions. They will be able to develop, evaluate, and present practical survey designs as part of a group project. Students will also have strengthened their social and communication skills through teamwork and will be able to present and discuss their findings effectively, both verbally and in writing.
Content	The module covers an overview of survey methods used in cycling, data collection, and data analysis.
Teaching and learning methods	Seminars 4 hours per week, plus independent study. Enrollment in the seminar is limited to 15 students, who will be selected on a first-come, first-served basis. A minimum of five participants is required for the module to take place.
Prerequisites	The competencies to be acquired in the module Data and Models in Transport Planning are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 70 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Advanced Issues in Psychology and Behavioral Economics**
Module number	VW-MOBS-121-SP
Module coordinator	Dr. Jens Schade jens.schade@tu-dresden.de
Learning goals	Students will gain a deeper understanding of psychological concepts in the context of transport economics. They will be able to apply psychological theories and methods effectively to solve complex behavioral economics problems. They will have an in-depth understanding of the socially and scientifically relevant intersections between psychology and behavioral economics.
Content	The module covers application areas, intervention strategies, and spheres of action in psychology, as well as in behavioral economics.
Teaching and learning methods	Seminars 2 hours per week, plus independent study.
Prerequisites	The competencies to be acquired in the module Basics in Psychology and Behavioral Economics are a prerequisite.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 100 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Light and Lighting in Transportation Systems**
Module number	VW-MOBS-122-SP
Module coordinator	Dr. Christoph Schulze christoph.schulze@tu-dresden.de
Learning goals	Students will become familiar with the requirements and technical design criteria for artificial lighting, as well as the use of lighting technology to facilitate communication and influence behavior in traffic systems. This includes active lighting and targeted reflective elements in traffic engineering. Students will be able to evaluate the role of lighting elements in ensuring that traffic flows operate with the desired capabilities and necessary safety. They will be able to understand the central role of visual perception processes in lighting applications and traffic safety, particularly in nighttime traffic conditions. Students will be able to classify practical photometric measurements and photometric requirements in terms of function and quality.
Content	The module covers: 1. Fundamentals of lighting technology and vision, 2. Fixed traffic lighting, 3. Light signals, 4. Reflective properties of transportation infrastructure and 5. Nighttime traffic safety.
Teaching and learning methods	Lecture 2 hours per week, seminar 2 hours per week, and independent study. The lecture and seminar will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty. Enrollment in the module is limited to 30 students, who will be selected on a first-come, first-served basis. A minimum of three participants is required for the module to take place.
Prerequisites	None.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 30 hours. The examination language is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Planning Process and Environmental Protection in Road Design**
Module number	VW-MOBS-141-RR
Module coordinator	Prof. Reinhard Koettnitz kontakt.strasse@mailbox.tu-dresden.de
Learning goals	Students will acquire knowledge of the legal requirements and the engineering approach to road infrastructure in the context of nature conservation. They will master the methodological fundamentals of road noise control and gain practical insights into issues related to planning and design. They will gain an understanding of the application and design of passive safety systems under various operating conditions, as well as the key stakeholders involved in planning and regulatory procedures, and will be able to analyze and understand the respective viewpoints and present them to others, either independently or as part of a team. Students will be capable of acting responsibly and will be aware of social issues, such as sustainability and safety.
Content	The module covers: 1. Functions and responsibilities of road administration and engineering firms, 2. Nature conservation in road design and its integration into the planning process, 3. Factors and methods for acoustic calculations, 4. Fundamentals of noise control on roads and 5. Passive safety systems in road design.
Teaching and learning methods	Lecture 2 hour per week, practical 1 hours per week, seminar 1 hours per week plus independent study. The lecture, practical, and the seminar will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty. A minimum of four participants is required for the module to take place.
Prerequisites	Participants require skills acquired in the Road Design and Pavements module.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 30 hours. The examination language is German.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.

Module duration	The module runs for the duration of one semester.

Module name	**Building Information Modeling for Transportation Infrastructure**
Module number	VW-MOBS-142-RR
Module coordinator	Prof. Reinhard Koettnitz kontakt.strasse@mailbox.tu-dresden.de
Learning goals	Students will gain an understanding of the fundamental aspects of client information requirements and project management plans based on Building Information Modeling (BIM) in the transportation sector. Students will have a thorough understanding of the BIM process and will be able to integrate the requirements of various trades into the process. Students will acquire application-oriented knowledge of industry-standard data exchange formats and software solutions, and will be able to visualize and present the results of a project.
Content	The module covers: 1. BIM use cases, 2. Data management and data exchange, 3. Modeling of infrastructure routes, 4. Quantity and cost estimation, 5. Sound and noise protection analyses and 6. Construction scheduling and clash detection.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study. The lecture and practical will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty.
Prerequisites	Participants require skills acquired in the Road Design and Pavements module.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a portfolio with a scope of 60 hours. The examination language is German.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Theoretical Multivariate Statistics**
Module number	VW-MOBS-180-DM
Module coordinator	Prof. Ostap Okhrin ostap.okhrin@tu-dresden.de
Learning goals	Students will be able to describe multivariate data and analyze it using practical methods. They will be familiar with regression analysis, simple analysis of variance, general and specific multivariate distributions, particularly the theory of the multivariate normal distribution, copulas, estimation theory, and hypothesis testing, and will be able to apply these concepts. Students will be proficient in applying mathematical concepts such as linear algebra and integral calculus to statistical problems. They will be able to formulate statistical hypotheses and test them correctly, as well as to understand the fundamentals of estimation theory and the properties of the estimators discussed therein, even outside the context of the normal distribution.
Content	The module covers: 1. Linear algebra, 2. Theory of multivariate normal distribution, 3. Copula, 4. Estimation theory, 5. Hypothesis testing, 6. Expectation-maximization algorithm and 7. Markov chains
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study.
Prerequisites	Students require knowledge of mathematics and statistics at basic upper secondary school level. Useful reading for this module: Sydsaeter, K., Hammond, P.: Essential Mathematics for Economic Analysis, Financial Times Prentice Hall, Harlow, current edition. Härdle, W., Okhrin, O., Okhrin, Y.: Basic Elements of Computational Statistics, Springer, 2017.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules. It fulfills the requirements for the Applied Multivariate Statistics module.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. If more than 20 students register, the module examination consists of a 120-minute written exam. If up to 20 students register, it consists of a 30-minute non-public oral exam as an individual examination; if so, this will be announced to the registered students in writing at the end of the registration period.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.

Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours.
Module duration	The module runs for the duration of one semester.
Supporting literature	Backhaus, K., Erichson, B., Plinke, W., Weiber, R.: Multivariate Analysemethoden: Eine anwendungsorientierte Einführung, Springer Verlag, 12th edition. Härdle, W., Simar, L.: Applied Multivariate Statistical Analysis, Springer Verlag, current edition. Härdle, W., Hlavka, Z.: Multivariate Statistics: Exercises and Solutions, Springer Verlag, current edition.

Module name	**Applied Multivariate Statistics**
Module number	VW-MOBS-181-DM
Module coordinator	Prof. Ostap Okhrin ostap.okhrin@tu-dresden.de
Learning goals	Students will acquire comprehensive knowledge of key multivariate statistical methods, such as cluster analysis, regression analysis, analysis of variance, discriminant analysis, and factor analysis, and will apply these methods in a practical manner when analyzing real-world datasets. They will be able to develop predictive models and apply classification methods based on data. Students will gain key skills in rhetoric, presentation techniques, and teamwork.
Content	The module covers: 1. Linear algebra, 2. Principal component analysis, 3. Factor analysis, 4. Correspondence analysis, 5. Canonical correlation analysis, 6. Multidimensional scaling, 7. Discriminant analysis and 8. Linear and logistic regression
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study. Enrollment in the lecture and practical is limited to 30 students, who will be selected on a first-come, first-served basis.
Prerequisites	Participants require skills acquired in the Theoretical Multivariate Statistics module.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a seminar combined term paper with a scope of 70 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.
Supporting literature	Backhaus, K., Erichson, B., Plinke, W., Weiber, R.: Multivariate Analysemethoden: Eine anwendungsorientierte Einführung, Springer Verlag, 12th edition. Härdle, W., Simar, L.: Applied Multivariate Statistical Analysis,

	Springer Verlag, current edition. Härdle, W., Hlavka, Z.: Multivariate Statistics: Exercises and Solutions, Springer Verlag, current edition.

Module name	**Algorithms and Traffic Networks**
Module number	VW-MOBS-185-DM
Module coordinator	Prof. Jörn Schönberger joern.schoenberger@tu-dresden.de
Learning goals	Students will learn about classic optimization problems in transportation networks and the strategies for solving them. They will be able to break down simple planning problems into subproblems, organize the relevant data in a structured manner, select appropriate optimization algorithms to solve the problems, and implement these algorithms in a programming language. Students will be able to identify standard tasks and make use of existing programming libraries. They will be able to solve programming problems in small teams.
Content	The module covers: 1. Basic knowledge of the C++ programming language, 2. Use and development of open data sources, 3. Graphs as a modeling concept, 4. Algorithms in graphs, 5. Optimal path and traveling salesmen problems and their solutions, 6. Implementation of optimization algorithms, 7. Validation, testing, and implementation of self-developed programs and 8. Typical approaches to software development and the management of software development projects
Teaching and learning methods	Lecture 1 hours per week, practical 3 hour per week, plus independent study. Enrollment in the lecture and practical is limited to 30 students, who will be selected on a first-come, first-served basis.
Prerequisites	Students require knowledge of mathematical modeling, operations research, and programming at the Bachelor's level.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 60 hours.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Decision Support in Transportation Logistics**
Module number	VW-MOBS-186-DM
Module coordinator	Prof. Jörn Schönberger joern.schoenberger@tu-dresden.de
Learning goals	Students will learn about design concepts for algebraic search methods used to solve decision-making problems. They will understand the design and implementation of modern artificial intelligence search algorithms, particularly evolutionary and genetic search, local search, and ant colony optimization algorithms, and will be able to design and implement prototype search algorithms for selected decision-making problems in logistics and transportation logistics. Students will be able to tackle complex, practical decision-making problems by applying search algorithms and derive concrete recommendations for action. They will have advanced media skills in working with software and programming languages and will have developed and strengthened their personality.
Content	The module covers: 1. Basic scenarios for vehicle deployment planning, 2. Coding relevant scenario data into XML files, 3. Design and prototypical implementation of simple decision-making algorithms for vehicle dispatch planning, 4. Integration of existing algorithm libraries via an API, 5. Metaheuristics, 6. Visualization of solutions to complex vehicle scheduling problems and 7. Integration of electronic mapping systems into vehicle dispatch algorithms
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study. Enrollment in the lecture and practical is limited to 30 students, who will be selected on a first-come, first-served basis.
Prerequisites	Students require knowledge of operations research, logistics and a high-level programming language, ideally C++, at Bachelor's level. Useful reading for this module: Stroustrup, B.: Programming: Principles and Practice Using C++, Addison Wesley, current edition.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master’s degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 75 hours. The examination language is German.
Credit points and grades	The module is worth 5 credit points. The module grade is the grade of the examined assessment.
Module frequency	The module is offered each year in the summer semester.

Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Geodata Infrastructures**
Module number	VW-MOBS-192-DM
Module coordinator	Prof. Lars Bernard lars.bernard@tu-dresden.de
Learning goals	Students will acquire a sound overview of geodata infrastructures and related technologies. They will gain methodological expertise in setting up geoinformation services and in using and adapting the relevant software products.
Content	The module covers organizational and technical concepts of geodata infrastructures (GDI), interoperability for geoinformation, and the development of geodata infrastructures based on interoperable geoinformation services.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study.
Prerequisites	Participants require skills acquired in the Fundamentals of Geoinformatics module.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 40 hours. The examination language is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Geoinformation Services**
Module number	VW-MOBS-193-DM
Module coordinator	Dr. Stephan Mäs Stephan.maes@tu-dresden.de
Learning goals	Students will be able to critically analyze current research and development work in the field of geoinformation services and systems. Using use case scenarios as examples, they will be able to plan and implement software projects for the development of geoinformation services.
Content	The module covers the design, planning, and implementation of a software project for the development of geoinformation services for various use case scenarios area of in geoinformatics, including environmental and traffic planning.
Teaching and learning methods	Seminars 2 hours per week, plus independent study. The seminar will be held in German or English. The language of instruction will be specified by the lecturer at the beginning of each semester and announced as is customary at the faculty.
Prerequisites	Students are required to have basic knowledge of geoinformatics, in particular about geodata structures, geo-databases, analysis of geo-objects, GIS, software modeling and design, programming, and geodata infrastructures at Bachelor's level
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master’s degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises a complex assessment totaling 80 hours. The examination language is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Sensor Technology in Transport Systems**
Module number	VW-MOBS-195-DM
Module coordinator	Prof. Oliver Michler oliver.michler@tu-dresden.de
Learning goals	Students will master the fundamentals of the physical effects underlying sensor use and methods of sensor data processing. They will be able to classify, specify, and design sensor systems; apply sensor systems for traffic data collection and processing in intelligent transportation systems; integrate sensor systems; and assess and evaluate selected mode-specific sensor applications.
Content	The module covers: 1. Fundamentals of the physical effects involved in sensor use, 2. Selected measurement parameters, sensors, and methods for sensor data processing, 3. Practical application of sensor data and 4. Applications in sensor data processing and intelligent transportation systems.
Teaching and learning methods	Lecture 2 hours per week, practical 2 hour per week, plus independent study.
Prerequisites	Students require foundational knowledge of electrical engineering, information technology, and telecommunications, as well as a basic understanding of the theory and technology of information systems, vehicle communication, and positioning at Bachelor's level.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. If more than 15 students register, the module examination consists of a 90-minute written exam. If up to 15 students register, it consists of a 30-minute non-public oral exam as an individual examination; if so, this will be announced to the registered students in writing at the end of the registration period. The examination language for written examination and the oral examined assessment is German or English, at the student's discretion.
Credit points and grades	The module is worth 5 credit points. The module grade corresponds to the grade of the examined assessment.
Module frequency	The module is offered each winter semester.
Workload	The workload comprises 150 hours in total.
Module duration	The module runs for the duration of one semester.

Module name	**Vocational Internship in Mobility Systems**
Module number	VW-MOBS-200
Module coordinator	Dean of Studies for Transport Engineering studiendekan-viw@mailbox.tu-dresden.de
Learning goals	Students will be able to apply their knowledge of transport science to specific practical problems in mobility planning. They will be familiar with the academic activities and approaches typical of the field of mobility planning. Students will obtain key skills in social competence and teamwork and will develop greater self-confidence.
Content	The module covers academic knowledge of transport science as applied in professional practice, as well as specific professional requirements.
Teaching and learning methods	At least 275 hours of internship and independent study.
Prerequisites	None.
Applicability	This module is one of 36 elective compulsory modules in the Mobility Systems Master's degree program, from which students must select 10 or 11 modules.
Requirements for earning credit points	Credit points are awarded upon passing the module examination. The module examination comprises an ungraded term paper with a scope of 5 hours. The examination language is German.
Credit points and grades	The module is worth 10 credit points. The module examination assessment will be assessed as either "pass" or "fail."
Module frequency	The module is offered each semester.
Workload	The workload comprises 300 hours in total.
Module duration	The module runs for the duration of one semester.

Annex 2
(ref. § 6 para. 5):
Study schedule for full-time studies
including type and scope of the courses in hours per week (SWS) as well as required academic work, the type, scope and design of which can be found in the module descriptions

Key:
*) alternative modules worth a total of 55 credit points
**) modules worth least 30 credit points
LP Credit points (*Leistungspunkte*) M Mobility window (*Mobilitätsfenster*) PL Examined assessment (*Prüfungsleistung*)
S Seminar Ü Practical (*Übung*) V Lecture (*Vorlesung*)

Module number	Module name	1st semester	2nd semester	3rd semester (M)	4th semester	LP
		V/Ü/S	V/Ü/S	V/Ü/S	V/Ü/S	
Compulsory field						
VW-MOBS-01-SP	Mobility System Planning and Research	3/1/0 PL				5
VW-MOBS-02-SP	Human Behavior and Environmental Effects in Transportation	4/0/0 PL				5
VW-MOBS-03-SP	Design and Operation in Public Transportation	2/2/0 PL				5
VW-MOBS-04-RR	Road Design and Pavements	4/1/0 PL				5
VW-MOBS-05-DM	Data and Models in Transport Planning	2/2/0 PL				5
VW-MOBS-06	Research Task in Mobility Systems			0/0/2 PL		10
					Master's thesis	22
					Colloquium	8
Elective compulsory field*						
VW-MOBS-10-SP**	Urban Mobility Workshop Basics		1/1/0 PL			5
VW-MOBS-11-SP**	Urban Mobility Workshop Advanced			1/0/0 PL		5
VW-MOBS-15-SP**	Scenarios for Sustainable Mobility		2/0/2 PL			5
VW-MOBS-20-SP**	Basics in Psychology and Behavioral Economics	0/0/2 PL				5
VW-MOBS-25-SP**	Cost-Benefit Evaluation of Infrastructure Projects and Traffic Law			4/0/0 PL		5
VW-MOBS-26-SP**	Urbanism		2/2/0 PL			5

Module number	Module name	1st semester	2nd semester	3rd semester (M)	4th semester	LP
		V/Ü/S	V/Ü/S	V/Ü/S	V/Ü/S	
VW-MOBS-30-SP**	Management of Public Transport Systems and Services		2/2/0 PL			5
VW-MOBS-35-SP**	Railway Operation		2.5/1.5/0.5 PL			5
VW-MOBS-40-RR**	Urban Engineering and Road Drainage Systems		3/1/0 PL			5
VW-MOBS-45-RR**	Road Traffic Safety		2/1/0 PL			5
VW-MOBS-50-RR**	Road User Behavior and Safety		0/0/4 PL			5
VW-MOBS-55-RR**	Rail Design		3/1/0 PL			5
VW-MOBS-60-RR**	Fundamentals of Traffic System Dynamics and Control	3/1/0 PL				5
VW-MOBS-61-RR**	Advanced Traffic System Dynamics and Control		3/1/0 PL			5
VW-MOBS-65-DM**	Agent-based Modeling in Transportation		2/2/0 PL			5
VW-MOBS-70-DM**	Methods in Data Analytics	2/2/0 PL				5
VW-MOBS-71-DM**	Advanced Methods in Data Analytics		2/2/0 PL			5
VW-MOBS-75-DM**	Transport Network Optimization with Emerging Data for Ethical and Sustainable Applications		3/0/0 PL			5
VW-MOBS-82-DM**	Data Driven Statistics		2/0/0 PL			5
VW-MOBS-90-DM**	Fundamentals of Geoinformatics	2/2/0 2xPL				5
VW-MOBS-91-DM**	GIS and Geodata Bases		0.5/1.5/2 PL			5
VW-MOBS-116-SP	Advanced Tools and Methods of Transportation Ecology		0/0/4 PL			5
VW-MOBS-117-SP	Analysis of Vehicle Emissions and Air Pollution			0/0/4 PL		5
VW-MOBS-118-SP	Data Collection and Evaluation Methods for Bicycle Planning		0/0/4 PL			5
VW-MOBS-121-SP	Advanced Issues in Psychology and Behavioral Economics		0/0/2 PL			5
VW-MOBS-122-SP	Light and Lighting in Transportation Systems		2/0/2 PL			5
VW-MOBS-141-RR	Planning Process and Environmental Protection in Road Design			2/1/1 PL		5
VW-MOBS-142-RR	Building Information Modeling for Transportation Infrastructure		2/2/0 PL			5

Module number	Module name	1st semester	2nd semester	3rd semester (M)	4th semester	LP
		V/Ü/S	V/Ü/S	V/Ü/S	V/Ü/S	
VW-MOBS-180-DM	Theoretical Multivariate Statistics	2/2/0 PL				5
VW-MOBS-181-DM	Applied Multivariate Statistics		2/2/0 PL			5
VW-MOBS-185-DM	Algorithms and Traffic Networks	1/3/0 PL				5
VW-MOBS-186-DM	Decision Support in Transportation Logistics		2/2/0 PL			5
VW-MOBS-192-DM	Geodata Infrastructures			2/2/0 PL		5
VW-MOBS-193-DM	Geoinformation Services			0/0/2 PL		5
VW-MOBS-195-DM	Sensor Technology in Transport Systems			2/2/0 PL		5
VW-MOBS-200	Vocational Internship in Mobility Systems			0/0/0 At least 275 hours of internship PL		10
LP		**30**	**30**	**30**	**30**	**120**