Annex 1:
Module descriptions

DISCLAIMER: Please note that the English translation is provided for information purposes only. The English text is not legally binding. Only the original German document has legal validity. The official language at TU Dresden is German. German jurisdiction applies.

Note: SWS = The semester hours per week (SWS) indicate the duration of the courses in a semester. 1 SWS means that the course lasts one hour (1 x 45 minutes) per week in the respective semester.

Number of Module	Name of Module	Lecturer
VW-ATL-01	Operations Research and Logistics	Prof. Jörn Schönberger joern.schoenberger@tu-dresden.de
Qualification Aim	The students know a variety of methods and models that can be used to solve diverse optimization problems. Furthermore, students are able to use optimization software to solve complex problems.	
Content	The content of the module includes the design and planning of transportation networks, transportation planning and program design, basic models of vehicle deployment planning, integrated planning of self-routing and subcontracting, and the design of freight rates.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	Basic undergraduate level knowledge of operations research is presupposed. The following literature is suitable for preparation: Ivanov, D.; Tsipoulanidis, A.; Schönberger, J.: Global Supply Chain and Operations Management - A Decision-Oriented Introduction to the Creation of Value, newest edition.	
Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics. It creates the prerequisites for the modules Terminal Operations and Management of Public Transport Systems and Services.	
Requirements for the Award of Credits	The credit points are acquired if the module examination is passed. The module examination consists of a written examination of 120 minutes duration. The language of the examination is English.	
Credit Points and Grades	5 credit points can be acquired through this module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-02	Material Flow Analysis and Optimization	Dr. Henning Preis Henning.Preis@tu-dresden.de
Qualification Aim	The students master important engineering fundamentals of material flow design in logistics systems. They can describe and evaluate characteristic system variables and apply methods for the analysis and optimization of material flows in networks.	
Content	Content of the module are - Classification and properties of logistic objects, - Marginal power calculation for material flow components, - Operation theoretical basics for material flow components, - Analysis and evaluation of complex material flow systems, and - Modeling and optimization of decision problems in material flow systems.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	Basic knowledge of logistics, transportation systems theory, and statistics at the undergraduate level is assumed.	
Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics. It creates the prerequisites for the modules Decision Making in Enterprise Logistics, Material Handling and Storage Systems, as well as Advanced Theory of Air Transportation Systems and Simulation.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes. The language of the examination is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-03	Methods in Transportation Econometrics and Statistics	Dr. Martin Treiber martin.treiber@tu-dresden.de
Qualification Aim	The students have an in-depth understanding of empirical and model-theoretical methods of essential problem areas of transport planning and transport economics in general. They are familiar with the statistical and analytical methods for model building and system analysis in transport econometrics as well as with the special focus on the modeling of discrete choice decisions, for example in the choice of means of transport.	
Content	Content of the module is the formulation of quantitatives methods to describe the decisions of individuals and the influencing factors in the context of transportation through mathematical models, and the analysis of data through various statistical techniques.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	Knowledge of statistics and mathematics at bachelor level is assumed. The following literature is suitable for preparation: Sydsaeter, K.; Hammond, P.: Essential Mathematics for Economic Analysis, Financial Times Prentice Hall, Harlow, current edition. Bamberg, G., Baur, F., Krapp, M.: Statistik, Oldenbourg Verlag, Munich, current edition.	
Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination of 120 minutes duration. The examination language of the written examination is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-04	Decision Making in Enterprise Logistics	Dr. Henning Preis Henning.Preis@tu-dresden.de
Qualification Aim	The students master important basics and methods of corporate logistics. They are able to describe, model, and solve logistical decision-making problems in procurement, production and distribution. They are able to derive optimal decisions and to classify them in the overall context of corporate logistics.	
Content	Content of the module are - problems and models of procurement logistics, including procurment strategies, ordering procedures, warehousing, - problems and models of the production logistics such as supply concepts and sequence planning, - problems and models of distribution logistics, such as route and tour planning, transport optimization, distribution levels and location problems, as well as - planning methodology of logistics projects and supply chain management requirements.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	The competencies to be acquired in the module Material Flow Analysis and Optimization are assumed.	
Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics. It lays the foundation for the Material Handling and Storage Systems module.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes. The language of the examination is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-05	Flight Performance and Aerodynamics	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	Students know the methods and applications that describe the motion of aircraft with six degrees of freedom with the associated forces and moments, powers and energy expenditures. They also understand the origin and influence of air forces/moments on the aircraft. Students will be able to mathematically model important factors influencing flight performance and flight characteristics. In addition, they are able to evaluate the operational behavior of the aircraft in relation to the flight condition with regard to safety, economy, and environmental compatibility. Students will also understand the main engine assembly in terms of its structure, mode of operation, and operating behavior, and will be able to assess various aircraft propulsion systems in an informed manner.	
Content	Content of the module are - operational behavior of an aircraft in the different flight conditions, - target functions and variants of cruise flight performance, - ETOPS regulation and flight performance calculation, - basics of thrust diagrams and speed polars, - properties of air, - lift and its generation, and associated air forces and air force moments, - subjects in the field of aerodynamics, flight mechanics and aerodynamic characteristics such as polars, - the airfoil and airfoil geometry, - the establishment of the moment equilibrium, - the load, the trim and required aircraft control, - fundamentals of thermodynamics and gas dynamics, especially p-v and T-s diagrams of OTTO and JOULE process, - flow through diffusers and nozzles, - the structure and functioning, as well as - the operating behavior of gas turbine assemblies and material, and running time problems in gas turbine engines.	
Teaching and Learning Methods	7 SWS lecture, 1 SWS tutorial, 0.5 SWS field work, and independent study.	
Requirements for Participation	Basic knowledge of linear algebra and calculus, differential equations and differential calculus, integral transformations, integral calculus, stochastics, experimental physics, and basic understanding of logistical processes, and the air transportation system at bachelor's level are required.	

Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics. It lays the foundation for the module Safety and Airline Management.
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 240 minutes. The prerequisite for the examination is a homework task of 5 hours. The examination language of the written examination and the homework task is German or English, at the student's choice.
Credit Points and Grades	10 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.
Frequency of Module	The module is offered each academic year in the winter semester.
Workload	The total workload is 300 hours.
Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Verantwortliche Dozentin bzw. verantwortlicher Dozent
VW-ATL-06	Flight Planning and Aircraft Operations	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	With the help of meteorological knowledge, the students are able to compile and evaluate the essential documents for the safe, economic, punctual and regular flight operations of an airline. They know the flight operations tasks / operating procedures and have a detailed command of the central elements of the cockpit equipment. In addition, the students understand the structure and operation of fly-by-wire technology in aircraft as well as the possibilities of modern avionics for achieving economical and environmentally compatible flight operations. Students are sensitized to economic, sustainable, and related social issues.	
Content	Content of the module are - the structure of the atmosphere, - the basic meteorological elements, - synoptic meteorology, - meteorological hazards, - aeronautical meteorological consulting and support, - problems of weather forecasting, and tasks and organization of flight operations services, - flight preparation procedures (operational and ATC flight plan) and traffic flow control, - navigation procedures/tasks and organization of flight operations services, - crew Resource Management (CRM), - flight operations technology, and - cockpit equipment/avionics and their future developments.	
Teaching and Learning Methods	4 SWS lecture, 0.5 SWS tutorial, 0.5 SWS field work, and independent study.	
Requirements for Participation	A basic knowledge of aviation at the bachelor's level is assumed.	
Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 180 minutes. The examination language of the written examination is German or English, at the student's choice.	

Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.
Frequency of Module	The module is offered each academic year in the winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-07	Air Traffic and Airport Operations	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	The students know the specific process characteristics of the operation of aircraft from the perspective of air traffic control and the airport operator as well as their restrictions resulting from international and national legislation. They understand air traffic control and the airfield as companies operating under safety-related, economic and ecological constraints. The students are able to assign the individual system elements and structures holistically.	
Content	Content of the module are - structure and organization of airspace, - rules, procedures, services and instruments of air traffic control, - operational and environmental conditions of airfield operations, - current and future forms of organization of airfield operations, taking into account international trends, - sources of income of an aerodrome, - structure of national and international air traffic law, - content and importance of important legal regulations in air traffic, and - authorities and their tasks in air traffic.	
Teaching and Learning Methods	6 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	Basic knowledge of logistics and the air transportation system at the bachelor's level is assumed.	
Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics. It lays the foundation for the module CNS and tactical ATM.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 240 minutes. The examination language of the written examination is German or English, at the student's choice.	
Credit Points and Grades	10 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 300 hours.	

Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-08	CNS and tactical ATM	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	The students master the procedures of radio, inertial, and satellite navigation and understand technical navigation systems with their tasks, structure, and mode of operation. They also understand the planning, organization and implementation of air traffic control, and know about the necessary operational-technical systems for communication and monitoring of air traffic.	
Content	Content of the module are - geodetic and cartographic basics, - Radio navigation/location systems technology, - inertial navigation, - satellite navigation, - the principles of procedure design, - the principles of airspace utilization in relation to given capacities, - the procedures of airport coordination, - the traffic flow control of network operations, - the tactical control measures of air traffic control and air traffic control operational services, - the organization and implementation of air traffic control and its future concepts, and - the airborne and ground-based systems and technologies of communication and surveillance.	
Teaching and Learning Methods	6 SWS lecture, 1 SWS tutorial, 1 SWS field work, and independent study.	
Requirements for Participation	The competencies to be acquired in the module Air Traffic and Airport Operations as well as basic knowledge in linear algebra and analysis, differential equations and differential calculus, information technology, as well as basic understanding of logistic processes, and the air traffic system at bachelor level are assumed.	
Usability	The module is a compulsory module in the master's degree program Air Transport and Logistics.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 240 minutes. The examination language of the written examination is German or English, at the student's choice.	

Credit Points and Grades	10 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.
Frequency of Module	The module is offered each academic year in the winter semester.
Workload	The total workload is 300 hours.
Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-20	Safety and Airline Management	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	The students have knowledge of structures and measures to ensure aviation safety. They are familiar with system-immanent and system-external influencing variables on air traffic safety and know the common methods for evaluating and quantifying air traffic safety. Students will also understand the objectives, structure and implementation of safety management systems at airports, ground handlers and, in particular, airlines, their concerns and objectives for flight and airport operations and their specific management functions.	
Content	Content of the module are - general traffic safety relevant characteristics of air traffic and influencing factors on air traffic safety (Safety), - General quantitative assessment options for air traffic safety, - Requirements and general conditions for the management and flight operations of an airline, - business strategies and corporate forms of airlines, - the role of aviation safety in airline management, and - safety management at airports and airlines.	
Teaching and Learning Methods	3 SWS lecture, 1 SWS tutorial, and independent study.	
Requirements for Participation	Knowledge of linear algebra and analysis, differential equations and differential calculus, integral calculus, stochastics, as well as a basic understanding of logistical processes and the air traffic system at bachelor level are assumed. In addition, the competencies to be acquired in the module Flight Performance and Aerodynamics are assumed.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 180 minutes. The examination language of the written examination is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	

Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-21	Terminal Operations	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	The students have knowledge of structures and measures to ensure aviation security. They can evaluate different security strategies specifically for terminal operations. Students are also able to describe the individual processes of passenger handling in the terminal with the aid of specific parameters and to model these operating processes. Students will be able to develop and apply stochastic-based models.	
Content	Content of the module are: - Characterization of operating and movement processes in the terminal, such as general factors influencing aviation security, - Procedures and guidelines for emergency management, - Procedures for the assessment of hazard potentials, - modeling of operation and movement processes in the terminal of an airfield as well as - Requirements and design criteria for control systems in terminals.	
Teaching and Learning Methods	3 SWS lecture, 1 SWS tutorial, and independent study.	
Requirements for Participation	Basic knowledge in linear algebra and analysis, differential equations and differential calculus, integral calculus, stochastics, traffic system theory, sound knowledge of the office application EXCEL and the programming language JAVA on bachelor level are required. In addition, the competencies to be acquired in the module Operations Research and Logistics are required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 120 minutes. The prerequisite for the examination is a homework tast of 20 hours. The examination language of the written paper and the homework is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-22	Aircraft Engines	Prof. Ronald Mailach roland.mailach@tu-dresden.de
Qualification Aim	Students will be familiar with the structure and mode of operation, operating ranges, operating characteristics, and efficiencies of aircraft engines. They understand the ideal and real process sequences in the aircraft engine with the associated laws and specific parameters as well as the parameters influencing the process. Students will understand the function of the individual sections of an engine and will be able to interpret typical parameters and maps.	
Content	Content of the module are - the structural design and operation of dual-flow turbine air-jet engines, - component-wise thermodynamics, as well as - Characterization of the most important influencing parameters and synthesis for operating behavior and control.	
Teaching and Learning Methods	2 SWS lecture, 1 SWS tutorial, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	A basic knowledge of linear algebra and calculus, differential equations and differential calculus, integral transformations, integral calculus, stochastics, experimental physics, engineering mechanics, aircraft technology, and aircraft characteristics at the undergraduate level is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes. The examination language of the written examination is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-23	Helicopter Technology	Prof. Christoph Keßler christoph.kessler@tu-dresden.de
Qualification Aim	Students are familiar with different rotorcraft variants and essential helicopter systems. Students will be able to roughly estimate the power requirements of a rotor. The participants will also be able to apply an improved method for calculating the power of the entire helicopter. They will also be able to derive the forces and moments on the rotor blade that are required to set up the rotor blade differential equations of motion and understand couplings between the blade degrees of freedom. In addition, students are able to access key design parameters for the design of a helicopter and to apply rotor dynamics techniques for stability analysis. They are familiar with a dynamic rotor inflow model, coupled rotor airframe vibration problems, as well as handling qualities guidelines and methods for handling qualities analysis. Finally, students will know the origin of vibrations of a helicopter and how they can mitigated.	
Content	Contents of the module are: – Introduction to the history of helicopter development and their special characteristics, – Methods of momentum theory for rotor performance considerations, – Blade element theory, – Performance considerations of the entire helicopter, – Design fundamentals of helicopters, – Control systems of helicopters, – Coupling effects of rotor blade motion, – Stability analysis of rotor blades, – Dynamic inflow model, – Coupled rotor airframe oscillations, – Flight dynamics of helicopters, and – Cause of vibrations in the airframe.	
Teaching and Learning Methods	4 SWS lecture, and independent study. The teaching language of the lecture can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Basic knowledge of linear algebra and calculus, differential equations and differential calculus, integral calculus, engineering mechanics, aircraft properties, and fluid mechanics on Bachelor level is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	

Requirements for the Award of Credits	Credit points are earned when the module examination is passed. For more than 15 registered students, the module examination consists of a written examination lasting 120 minutes. For up to 15 registered students, it consists of a non-public oral examination as an individual examination lasting 45 minutes; if necessary, this will be announced to the registered students in text form at the end of the registration period.
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.
Frequency of Module	The module is offered every academic year, beginning in the summer semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts two semesters.

Number of Module	Name of Module	Lecturer
VW-ATL-24	Aircraft Design	Prof. Johannes Markmiller johannes.markmiller@tu-dresden.de
Qualification Aim	Students will have knowledge of the basic structure of commercial aircraft as well as the design requirements and economic specifications for the design of the main assemblies of an aircraft. The students also know the damage behavior of components as well as methods, test procedures and strategies for the maintenance and repair of aircraft and their components. Students will be able to estimate the costs and benefits of different maintenance strategies.	
Content	Content of the module are - the construction of commercial aircraft, - applicable construction regulations, - Basics of aircraft design, - determination of loads, - construction methods, construction philosophies, - economic aspects, and the influence of design, construction and materials on maintenance, - Types of damage to aircraft structures, - Regulations related to aircraft maintenance, - Methodology for the development of maintenance programs, - maintenance system, and - Inspection procedures and fundamentals of aircraft structures repair.	
Teaching and Learning Methods	4 SWS lecture, and independent study. The teaching language of the lecture can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Basic knowledge of linear algebra and calculus, differential equations and differential calculus, integral transformations, stochastics, engineering mechanics, transportation systems theory, and statistics at the undergraduate level is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 180 minutes.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	

Frequency of Module	The module is offered each academic year in the winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-25	Research Task in Air Transport and Logistics	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	Students have basic skills in independent scientific work in the field of aviation and logistics using literature and other sources that they research themselves. They are able to use heterogeneous source material to work on and solve a small technical-scientific problem in the subject area using scientific methods and to prepare a technical-scientific report. They are able to prepare, document, present and defend scientific presentations. Students have organizational skills, know the basics of scientific work and the guidelines for good scientific practice and are able to present and discuss results appropriately in written and spoken form.	
Content	Content of the module are – Scientific work, – current topics and issues in air traffic and logistics as well as – basic methods of engineering research.	
Teaching and Learning Methods	3 SWS seminar, and independent study. Participation in the seminar is limited to 39 participants in accordance with Section 6 (9) of the study regulations.	
Requirements for Participation	The basics of scientific work and air traffic at Bachelor's level are required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a combined term paper of 75 hours.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance. The examination language is English.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-30	Methods in Data Analytics	Prof. Pascal Kerschke pascal.kerschke@tu-dresden.de
Qualification Aim	The students know basic methods of data analysis. In addition, they are able to apply these methods and to recognize and solve problems that arise in the process.	
Content	The content of the module is theoretical concepts and the application of basic data analysis methods relevant for working with traffic-related data.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	Basic knowledge in statistics and data analytics on bachelor level is assumed. The following literature is suitable for preparation: Heumann, C., Schomaker Shalab, M.: Introduction to Statistics and Data Analysis, Springer, current edition.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes. The examination language of the written examination is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-31	Theoretical Multivariate Statistics	Prof. Ostap Okhrin ostap.okhrin@tu-dresden.de
Qualification Aim	Students will be able to apply procedures that are commonly used in the reality describing multivariate data. Students are familiar with the following topics and methods: matrix algebra, regression analysis, simple analysis of variance, general and specific multivariate distributions, copulas, theory of multivariate normal distribution, estimation theory, hypothesis testing. Furthermore, students acquire mathematical and statistical foundations to understand other procedures such as cluster analysis, principal component analysis and other methods.	
Content	The content of the module are procedures of theoretical multivariate statistics and their methods of analysis.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	Bachelor's level knowledge of mathematics and statistics is required. The following literature is suitable for preparation: Sydsaeter, K.; Hammond, P.: Essential Mathematics for Economic Analysis, Financial Times Prentice Hall, Harlow, newest edition. Härdle, W., Okhrin, O., Okhrin, Y.: Basic Elements of Computational Statistics, Springer, current edition.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations. It provides the prerequisite for the modules Applied Multivariate Statistics, Data-Driven Multivariate Statistics, and Vocational Internship.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 120 minutes. The examination language of the written examination is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-32a	Cargo Handling and Intermodal Transportation	Dr. Henning Preis henning.preis@tu-dresden.de
Qualification Aim	Students master the basic principles, models and methods for planning and optimizing transshipment and loading systems as well as intermodal freight transport systems. They are able to calculate characteristic system parameters, evaluate alternative system designs and develop intermodal freight networks.	
Content	Contents of the module are – Technical design of handling and storage systems, – Operating parameters of conveyor systems and handling equipment, – Picking strategies, – Layout design of handling terminals, – Resource planning and routing in handling terminals, – Allocation of gates and berths, – Intermodal transportation systems, – models for the design of intermodal networks and – optimal design of loading units and load securing.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	The competencies to be acquired in the modules Material Flow Analysis and Optimization and Decision Making in Enterprise Logistics are assumed.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a portfolio of 25 hours. The examination language of the complex examination is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-50	Advanced Methods in Data Analytics	Prof. Pascal Kerschke pascal.kerschke@tu-dresden.de
Qualification Aim	Students know advanced methods of data analysis that enable them to analyze data in detail. In addition, they are able to apply these methods and recognize and resolve any problems that arise. Furthermore, students are strengthened in their personality.	
Content	The module covers theoretical concepts and the application of advanced methods of data analysis that are relevant for the processing of traffic-related data. These are treated with reference to current research.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	The skills to be acquired in the Methods in Data Analytics module are assumed.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes. The examination language of the complex examination is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-51	Applied Multivariate Statistics	Prof. Ostap Okhrin ostap.okhrin@tu-dresden.de
Qualification Aim	Students know the most important multivariate statistical methods, such as cluster analysis, regression analysis, analysis of variance, discriminant analysis and factor analysis, and apply them to real data. They also have key skills in the areas of rhetoric, presentation and presentation techniques and possess social skills and the ability to work in a team.	
Content	The content of the module is the application of multivariate statistical methods to specific problems and the introduction to a free programming language for statistical calculations and graphics. The content is treated with reference to current research.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	The competencies to be acquired in the module Theoretical Multivariate Statistics are required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a complex examination of 75 hours. The examination language of the complex examination is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-52a	Data-Driven Multivariate Statistics	Prof. Ostap Okhrin ostap.okhrin@tu-dresden.de
Qualification Aim	Students have an in-depth understanding of data analysis, especially of unstructured data and of handling data sets with missing data. They have strong skills in using statistical software (media literacy).	
Content	Content of the module are non-trivial regressions (with correlated residuals, non-diagonal covariance matrices, kernel regressions etc.), Bayesian regressions, classification methods (logistic regressions, support vector machines, decision trees, random forests, boosting, bagging etc.), missing data analysis (missing at random, EM algorithms etc.), neural networks with the introduction to deep learning.	
Teaching and Learning Methods	2 SWS lecture, and independent study.	
Requirements for Participation	The competencies to be acquired in the module Theoretical Multivariate Statistics are required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. For more than 20 registered students, the module examination consists of a written exam lasting 120 minutes. For up to 20 registered students, it consists of a non-public oral examination lasting 30 minutes as an individual examination; if applicable, this will be announced to the registered students in text form at the end of the registration period. The examination language of the written examination or the oral examination is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-53	Management of Public Transport Systems and Services	Prof. Jörn Schönberger joern.schoenberger@tu-dresden.de
Qualification Aim	Students are familiar with the decision problems that arise in the context of the design, configuration and operation of passenger transportation systems. They have an insight into the algebraic modeling of these decision situations and can apply techniques and tools with which the complex models can be solved. Students are able to select and apply the modeling and decision-making techniques they have learned in a goal-oriented manner. Furthermore, the students are strengthened in their personality.	
Content	Content of the module is the planning of infrastructure, especially the definition of line routes. Other content includes timetabling, planning of staff deployment based on the defined service provision processes, specification of the public transport products offered, and an overview of challenges arising from the operating concepts for shared mobility systems. The content is based on the current state of research.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	The competencies to be acquired in the Operations Research and Logistics module are required, as well as basic knowledge at bachelor level of programming (e.g. VBA, PHP, Java, C++). The following literature is suitable for preparation: Stroustrup, B.: Programming: Principles and Practice Using C++, Addison Wesley, newest edition.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a term paper of 75 hours. The examination language of the term paper is English.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-54	Applied Computer Sciences	Dr. Mykola Sysyn mykola.sysyn@tu-dresden.de
Qualification Aim	Students are able to deal with computer-aided engineering and engineering practice work methods based on CAD systems, the commonly available office application and programming environment, and the possibilities of data and tool integration. They are able to solve routing problems in a geometrically correct manner using general CAD software, have knowledge and practices on the fundamentals of macro programming, and are able to develop software solutions to engineering problems based on basic numerical mathematics techniques. Students will be able to rationally process engineering projects using the essential capabilities of current computing resources across programs.	
Content	Contents of the module are: - CAD-supported geometric routing of track systems, - Basics of Marko programming, - development of software-technical solutions for engineering problems on the basis of numerical mathematics as well as - cross-program problem solving.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, each in german language, and independent study.	
Requirements for Participation	No special knowledge is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-55	Advanced Theory of Air Transportation Systems and Simulation	Prof. Karl Nachtigall karl.nachtigall@tu-dresden.de
Qualification Aim	Students will be able to apply aspects of modeling, planning and control of air traffic service provision processes such as slot allocation and approach control in air traffic (ATFM). They know basic terms and principles of simulation and can analyze, model and solve concrete optimization problems of air traffic with methods of operation research. They are familiar with the assessment and adaptation of similar problems with the efficiency of the treated methods to the respective problems correctly.	
Content	Content of the module are - methods of operation research, including advanced linear programming, artificial intelligence techniques, - capacity management in air traffic, - special problems of air traffic flow management (ATFM), and - fundamentals of simulation.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be specifically determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Basic knowledge of linear algebra, analysis, statistics, and optimization at the bachelor's level is assumed, as well as the skills to be acquired in the module Material Flow Ana-lysis and Optimization.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations. It creates the prerequisites for the module Actual Aspects in Optimization of Processes in Transportation and Logistics. The module cannot be selected if the Advanced Theory of Transportation Systems module has already been selected.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	

Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-56	Advanced Theory of Transportation Systems	Prof. Karl Nachtigall karl.nachtigall@tu-dresden.de
Qualification Aim	The students are able to analyze concrete optimization problems of land and air traffic and to model and solve them with selected methods of operation research including simulation. They are also able to correctly assess the efficiency of the discussed methods on the respective problems and to adapt them to similar problems.	
Content	Content of the module are - Operation research methods, including linear programming, constraint propagation, artificial intelligence techniques, - Traffic supply and demand modeling, - line and cycle scheduling, - Capacity management in surface and air transportation, - Special problems of air traffic flow management (ATFM), and - fundamentals of Simulation.	
Teaching and Learning Methods	5 SWS lecture, 5 SWS tutorial, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Basic knowledge of linear algebra, calculus, statistics, and optimization at the undergraduate level is assumed.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations. It creates the prerequisites for the module Actual Aspects in Optimization of Processes in Transportation and Logistics. The module cannot be chosen if the module Advanced Theory of Air Transportation Systems and Simulation has already been chosen.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a combined term paper (including presentation and discussion) of 30 hours and a written examination of 180 minutes. The written examination is relevant for passing the examination.	
Credit Points and Grades	15 credit points can be acquired through the module. The module grade results from the weighted average of the grades of the individual examination performances. The term paper is weighted once and the written examination is weighted four times.	
Frequency of Module	The module is offered every academic year, beginning in the winter semester.	

Workload	The total workload is 450 hours.
Duration of the Module	The module lasts two semesters.

Number of Module	Name of Module	Verantwortliche Dozentin bzw. verantwortlicher Dozent
VW-ATL-61	Transportation Telematics Networks	Prof. Oliver Michler oliver.michler@tu-dresden.de
Qualification Aim	Students will be able to apply the theoretical principles of the structure, classification, design and operation of traffic telematics networks. They master the principles of layer-by-layer modeling of the functionality of telematics networks and know traffic-specific applications of these networks. Students will be able to design, dimension, evaluate and operate telematics networks.	
Content	Content of the module are theoretical and methodical basics of network design, basics of communication networks and open communication systems, reference models for network platforms and for market participants, monomedial and multimedia service platforms and the specifics of traffic telematic applications as well as standards and framework regulations.	
Lehr- und Lernformen	3 SWS lecture, 1 SWS practical, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Knowledge of electrical, information and communication technology fundamentals as well as process automation in traffic telematics at bachelor level is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations. It creates the prerequisites for the Theory of Communication Traffic and Information Transfer Security module.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. For more than 5 registered students, the module examination consists of a written examination lasting 90 minutes. For up to 5 registered students, it consists of a non-public oral examination as an individual examination lasting 30 minutes; if necessary, this will be announced to the registered students in text form at the end of the registration period. The examination language of the written or oral examination is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Häufigkeit des Moduls	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	

Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Verantwortliche Dozentin bzw. verantwortlicher Dozent
VW-ATL-62	Theory of Communication Traffic and Information Transfer Security **Module is not currently offered.**	Prof. Oliver Michler oliver.michler@tu-dresden.de
Qualification Aim	The students master the methodical basics for modeling classical traffic theoretical problems and are able to independently derive and apply the correlations for dimensioning and evaluating the performance parameters of new, traffic-typical communication systems. Furthermore, the students have knowledge and skills in strategies, procedures and algorithms of a secure information transmission in different network structures for information of different security classes with the aim of an optimal system design.	
Content	Content of the module are the operation and reliability theoretical approaches for the description, dimensioning and evaluation of communication systems. Other content includes the basic concepts of information assurance as well as procedures, measures and management methods for ensuring information security.	
Teaching and Learning Methods	2 SWS lecture, 2 SWS tutorial, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Knowledge of transport system theory and statistics at Ba-chelor level is assumed. In addition, the competencies to be acquired in the module Transporta-tion Telematics Networks are assumed.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a non-public oral examination of 30 minutes duration. The examination language of the oral examination is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Häufigkeit des Moduls	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-63	Satellite-based and Position-based Communication	Prof. Oliver Michler oliver.michler@tu-dresden.de
Qualification Aim	The students know the basic structure of satellite systems and radio sensor networks, the special transmission-related consequences for technology and special satellite communication and positioning services, both satellite-based and terrestrial. They are able to assess and evaluate the use and diverse applications in land, air and maritime transport. Students will be able to use positioning, navigation and communication technology in a realistic way and understand the operation and characteristics of components, systems and procedures of vehicle and mobile communication.	
Content	Content of the module are theoretical and technical basics and procedures of satellite-based and terrestrial communication and positioning systems, their traffic-specific applications in the transport modes rail, road, air and water as well as essential parts of the associated vehicle and mobile communication in their application.	
Teaching and Learning Methods	2 SWS lecture, 1 SWS tutorial, 1 SWS field work, Selbststudium. The teaching language of the lecture, the tutorial, and the field work can be German or English and will be specifically determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Basic knowledge in linear algebra, analysis, differential equations, differential calculus, computer science, experimental physics, electro-, information- and communication-technical basics on bachelor level is required.	
Usability	This module is one of 27 elective modules in the master's degree pro-gram Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a portfolio of 40 hours. The examination language of the portfolio is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Verantwortliche Dozentin bzw. verantwortlicher Dozent
VW-ATL-64a	Sensor Technology in Transport Systems	Prof. Oliver Michler oliver.michler@tu-dresden.de
Qualification Aim	Students master the fundamentals of physical effects for sensor use and sensor data processing methods. Furthermore, students can classify, specify and design sensor systems. They are able to apply sensor systems for traffic data acquisition and processing in intelligent traffic systems, integrate sensor systems and assess and evaluate selected traffic mode-specific sensor applications.	
Content	Content of the module are the basics of physical effects for sensor use, selected measurement variables, sensors and methods for sensor data processing as well as the practical application of sensor data. The content to be taught includes important sensors such as accelerometers, gyroscopes and radar sensors as well as the basics of filter algorithms and their applications in sensor data processing and intelligent traffic systems.	
Lehr- und Lernformen	2 SWS lecture, 2 SWS tutorial, and independent study.	
Requirements for Participation	Basic electrical, information and communication technology as well as basic knowledge of the theory and technology of information systems, vehicle communication and positioning at bachelor level are required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. For more than 15 registered students, the module examination consists of a written examination lasting 90 minutes. For up to 15 registered students, it consists of a non-public oral examination as an individual examination lasting 30 minutes; if necessary, this will be announced to the registered students in text form at the end of the registration period. The examination language of the written or oral examination is German or English, at the student's choice.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Häufigkeit des Moduls	The module is offered each academic year in the winter semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-71	Transport and Infrastructure Planning	Prof. Regine Gerike Regine.Gerike@tu-dresden.de
Qualification Aim	Students will have an overview of the complex interrelationships of spatial and transport planning, their procedures and processes with integrated cooperative and consensus-oriented approaches. They are familiar with the tasks of the planning process and take into account the necessary integration aspects. The students know the interactions between regional planning, urban development planning and integrated transport development planning. They have the ability to analyze and forecast the traffic situation and to evaluate the effects of planned traffic infrastructure measures. They possess special knowledge of approaches to solving practical traffic planning tasks in the municipal area.	
Content	The contents of the module are in particular: - Measures of transport development planning, - Objective and methodology of federal traffic route planning, - Urban land use planning and planning approval procedures, - Impact analyses and traffic planning evaluation procedures, - Collection of data on traffic behavior.	
Teaching and Learning Methods	3 SWS lecture, 1 SWS tutorial, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Basic knowledge of transportation planning at the bachelor's level is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a written examination lasting 90 minutes. Pre-requisite for the examination is a homework task of 10 hours.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-72	Basics of traffic modeling	Prof. Regine Gerike regine.gerike@tu-dresden.de
Qualification Aim	Students will be familiar with common approaches to modeling transport systems, their properties and possible applications in the area of conflict between the issues to be investigated, the modeling context and the availability of data and resources. They have an understanding of the recording of spatial structure, transport supply and demand in models and can perform calculations in the submodels used therein and interpret the results. They know analysis methods of spatial structure and traffic as well as typical fields of application. The students are able to estimate and interpret simple econometric models.	
Content	Content of the module are different modeling approaches, their fields of application, modeling systems used in practice and research, their submodels as well as typical and novel input data regarding spatial structure, traffic supply and demand, data preparation and typical algorithms and methods used in traffic modeling as well as software-supported estimation and evaluation of simple econometric models.	
Teaching and Learning Methods	2 SWS lecture, 1 SWS tutorial, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Basic knowledge of traffic planning and statistics at Bachelor level is assumed. The following literature is suitable for preparation: Sachs, Angewandte Statistik, Springer-Verlag, current edition.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a written examination of 60 minutes duration.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-74	Traffic and Transportation Psychology	Prof. Tibor Petzoldt tibor.petzoldt@tu-dresden.de
Qualification Aim	Students have developed an in-depth understanding of the most important research and application areas of traffic psychology and they have mastered basic theories, methods and practical intervention strategies of traffic psychology. Students are able to understand and evaluate complex issues in an interdisciplinary context. They are also able to reflect on scientific findings and transfer them into practice. Furthermore, they are able to prepare complex issues in an understandable way and present them clearly.	
Content	The content of the module is, according to the student's choice, the deepening of psychological theories from the most diverse psycho-logical fields of application and their effect and use in the context of traffic engineering or psychological aspects for the human-centered design of technical systems with reference to engineering fields of application in road, rail and air traffic as well as relevant psychological constructs, methodical basics of human-centered evaluation of technical systems as well as effects of automation.	
Lehr- und Lernformen	2 SWS lecture, 2 SWS seminar, and independent study. Participation in the internship is limited to 30 participants in accordance with § 6 paragraph 7 of the study regulations.	
Requirements for Participation	No special knowledge is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a written examination of 90 minutes duration and a combined term paper (including presentation and discussion) of 20 hours.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade results from the unweighted average of the grades of the individual examination performances.	
Häufigkeit des Moduls	The module is offered each academic year in the summer semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	

Number of Module	Name of Module	Lecturer
VW-ATL-75	Transport Network Optimization with Emerging Data for Ethical and Sustainable Applications	Prof. S. Travis Waller steven_travis.waller@tu-dresden.de
Qualification Aim	Students are able to use new data sources and methods of network optimization such as routing algorithms, complex network allocation as well as location and vehicle optimization in the context of metrics and constraints that explicitly consider ethical aspects of mobility.	
Content	Contents of the module are: – Fundamentals of transport networks, network terminology, computational complexity, network optimization models and network optimization algorithms, – advanced concepts of network theory and related problems in transportation planning, – advanced variants of static and dynamic user equilibrium, complex network design problems, vehicle routing problems and facility siting, – Quantifiable approaches specifically suited for network optimization in terms of sustainability, equity and environmental impact, – Quantification of equity and environmental justice in relation to transportation, – Modeling of relevant system metrics within the algorithmic approaches, – applications of the concepts to transportation planning problems such as network design problems and – fundamentals of automated planning.	
Lehr- und Lernformen	3 SWS lecture, and independent study. Participation is limited to 40 participants in accordance with § 6 paragraph 7 of the study regulations.	
Requirements for Participation	Competencies in statistics and network theory at bachelor level are assumed. The following literature is suitable for preparation: 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.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	

Requirements for the Award of Credits	Credit points are earned when the module examination is passed. The module examination consists of a combined term paper (including presentation and discussion) of 70 hours. The examination language is English.
Credit Points and Grades	5 credit points can be acquired through the module. The module grade results from the unweighted average of the grades of the individual examination performances.
Häufigkeit des Moduls	The module is offered each academic year in the winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-81	Quality and RAMS Management	Prof. Jörg Schütte joerg.schuette@tu-dresden.de
Qualification Aim	Students are familiar with the analysis, calculation and verification methods for the reliability and safety of electronic and electro-mechanical systems and automation systems in traffic engineering. They are able to create and calculate their own requirement spectra such as technical and qualitative specifications and models as well as validation and acceptance procedures on the basis of the applicable normative provisions. They are proficient in system modeling and functional analysis of large transportation systems in terms of reliability, availability, maintainability and safety (RAMS). You will be able to apply methods for analyzing and evaluating availability maintenance with the inclusion of incident operation modes and traffic infrastructure.	
Content	Contents of the module are - quality engineering methods (V models, requirement engineering, UML, ISO9000, EFQM, IRIS, EN50126), - RAMS quality parameters according to EN50126/IEC61508, - reliability parameters and distributions, - system modeling and calculation methods of system availability and maintainability, - reliability proof and hypothesis testing, consumer and producer risk, verification methods, MIL 781/217, and - state transition diagrams and computation (Markov models).	
Lehr- und Lehrformen	2 SWS lecture, 2 SWS tutorial, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	No special knowledge is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of a written examination of 90 minutes duration.	
Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.	
Frequency of Module	The module is offered each academic year in the summer semester.	

Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-82	Market-orientated design of rail freight and passenger transport	Daniel Haalboom jelle_daniel.haalboom@tu-dresden.de
Qualification Aim	Students will be able to conceptually prepare market-oriented service provision in rail freight and passenger transport on the basis of associated methods and procedures, understand, structure, initiate and implement associated processes. They are able to design relevant analyses and incorporate their results into planning and implementation. Furthermore, students will be able to set up the necessary key figure frameworks and will be able to assess and describe the support provided by information and scheduling systems. They know the effect of the use of process management and control systems and the effect of target functions in the planning of service provision in travel and rail-related logistics chains. They will be able to derive conclusions as to how thought and action processes can be designed in a success-oriented manner. Students have basic organizational and leadership skills.	
Content	Contents of the module are – Strategic management, strategic planning and service provision in rail freight and passenger transportation, – Strategic analysis, – Selection and evaluation of strategies for market-oriented service provision, – Implementation of strategies, – strategic controlling and – models for cooperation and competition.	
Lehr- und Lehrformen	3 SWS lecture, 1 SWS seminar, and independent study. The teaching language of the lecture and the tutorial can be German or English and will be determined by the lecturer at the beginning of each semester and announced in the usual manner.	
Requirements for Participation	Competencies in operational processes and in the operational management of transportation systems are required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. For more than 10 registered students, the module examination consists of a written examination lasting 90 minutes. For up to 10 registered students, it consists of an oral examination as a group examination lasting 30 minutes; if applicable, this will be announced to the registered students in text form at the end of the registration period. The examination language of the written examination or oral examination is German or English, at the student's discretion.	

Credit Points and Grades	5 credit points can be acquired through the module. The module grade corresponds to the grade of the examination performance.
Frequency of Module	The module is offered each academic year in the winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.

Number of Module	Name of Module	Lecturer
VW-ATL-91	Vocational Internship in Air Transport and Logistics	Prof. Hartmut Fricke hartmut.fricke@tu-dresden.de
Qualification Aim	Students are able to apply their knowledge of transportation science to specific practical problems in aviation and logistics. Furthermore, students are familiar with academic activities and procedures typical of the profession. Students have key qualifications in the areas of social skills and teamwork. Furthermore, students are strengthened in their personality.	
Content	Contents of the module are academic transportation science knowledge in professional practice and specific requirements in the profession.	
Lehr- und Lehrformen	At least 4 weeks of practical training and self-study.	
Requirements for Participation	No knowledge is required.	
Usability	This module is one of 27 elective modules in the master's degree program Air Transport and Logistics, which must be chosen according to § 32 paragraph 3 of the examination regulations.	
Voraussetzungen für die Vergabe von Leistungspunkten	Credit points are earned when the module examination is passed. The module examination consists of an ungraded term paper of 5 hours.	
Credit Points and Grades	5 credit points can be acquired through the module. The module is assessed as "passed" if the examination was assessed as "passed". Otherwise, the module is assessed as "failed" in accordance with Section 15 (1) and (5) PO. The examination language of the term paper is German or English at the student's discretion.	
Frequency of Module	The module is offered each semester.	
Workload	The total workload is 150 hours.	
Duration of the Module	The module lasts one semester.	