Module Description Transportation Management- Master

Stand: October 2019

Module	**Transport planning and traffic engineering**			
Semester: 1	Credit points: 6	Level: 1	Weight: 1	Language: German/English
Course	**Transport planning and traffic engineering**			
Module responsible Lecture	Prof. Dr.-Ing. Christoph Hupfer Prof. Dr. Jochen Eckart			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Transport planning and traffic engineering** Lecture, 3 CH. **Transport planning and traffic engineering exercises** Exercises, 1 CH.			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • Schnabel, Lohse: Grundlagen der Straßenverkehrstechnik und der Verkehrsplanung, Verlag Beuth Studium 2011 • FGSV: Leitfaden für Verkehrsplanung, Ausgabe 2001 • FGSV: Richtlinien für die Anlage von Stadtstraßen (RASt), Ausgabe 2006 • FGSV: Empfehlungen für Anlagen des öffentlichen Personennahverkehrs (EAÖ), Ausgabe 2003 • Elsner Handbuch für Straßen- und Verkehrswesen, Otto Elsner Verlagsgesellschaft 2012 • Dieter Appel und Tilman Bracher: Handbuch der kommunalen Verkehrsplanung, Wichmann Verlag 2009 Internet / Multimedia: • http://www.bast.de – Informationsportal der Bundesanstalt für Straßenwesen			
Course content	**Transport planning and traffic engineering lecture** The lecture thematizes the networking of solution and mechanisms of action from the perspective of transport planning and technology. It provides advanced knowledge of transport infrastructure planning and the diverse needs of different road users. On the basis of practical examples, traffic flows and performance on sections will be discussed. **Transport planning and traffic engineering exercises** In the practical part, the students examine a completed or currently ongoing implementation of a traffic planning measure. Focused and compared here are the performance and the traffic flow of the section in the respective planning, construction and operation phase of the corresponding project.			

Objectives

Transport planning and traffic engineering
In the lecture and practicum, the students are taught the project-oriented application of Transport planning and traffic engineering. You can consider specific transport mode requirements and create transport models.

Workload

Duration: 1 semester, overall:

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	3	45 h	-	75 h	120 h
Practicum	1	-	15 h	45 h	60 h

Frequency of the offer

Annually, summer semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of exam
Transport planning and traffic engineering	—	Exam 120 min
Transport planning and traffic engineering exercises	Seminar paper	

Module	**Transport analysis**			
Semester: 1/2	Credit points: 8	Level: 1	Weight: 1	Language: German/English
Course	**Transport analysis**			
Module responsible Lecture	Prof. Dr.-Ing. Christoph Hupfer			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Transport analysis** Lecture, 2 CH **Project Transport analysis** Project, 2 CH			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • FGSV: Empfehlungen für Verkehrserhebungen (EVE), FGSV, Köln 2012 • Bundesamt für Raumentwicklung: Verkehrsanalysen zu künftigen Kapazitätsengpässen auf den Nationalstraßen • Koehler, Leutwein und Partner: Verkehrsanalyse: fließender Individualverkehr und ruhender Verkehr Internet / Multimedia: • Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Institut für Verkehrsforschung: Analyse aktueller Szenarien des Verkehrs in Deutschland und dessen Umweltwirkungen			
Course content	**Lecture and project** The focus areas of the project and lecture transport analysis are the collection, evaluation and assessment of transport data. In the accompanying lectures, applications of different technologies, sensors and methods for automatic detection as well as their specific framework conditions are discussed. In addition, freely available transport data (OpenData), which are based on external surveys, or interpretation options and the formulation of recommendations for action following a transport data evaluation are important components of the module.			

Objectives	In the lecture and the project, students are taught the project-oriented application of transport analysis. They can collect, evaluate and assess transport data.
Workload	Duration: 1 semester, overall 240 h:

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	2	30 h	-	90 h	120 h
Practicum	2	-	30 h	90 h	120 h

Frequency of the offer	Annually, Summer semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Transport analysis	—	Exam 120 min + oral exam 20 min
Project Transport analysis	Practical work + written report	

Module	**Soft skills**			
Semester: 1	Credit points: 4	Level: 1	Weight: 1	Language: German/English
Course	**Soft skills**			
Module responsible Lecture	Prof. Dr.-Ing. Christoph Hupfer Center of Competence (CC) / Foreign Language Institute (IFS)			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Soft skills** 4 CH			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature recommendations according to the selected courses of the Center of Competence (CC) or the Foreign Language Institute (IFS)			
Course content	**Soft skills** The courses offered in this module promote the strong international and academic orientation of the Master's program. They prepare for services to be provided abroad or the general scientific and professional project work. The courses are held by the Center of Competence and announced at the beginning of each semester.			
Objectives	**Soft skills** The module Soft skills should deepen the scientific and professional working methods of the students on projects.			
Workload	Duration: variable, overall 120 h			
Frequency of the offer	Annually, Summer semester			
Prerequisite for the award of credit points	The exams taken (depending on the selected courses) must be submitted to the Examination Board. A rating is "passed" or "failed".			

Module	**Transport Systems**			
Semester: 2	Credit points: 6	Level: 2	Weight: 1	Language: German/English
Course	**Transport Systems**			
Module responsible Lecture	Prof. Dr. Jochen Eckart			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	Transport Systems Lecture, 4 CH Transport Systems Exercises, 2 CH			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • Michael Sandrock, Gerd Riegelhuth: Verkehrsmanagementzentralen in Kommunen – Eine vergleichende Darstellung, Verlag Springer Vieweg 2014 Journals: • Internationales Verkehrswesen, DVV Media Group • Sommer, C.; Leonhäuser, D.: Kostenvergleich für kommunale Verkehrssysteme – Entwicklung und Anwendung einer Methode zur Aufteilung der kommunalen Zuschüsse nach Verkehrssystemen (Straße und Autobahn, Jahrgang 66, Heft 3, Krischbaum-Verlag, Bonn, 2015)			
Course content	**Lecture and project** To develop feasible strategies and solutions for the optimal interaction between traffic supply and demand designates a successful traffic management. The main focus of this lecture is the application of the necessary tools and methods for the different modes of transport. The optimal use of existing traffic infrastructures as well as the task and requirements for mobility centers and hubs are a main topic of this module.			

Objectives

Lecture and exercises

The students understand the complex task of traffic system management based on planning principles and practical examples. You can understand the structures of intelligent systems and apply them un the project environment.

Workload

Duration: 1 semester, overall: 180h

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	4	60 h	-	60 h	120 h
Practicum	2	-	30 h	30 h	60 h

Frequency of the offer

Annually, Summer semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Lecture Transport systems	Exercises	Exam 120 min
Exercises Transport Systems	—	

Module	**Student Project**			
Semester: 3	Credit points: 3	Level: 3	Weight: 0	Language: German/English
Course	**Student Project**			
Module responsible Lecture	Prof. Dr.-Ing. Christoph Hupfer			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Student Project** 2 CH			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: 50 CP			
Literature and media for the preparation of the courses	Literature recommendations depend on the selected study project and must be coordinated in advance with the supervisors and project participants.			
Course content	**Student Project** Subject of the study project is the preparation and accompaniment of a student project in a bachelor's program at the University of Applied Sciences Karlsruhe. In this context, approaches to integration into existing or future tasks in research and teaching are required.			
Objectives	**Student Project** As part of the study project, the students learn how to lead a project team, to efficiently plan task packages, to meaningfully coordinate resources and to coordinate them.			

Workload

Duration: 1 semester, overall: 90 h

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Student Project	2	-	30 h	60 h	90 h

Frequency of the offer	Annually, Summer Semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Student Project	—	—
—	—	

Module	**Master Thesis**			
Semester: 3	Credit points: 22	Level: 3	Weight: 1	Language: German/English
Course	**Master Thesis**			
Module responsible Lecture	Prof. Dr.-Ing. Christoph Hupfer			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Master Thesis**			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature recommendations must be agreed with the supervisors in advance and during the processing phase.			
Course content	Subject from the field of Traffic System Management with a focus on one more elective module.			
Objectives	Formulation of the Master Thesis.			
Workload	Duration: 1 semester, overall: 6 months			
Frequency of the offer	Annually, Summer Semester			

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Master Thesis	—	Master Thesis

Module	**Final Exam**			
Semester: 3	Credit points: 5	Level: 3	Weight: 1 + 1	Language: German/English
Course	**Final Exam**			
Module responsible Lecture	Prof. Dr.-Ing. Christoph Hupfer			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Final Exam**			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: Module VSMM302, Master Thesis			
Literature and media for the preparation of the courses	Literature recommendations must be agreed with the supervisors in advance and during the processing phase.			
Course content	Subject from the field of Traffic System Management with a focus on one or more elective module			
Objectives	Presentation of the Master Thesis			
Workload	Duration: 1 semester, overall: 150 h			
Frequency of the offer	Annually, Summer Semester			
Prerequisite for the award of credit points				

Course unit	Prerequisite	Method of examination
Final Exam	—	Presentation 20 min Oral examination 20 min

Module	**Traffic Telematics**			
Semester: 1/2	Credit points: 12	Level: 2	Weight: 1	Language: German/English
Course	**Traffic Telematics**			
Module responsible Lecture	Prof. Dr.-Ing. Thomas Schlegel			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Traffic Telematics** Lecture, 3 CH **Project Traffic Telematics** Project			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • Günter Halbritter, Torsten Fleischer, Christel Kupsch: Strategien für Verkehrsinnovationen, Umsetzungsbedingungen – Verkehrstelematik – internationale Erfahrungen, edition sigma 2008 • Martin Krugmeister: Analyse des Anwendungspotentials und des Nutzens der Verkehrstelematik für wirtschaftliche Verkehrslösungen im Personenverkehr, 2004 Journals: • Hannes Hartenstein, Peter Vortisch: Verkehrstelematik – Schwerpunkttehmenheft der Zeitschrift it – Information Technology, Vol. 50 (2008), Heft 4 • Ralf Laufer: Qualitätsmodell und –analyse in der Verkehrstelematik (Zeitschrift für Vermessungswesen, Heft 1/2011) Internet / Multimedia: • http://www.bast.de – Informationsportal der Bundesanstalt für Straßenwesen			
Course content	**Lecture and project** The projects of this module are mainly concerned with set-up, comparison, operation, interface management, requirements of all participants and guidelines in relation to traffic telematic systems and equipment, such as: for network or route control, for temporary off-road clearance or for inflow control. Furthermore, information and communication systems such e.g. ???, driver assistance, Car-2-X (Car to Infrastructures) or traffic control systems to the core contents.			

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<tr><td>Objectives</td><td></td></tr>
<tr><td>Workload</td><td>Duration: 1 semester, overall: 360 h
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<tr><td>Lecture</td><td>3</td><td>45 h</td><td>-</td><td>45 h</td><td>90 h</td></tr>
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<tr><td>Lecture Traffic Telematics</td><td>—</td><td rowspan="2">Exam 120 min + Oral examination 20 min</td></tr>
<tr><td>Project Traffic Telematics</td><td>—</td></tr>
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Module	**Traffic Economics**			
Semester: 1/2	Credit points: 12	Level: 2	Weight: 1	Language: German/English
Course	**Traffic Economics**			
Module responsible Lecture	Prof. Dr. Sven Müller			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Traffic Economics** Lecture, 3 CH **Traffic Economics** Project			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • Gerd Aberle: Transportwirtschaft: Einzelwirtschaftliche und gesamtwirtschaftliche Grundlagen, Verlag Oldenburg 2000 • Wilfried Stocj, Tobias Bernecker: Verkehrsökonomie – Eine volkswirtschaftlich-empirische Einführung in die Verkehrswissenschaft, Springer Verlag, 2014 • Hans Friedrich Eckey: Verkehrsökonomie: Eine empirisch orientierte Einführung in die Verkehrswissenschaften, Gabler Verlag, 2000 • Sebastian Krummer: Einführung in die Verkehrswirtschaft, UTB 2010 Internet / Multimedia: • Günter Knieps: Neuere Entwicklungen in der Verkehrsökonomie: Der disaggregierte Ansatz, Diskussionsbeitrag des Instituts für Verkehrswissenschaft und Regionalpolitik, November 2002			
Course content	**Module description** The projects of this module include not only the application of traffic econometric methods but also quantifications of the transport sector, traffic areas or individual transport projects and the presentation of traffic with the help of statistical methods. In accompanying lecture blocks basic knowledge about common standards in the field of economics and new developments in the field of research will be discussed.			

Objectives	
Workload	Duration: 1 semester, overall: 360 h

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	3	45 h	-	45 h	90 h
Practicum	-	-	-	270 h	270 h

Frequency of the offer: Annually, 1. /2. Semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Traffic Economics	—	Exam 120 min + Oral examination 20 min
Traffic Economics Project	—	

Module	**Traffic Ecology**			
Semester: 1/2	Credit points: 12	Level: 2	Weight: 1	Language: German/English
Course	**Traffic Ecology**			
Module responsible Lecture	Prof. Dr. Jochen Eckart			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Traffic Ecology** Lecture, 3 CH **Project Traffic Ecology** Project			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • Baumbach, G.: Luftreinhaltung, Springer Berlin 1993 • Becker, U.; Gerike, R.: Gesellschaftliche Ziele von und für Verkehr, DIVU 1999 • Becker, U.; Gerike, R.; Winter, M.: Grundwissen Verkehrsökologie • Buchwald/Engelhardt: Umweltschutz, Grundlagen und Praxis, Band 16/1, 16/2: Verkehr und Umwelt • Bossel, H.; Umweltwissen, Springer 1994 • EEA: Term 2007: Climate for transport change • HKV – Handbuch der kommunalen Verkehrsplanung, Loseblattsammlung • Hoffmann: 0dB + 0dB = 3dB, E. Schmidt Verlag • IWW, Uni Karlsruhe, INFRAS: External Costs of Transport, Update Study, UIC Paris, 2004 • Klima-Bündnis: Klimaschutz durch Verkehrsvermeidung • Meadwos, D.: Die Grenzen des Wachstums, Club of Rome, 1972 • Petersen, Schallaböck: Mobilität für morgen, Birkhäuser • Maria Heide Zierer, Klaus Zierer: Zur Zukunft der Mobilität: Eine multiperspektivische Analyse des Verkehrs zu Beginn des 21. Jahrhunderts, VS Verlag, 2010 Internet / Multimedia: • http://www.zukunft-mobilitaet.net – Thema Verkehrsökologie • Lehrstuhl für Verkehrsökologie Dresden: Umwelt Bundesamt – Entwicklung von Indikatoren im Bereich Mobilität für die Nationale Nachhaltigkeitsstrategie • SRU: Umwelt und Straßenverkehr, Sondergutachten 7/05 http://www.umweltrat.de • Umweltbundesamt: Jahresberichte http://www.umweltbundesamt.de • Verkehr in Zahlen: http://www.diw.de			
Course content	**Lecture and project** The projects of this module particularly include the sustainable design of mobility and transport. The characterizing focus here is clearly in the long-term environmentally friendly design within the scope of the problem. In addition to the basic framework conditions for the generation of sustainability, the accompanying lecture blocks include: Current funding concepts and their objectives discussed.			

Objectives	
Workload	Duration: 1 semester, overall: 360 h

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	3	45 h	-	45 h	90 h
Practicum	-	-	-	270 h	270 h

Frequency of the offer: Annually, 1. /2. Semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Traffic Ecology	—	Exam 120 min + Oral Examination 20 min
Project Traffic Ecology	—	

Module	**Transport safety**			
Semester: 1/2	Credit points: 12	Level: 2	Weight: 1	Language: German/English
Course	**Transport safety**			
Module responsible Lecture	Prof. Dr.-Ing. Christoph Hupfer Robert Blaszczyk, M.Eng.			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Traffic safety** Lecture, 3 CH. **Project Traffic safety** Project			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • Jörn Drewes: Verkehrssicherheit im systematischen Kontext, Technische Universität, Institut für Verkehrssicherheit und Automatisierungstechnik, 2009 • Lars Schnieder: Verkehrssicherheit: Maße und Modelle, Methoden und Maßnahmen für den Straßen- und Schienenverkehr, Springer • Günther Wolf, Andreas Bracher, Berhard Bösl: Straßenplanung, Bundesanzeiger, 2013 • Christoph Klimmt: Verkehrssicherheitskommunikation: Beiträge der empirischen Forschung zur strategischen Unfallprävention, Springer, 2015 Journals: • ZVS – Zeitschrift für Verkehrssicherheit, Kirschbaum Verlag Internet / Multimedia: • Bundesanstalt für Straßenwesen, Publikationen Verkehrstechnik: Verkehrs- und Unfalldaten national (2014) und international (2013) • http://www.bmvi.de - Bundesministerium für Verkehr und digitale Infrastruktur – Verkehrssicherheit • http://www.dvr.de – Deutscher Verkehrssicherheitsrat • http://www.bast.de – Informationsportal der Bundesanstalt für Straßenwesen			
Course content	**Lecture and project** The projects of this module are aimed at improving the safety of the respective road users involved. Currently, in this context, problems that affect the foot and bicycle traffic, are in the foreground. Amongst others, it will be discussed the possible methods of detection (e.g., video or radar-based), their quality of results, applications and contribution to increasing security or automated identification of conflicts.			

Objectives	The students are familiar with different conflict situations and can assess them, analyze them with the right tools and then take appropriate measures to improve the safety of the road users.
Workload	Duration: 1 semester, overall: 360 h

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	3	45 h	-	45 h	90 h
Practicum	-	-	-	270 h	270 h

Frequency of the offer: Annually, 1. /2. semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of exam
Traffic safety	—	Exam 120 min + oral exam 20 min
Project Traffic safety	—	

Module	**Public Transport**			
Semester: 1/2	Credit points: 12	Level: 2	Weight: 1	Language: German/English
Course	**Public Transport**			
Module responsible Lecture	Prof. Dr.-Ing. Thomas Schlegel			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Public Transport** Lecture, 3 CH **Public Transport Project** Project			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature: • Forschungsgesellschaft für Straßen- und Verkehrswesen: Hinweise für die Qualitätssicherung im ÖPNV, 2005 • Hans-Heinrich Bass: Städtische Personentransportsysteme in Deutschland • Benjamin Linke: Die Gewährleistung des Daseinsvorsogeauftrags im öffentlichen Personennahverkehr, Baden-Baden 2010 • Lorenz Sönnichen, Bundesministerium für Verkehr (BMV): 40 Jahre Verkehrspolitik, 1989 • Deutsche Bahn: Geschichte vom „Gesetz betreffend den Überlandverkehr mit Kraftfahrzeugen“ und dem sogenannten Schenker Vertrag • Astrid Karl: Öffentlicher Verkehr im Gewährleistungsstaat – Der ÖPNV zwischen Regulierung und Wettbewerb, Edition Sigma, Berlin 2008 • Volker Eichmann, Felix Berschin, Tilman Bracher, Matthias Winter: Umweltfreundlicher, attraktiver und leistungsfähiger ÖPNV – ein Handbuch, Difu-Arbeitshilfen, Berlin 2006 • Hans-Liudger Dienel, Barbara Schmucki: Mobilität für alle, Geschichte des öffentlichen Personen-Nahverkehrs in der Stadt zwischen technischem Fortschritt und sozialer Pflicht, • Franz Steiner Verlag, Stuttgart, 1997 Internet / Multimedia: • DIN EN 13816: Öffentlicher Personenverkehr; Definition, Festlegung von Leistungszielen und Messung der Servicequalität, 2002 • http://www.bmvi.de - Bundesministerium für Verkehr und digitale Infrastruktur – Öffentlicher Personenverkehr			
Course content	**Lecture and project** The projects of this module deal with the main areas of public transport. The evaluation of the quality of services, optimization of interfaces, inter- and intra-modality, multi-media services, requirements and design guidelines of a local transport plan or the integration of rental systems (car / bike-sharing) can be potential contents of the project work. In the context of changing mobility factors, the focus is also on the appropriate access to and exit from public transport as well as growing networks and their information and communication structures.			

Objectives

Workload

Duration: 1 semester, overall: 360 h

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	3	45 h	-	45 h	90 h
Practicum	-	-	-	270 h	270 h

Frequency of the offer

Annually, 1. /2. Semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Public Transport	—	Exam 120 min + Oral Examination 20 min
Public Transport Project	—	

Module	**Research & Development 1/2**			
Semester: 1/2	Credit points: 12	Level:	Weight: 1	Language: German/English
Course	**Research & Development 1/2**			
Module responsible Lecture	**N.N.**			
Assignment to the Curriculum	Master Transportation Management			
Teaching methods / Credits Hours (CH)	**Research & Development 1/2** Lecture, 3 CH **Research & Development 1/2** Project			
Requirements for participation	Recommended prerequisites: none Requirements according to SER: none			
Literature and media for the preparation of the courses	Literature recommendations are to be discussed according to the thematic focus with the respective project supervisors.			
Course content	**Research & Development Project 1/2** The projects of these modules can include subject areas outside of the five defined project modules VSMM401 to 405. Students have the opportunity to work on new fields of research within the reach of traffic system management and incorporate them into their individual degrees, which are characterized by the elective modules.			
Objectives				
Workload	Duration: 1 semester, overall: 360 h			

Course unit	CH	Lecture	Supported ind. Learning (exercise lab/project work)	Independent learning	Overall
Lecture	3	45 h	-	45 h	90 h
Practicum	-	-	-	h	270 h

Frequency of the offer	Annually, 1. /2. Semester

Prerequisite for the award of credit points

Course unit	Prerequisite	Method of examination
Research & Development 1/2 Lecture	—	Exam 120 min + Oral Examination 20 min
Research & Development 1/2 Project	—	