Technische Hochschule Wildau
Technical University of Applied Sciences

Degree course

Technical Management

Master of Engineering

Programme description

As of March 2025

For the academic year 25/26

Profile

About the degree programme:
The Technical Management degree programme is jointly organised and run by the Industrial Engineering, Logistics and Transportation Systems Technology departments at TH Wildau.
It is primarily aimed at graduates holding bachelor's degrees in these fields, but is also open to all graduates with a degree in any related field.

Study objectives:
The degree programme has a more technical emphasis. It also contains courses on business administration and information systems and gives graduates an integrative and responsible understanding of tasks in technically oriented management roles as well as the interface between engineering sciences and business administration.

Technical Management - Matrix - Full-time

Module name	PA	Sem.	CP	V	Ü	L	P	S	Tot.
Importiert P - Compulsory									
Advanced Management Techniques	SMP	1	7	3	3	0	0	0	6
Design, Engineering and Management of Companies	SMP	1	15	0	4	0	8	0	12
Optimization in Engineering and Management	KMP	1	8	2	2	2	0	0	6
Importiert WP (30.0 CP) - Elective									
Certificate Module	SMP	0	30	0	0	0	24	0	24
Importiert WP (5.0 CP) - Elective									
Analysis and Design of Transportation Networks	KMP	2	5	2	1	1	0	0	4
Cyberphysical Production Systems	KMP	2	5	2	1	1	0	0	4
Enhanced Technologies for Mobility	FMP	2	5	2	2	0	0	0	4
IT-Systems Implementation in Production and Logistics	SMP	2	5	1	1	2	0	0	4
IT-Systems Implementation in Transportation Systems	SMP	2	5	1	1	2	0	0	4
Management of Transport Companies	KMP	2	5	2	1	1	0	0	4
Mobility Concepts	KMP	2	5	2	2	0	0	0	4
Product Life Cycle Management	KMP	2	5	2	1	1	0	0	4
Production Systems and Networks	SMP	2	5	2	2	0	0	0	4
Supply Chain Management	FMP	2	5	2	2	0	0	0	4
System Dynamics in Production and Logistics	KMP	2	5	2	2	0	0	0	4
Transportation Technologies	SMP	2	5	2	2	0	0	0	4
Academic credits									
Master's Colloquium	SMP	3	6						
Master's Thesis	SMP	3	24						

Technical Management - Matrix - Full-time

Total semester hours per week				5	9	2	8	0	24
Total credit points to be achieved from WPM			0						
Total credit points from PM			30						
Sum of academic achievements			30						
Total credit points			60						

V - Lesson
Ü - Exercise
L - Laboratory
P - Project

PA - Examination type
CP - Credit Points
PM - Compulsory modules
WPM - Elective modules

SPM - Specialization modules
SMP - Examination during the semester
KMP - Combined module examination
FMP - Fixed module examinatio

* - This elective course is available in multiple semesters.

Technical Management - Matrix - Part-time

Module name	PA	Sem.	CP	V	Ü	L	P	S	Tot.
Importiert P - Compulsory									
Advanced Management Techniques	SMP	1	7	3	3	0	0	0	6
Design, Engineering and Management of Companies	SMP	1	15	0	4	0	8	0	12
Optimization in Engineering and Management	KMP	1	8	2	2	2	0	0	6
Importiert WP (30.0 CP) - Elective									
Certificate Module	SMP	0	30	0	0	0	24	0	24
Importiert WP (5.0 CP) - Elective									
Analysis and Design of Transportation Networks	KMP	2	5	2	1	1	0	0	4
Cyberphysical Production Systems	KMP	2	5	2	1	1	0	0	4
Enhanced Technologies for Mobility	FMP	2	5	2	2	0	0	0	4
IT-Systems Implementation in Production and Logistics	SMP	2	5	1	1	2	0	0	4
IT-Systems Implementation in Transportation Systems	SMP	2	5	1	1	2	0	0	4
Management of Transport Companies	KMP	2	5	2	1	1	0	0	4
Mobility Concepts	KMP	2	5	2	2	0	0	0	4
Product Life Cycle Management	KMP	2	5	2	1	1	0	0	4
Production Systems and Networks	SMP	2	5	2	2	0	0	0	4
Supply Chain Management	FMP	2	5	2	2	0	0	0	4
System Dynamics in Production and Logistics	KMP	2	5	2	2	0	0	0	4
Transportation Technologies	SMP	2	5	2	2	0	0	0	4
Academic credits									
Master's Colloquium	SMP	3	6						
Master's Thesis	SMP	3	24						

Technical Management - Matrix - Part-time

Total semester hours per week				5	9	2	8	0	24
Total credit points to be achieved from WPM			0						
Total credit points from PM			30						
Sum of academic achievements			30						
Total credit points			60						

V - Lesson

Ü - Exercise

L - Laboratory

P - Project

PA - Examination type

CP - Credit Points

PM - Compulsory modules

WPM - Elective modules

SPM - Specialization modules

SMP - Examination during the semester

KMP - Combined module examination

FMP - Fixed module examinatio

* - This elective course is available in multiple semesters.

Certificate Module

Module name			
Certificate Module			
Degree course	Degree		
Technical Management	Master of Engineering		
Module responsible(s)			
Prof. Dr. rer. pol. Jens Wollenweber			
As of	Language		
2020-05-04	English		
Type	Examination type	CP according to ECTS	
Elective	SMP	30	

Study type	Semester	SWS	L / E / L / P / S
Full-time	0	24	0 / 0 / 0 / 24 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	0	24	0 / 0 / 0 / 24 / 0

Recommended prerequisites
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
360,0 h	0,0 h	540,0 h	0,0 h	900 h

Learning objectives

Knowledge

Skills

Social

Autonomy

Certificate Module

Content

1. Das Zertifikatsmodul umfasst ein vom Studiengangsprecher zu definierendes und von einem Hochschullehrer zu bewertendes Praxisprojekt, z.B. Transferprojekt, Fallstudie. Dieses Projekt muss konkret abgrenzbar sein und eine Aufgabenstellung aus dem Themenfeld des technischen Managements aufweisen. Das Ergebnis des Projektes wird in einer schriftlichen Projektdokumentation mit bis zu 50 Seiten dargestellt.
   Die Projektdokumentation wird als Prüfungsleistung für das Zertifikatsmodul undifferenziert mit „mit Erfolg“ / „ohne Erfolg“ bewertet. Bewertungskriterien sind die inhaltliche Qualität, Konsistenz der Struktur und Argumentation, die Identifikation von Projekterfolgs- und Projektrisikofaktoren, eine Reflexion der Projektergebnisse und der Erfahrungen sowie Schlussfolgerungen aus dem Projekt

Compulsory literature

Suggested literature

Advanced Management Techniques

Module name		
Advanced Management Techniques		
Degree course Technical Management	Degree Master of Engineering	
Module responsible(s) Prof. Dr.-Ing. Gaby Neumann & Prof. Dr.-Ing. Thomas Masurat		
As of 2021-03-15	Language English	
Type Compulsory	Examination type SMP	CP according to ECTS 7

Study type	Semester	SWS	L / E / L / P / S
Full-time	1	6	3 / 3 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	1	6	3 / 3 / 0 / 0 / 0

Recommended prerequisites
- -
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
90,0 h	88,0 h	30,0 h	2,0 h	210 h

Advanced Management Techniques

Learning objectives

Knowledge

- Applying tools and methods of conventional Project Management in complex undertakings
- Analyse possible risks and develop mitigation strategies within the concept of risk management
- Develop systems for adequate controlling of complex undertakings
- Identification and utilization of advanced management methods, approaches and tools
- Recognize and unterstand how to transfer different methods and procedure models to new fields of application
- Capability to develop procedure models as guidelines to cope with complex tasks

Skills

- Plan, schedule and control complex undertakings in the context of modern companies
- Describe, analyze and modify complex undertakings in a structured and directed manner
- Perform the transfer of various methods and models to new fields of application.

Social

- Be able to work in teams, organize team work and manage a project team
- Be able to critically reflect and self-organize learning processes
- Be able to communicate in a team work context and to present results

Autonomy

- Be able to analyze and work on complex topics autonomously.
- Be able to speak freely about technical topics.
- Be able to adopt and assess critically specialized, advanced knowledge.

Advanced Management Techniques

Content

1. Project Management
   - 1.1 Project organisation
   - 1.2 Project planning
   - 1.3 Network planning techniques
   - 1.4 Risk Management
   - 1.5 Controlling of Projects
2. Procedure Models
   - 2.1 Definition Procedure Model - Problem Solving Process in general
   - 2.2 Demarcation of Model, Method and Algorithm
   - 2.3 Important Models for Innovation and Change Projects
     - 2.3.1 Models for Product Development
     - 2.3.2 Models for Software Development (Agile Development)
     - 2.3.3 Models for Improvement Projects
     - 2.3.4 Morphological Model for setting Objectives in Fachtory Planning

Compulsory literature

Suggested literature

- VDI Guideline 5200, Part 2: “Morphological model of the factory for the setting of objectives in the factory planning"
- VDI Guideline 2206: “Design methodology for mechatronic systems"

Design, Engineering and Management of Companies

Module name		
Design, Engineering and Management of Companies		
Degree course Technical Management	Degree Master of Engineering	
Module responsible(s) Prof. Dr.-Ing. Marcus Ulrich Abramowski		
As of 2020-07-23	Language English	
Type Compulsory	Examination type SMP	CP according to ECTS 15

Study type	Semester	SWS	L / E / L / P / S
Full-time	1	12	0 / 4 / 0 / 8 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	1	12	0 / 4 / 0 / 8 / 0

Recommended prerequisites
Basics from Module “Models and Methods for Engineering and Management" Basics from Bachelor-Studies: Basics in Logistics, Quality Management and Project Management
Special regulations
Depending on the situation, (relevant student number), the module can be delivered in two streams. One stream for production and logistics, the other one for transportation aspects.

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
180,0 h	100,0 h	150,0 h	10,0 h	440 h

Learning objectives

Knowledge

- Decision management in companies can be reflected
- Execution and exercise of the methods from Module „Models and Methods for Engineering and Management"
- Development of new concepts and processes regarding the end-to-end process in production / transportation companies
- Decisions in site and structural matters of organisations
- Reflection of organisational challenges in IT-and complex solutions

Design, Engineering and Management of Companies

- Development of modern management processes and the related management functions
- Establish project organisations

Skills

- To manage and to solve complex problems in terms of planning, organising, controlling and leading in the context of global companies and organisations
- To find and assess alternative solutions and submit proposals for a decision
- Define business objectives
- Operate in business process reengineering projects
- Implement business processes (end-to-end) in IT-Systems
- Working in comprehensive and complex projects.
  Reproducing processes in purchasing, logistics (internal and external), sales and distribution ERP-Solutions as well as transportation aspects in specific IT systems
- To control projects with project management tools

Social

- Leading project teams
- Conflict resolution internal and external
- Integration in interdisciplinary teams
- To manage work tasks in working groups

- To perform simple management tasks
- Moderation of steering committees and project management meetings
- Increase of motivation

Autonomy

- To develop internal project teams
- Leading sub-projects

- Take responsibility for decisions and groups
- To analyze and evaluate learning and work processes
- To design and optimize learning and work

Design, Engineering and Management of Companies

Content

1. Strategic alignment of the plant / site / transportation needs and connection
   • Analysis of the existing processes and incidents
   • Reflection and assessment of the strategic parameters
   • Knowledge management in organisations
   • Evaluation of organisational aspects
2. Development of projects
   • Project organisation and development of the project organisation
   • BPMN for processes and their documentation
   • Milestone Trend Analysis or Earned Value Analysis for controlling
   • Documentation of projects (open issue lists etc.)
   • Using strategies for project escalations
3. Applied business process engineering / reengineering
   • Integrated description processes in organisation and IT (several levels of abstraction)
   • Compare, select and operate the several methods in BPR
   • Tools: ARIS / BPML
   • Harmonization between organisational and IT-Processes
4. Global site strategies
   • Position of the site in the supply chain
   • Position of the site in strategy of the company
   • Position of the site in transportation aspects
   • Normative processes of the company
5. Solution for a model-based company
   • End to end planning processes
   • Development of strategic, functional and anticipated processes
   • Strategic (short and long term) planning scenarios in production and logistics as well transportation
   • In- and Outsourcing
6. IT-Systems implementation
   • IT-support for strategic, functional and anticipated processes
   • Realization of ERP-Functions
   • Go Live
   • Support after Go Live
   • Use of der ERP-Systems

Design, Engineering and Management of Companies

Compulsory literature

- Ruhe, G. (2014). *Software Project Management: Setting the Context*. Springer.
- Walter, M. (2015). *Multi-Project Management with a Multi-Skilled Workforce*. Springer.
- Kirchmer, M. (1998). Business process oriented implementation of standard software. Berlin u.a.: Springer.
- Anderson, G. (2009). *SAP Implementation*. SAMS.
- Vollmann, T. (2004). *Manufacturing planning and control for supply chain management* (5, ed.). Boston, Mass. [u.a.] : McGraw-Hill.
- Akhtar, J. (2016). *Production Planning and Control with SAP ERP*. Galileo.
- Davim, P. (2018). *Progress in Lean Manufacturing*. Springer.

Suggested literature

Optimization in Engineering and Management

Module name			
Optimization in Engineering and Management			
Degree course	Degree		
Technical Management	Master of Engineering		
Module responsible(s)			
Dr. Thomas Kopsch			
As of	Language		
2024-03-19	English		
Type	Examination type	CP according to ECTS	
Compulsory	KMP	8	

Study type	Semester	SWS	L / E / L / P / S
Full-time	1	6	2 / 2 / 2 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	1	6	2 / 2 / 2 / 0 / 0

Recommended prerequisites
- -
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
90,0 h	85,0 h	60,0 h	5,0 h	240 h

Optimization in Engineering and Management

Learning objectives

Knowledge

- Explain and evaluate optimization models and methods
- Recognize and unterstand how to transfer different methods to new fields of application

Skills

- Describe, analyze and modify complex situations in a structured and directed manner
- Perform the transfer of various methods to new fields of application.
- Be able to apply optimization methodology to practical problems from production, logistics or transportation

Social

- Be able to work in teams, organize team work and manage a project team
- Be able to critically reflect and self-organize learning processes
- Be able to communicate in a team work context and to present results

Autonomy

- Be able to analyze and work on complex topics autonomously.
- Be able to speak freely about technical topics.
- Be able to adopt and assess critically specialized, advanced knowledge.

Content

1. Introduction to Operations Research
2. Problems and models
3. Linear programming
   - 3.1 Models
   - 3.2 Graphical solution
   - 3.3 The simplex algorithm
4. Duality theory
5. Integer programming
6. Introduction to IBM ILOG CPLEX Optimization Studio

Compulsory literature

- Hillier F., Lieberman G. (2014). Introduction to Operations Research. McGraw-Hill Education Ltd.

Suggested literature

Analysis and Design of Transportation Networks

Module name		
Analysis and Design of Transportation Networks		
Degree course	**Degree**	
Technical Management	Master of Engineering	
Module responsible(s)		
Prof. Dr. rer. pol. Jens Wollenweber		
As of	**Language**	
2022-03-18	English	
Type	**Examination type**	**CP according to ECTS**
Elective	KMP	5

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 1 / 1 / 0 / 0
Part-time	2	4	2 / 1 / 1 / 0 / 0

Recommended prerequisites
Models and Methods for Engineering and Management
Special regulations

Workload breakdown				
Presence	**Self-study**	**Projects**	**Exam**	**Total**
60,0 h	36,0 h	50,0 h	4,0 h	150 h

Learning objectives

Knowledge

- Students will be able to analyse, design and implement:
- decision making processes in logistics and
- transportation networks
- optimization problems.

Skills

- Students will be able to solve strategic, tactical and operational decisions:
- for clustering/covering problems

Analysis and Design of Transportation Networks

- for assignment problems,
- for finding optimal locations of facilities.

Social

- Students should be able to integrate knowledge and face the complexity of making judgements from information which, being incomplete or limited, include reflections on the social and ethical responsibilities linked to the application of their knowledge and judgements.
- Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously.
- Work collaboratively in a group.

Autonomy

- Address problems of management and coordination of logistics operations in production, transport and services in a holistic approach, by means of the consistent application of the supply chain management concepts and strategies, taking into account the pertinent aspects of environment, human capital, quality, technology, and economics.
- Apply a rigorous and efficient approach to problem solving
- Apply quantitative methods and techniques based on optimisation and/or simulation models in order to evaluate the different alternatives and select the most promising solution to be implemented
- Demonstrate abilities to document and reflect the problem-solving process in order to extract the lessons learned.
- Elaborate solid arguments based on quantitative models and analytical methods in order to convince and motivate decision makers and then plan and coordinate the project to implement the solution.
- Face a new problem under a scientific perspective.
- Identify the main aspects to be planned in the resolution of a logistic project, specifying the project boundaries, and leading with a solution.
- Select and apply the most relevant analytical methodologies, strategies and current technologies for designing solutions to the problems of management and coordination of material, information and financial flows.
- Students should possess an ability to learn that enables them to continue studying in a manner which is largely self-supervised or independent.

Analysis and Design of Transportation Networks

Content

1. Selected theoretical basics for logistical decisions
   A. Model building
   B. Decision making and optimisation
   C. Optimisation software
2. Clustering Algorithms/Covering problems
   A C-means algorithms
   B Fuzzy C-Means algorithm
   C Set Covering problems
   D Maximum covering problems
3. Logistical Assignment Problems
   A The Standard Assignment Problem
   B Maximum Cardinality Problems
   C Generalised Assignment Problems
4. Location Problems
   A Facility Location Problems
   B Hub Location Problems

Compulsory literature

- Rodrigue, J. (2018). *Efficiency and sustainability in multimodal supply chains*. Paris: Organisation for Economic Co-operation and Development (OECD), International Transport Forum.
- Rodrigue, J., Comtois, C. & Slack, B. (2017). *The geography of transport systems* (Fourth edition). London ; New York : Routledge.
- Hillier, F. & Lieberman, G. (2015). *Introduction to operations research* (10. ed., internat. ed.). New York : McGraw-Hill Education.

Suggested literature

- U.S. Department of Transportation (2015). The Transportation Planning Process: Key Issues

Cyberphysical Production Systems

Module name			
Cyberphysical Production Systems			
Degree course Technical Management	Degree Master of Engineering		
Module responsible(s) Prof. Dr. René Krenz-Baath			
As of 2024-03-19	Language English		
Type Elective	Examination type KMP		CP according to ECTS 5

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 1 / 1 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 1 / 1 / 0 / 0

Recommended prerequisites
Basic educational standards
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	88,0 h	0,0 h	2,0 h	150 h

Cyberphysical Production Systems

Learning objectives

Knowledge

– After the course the student will:
  - understand specific requirements of cyber-physical production systems and their complexity
  - be able to apply procedure, methods, tools for specifying, selecting, implementing, testing and analysing entities of cyber-physical production systems

Skills

– After the course the student will:
  - be able to evaluate different digital alternatives and select the entities to be implemented
  - be able to acknowledge the risk of using of autonomous technical entities (i.e. mobile robots) as well as the importance of rules in social and technical level
  - elaborate solid arguments to convince and motivate decision makers

Social

– The student is able to:
  - apply a rigorous and efficient approach to problem solving.
  - address design problems in Logistics Management and Control from a holistic approach.
  - demonstrate abilities to document and reflect the problem-solving process in order to extract the lessons learned.
  - present the solution in a sufficient way.

Autonomy

– The student is able to:
  - elaborate solid arguments to convince/motivate decision makers.
  - evaluate different alternatives and select the Logistics Management and Control solution to be implemented.
  - face a new problem under a scientific perspective.
  - identify the main aspects to be planned in the resolution of a logistic project, specifying the project
  boundaries, and leading with a solution
  - select and apply the right methodologies and strategies to specify and formalise the requirements of a Logistics Management and Control system.
– Students should possess an ability to learn that enables them to continue studying in a manner which is largely self-supervised or independent

Cyberphysical Production Systems

Content

1. Concept formation/ definitions
2. Control architecture of automated systems
3. Technical entities and closed loop controls for cyber-physical production
4. Methods and tools of a cyber-physical production system
5. Information flow horizontally and vertically: methods and examples
6. Human/Machine/Factory interaction
7. Multi-agent, multi-vendor systems
8. Human-robot collaboration/Middleware/Real-time systems

Compulsory literature

- List of literature will given in first lesson

Suggested literature

- Ustundag, A. & Cevikcan, E. (2018). *Industry 4.0: managing the digital transformation*. Cham, Switzerland : Springer.
- E. A. Lee, “Cyber physical systems: Design challenges," Proceedings - 11th IEEE Symposium on Object/Component/Service-Oriented Real- Time Distributed Computing, ISORC 2008, pp. 363-369, 2008.
- A. Bunte, B. Stein, and O. Niggemann, “Model-based diagnosis for cyber-physical production systems based on machine learning and residual-based diagnosis models." Hawaii, USA: Thirty-Third AAAI Conference on Artificial Intelligence (AAAI-19), Jul 2019
- Anette Karltun, Johan Karltun, Martina Berglund, JörgenEklund. In: Applied Ergonomics Volume 59, Part A, March 2017, Pages 182-190
- Zhang, L.; Fallah, Y. P.; Jihene, R. (2013). Cyber-Physical Systems: Computation, Communication, and Control. In: International Journal of Distributed Sensor Networks, vol. 2013, Article ID 475818, 2 pages, 2013. doi:10.1155/2013/475818
- Ustundag, A. & Cevikcan, E. (2018). *Industry 4.0: managing the digital transformation*. Cham, Switzerland : Springer.
- Biberman, J. (2022). *Manufacturing the Digital Revolution: Building a Sustainable Supply Chain for ICT-Driven Development in India*. New York, NY: Columbia University, Earth Institute, Center for Sustainable Development (CSD).

Enhanced Technologies for Mobility

Module name			
Enhanced Technologies for Mobility			
Degree course Technical Management	Degree Master of Engineering		
Module responsible(s) Prof. Dr.-Ing. Stefan Kubica			
As of 2020-07-23	Language English		
Type Elective	Examination type FMP	CP according to ECTS 5	

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 2 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 2 / 0 / 0 / 0

Recommended prerequisites
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	18,0 h	70,0 h	2,0 h	150 h

Enhanced Technologies for Mobility

Learning objectives

Knowledge

- Vehicle sensors and oientation in the 2D-/3D surrounding space
- Conditions for movements of vehicles (usable tracks, obstacles, etc.)
- Collaboration of onboad and offboard sensors, computers and networks

Skills

- Using test facilities as well as hard- and software systems for systems developments and evaluations
- Researching strategies in vehicle control and traffic management
- Elaboration of research and test reports

Social

- Facilitating the collaboration and coordination of projects teams
- Communication on different social and knowledge levels

Autonomy

- Capability for self-reliant work and searching for support and literature
- Evolution of a structured work flow within a project

Content

1. Conduct an R&D project within small project teams concerning actual topics such as autonomous driving, traffic management, traffic sensor or C2X networks

Compulsory literature

Suggested literature

IT-Systems Implementation in Production and Logistics

Module name		
IT-Systems Implementation in Production and Logistics		
Degree course Technical Management	Degree Master of Engineering	
Module responsible(s) Prof. Dr.-Ing. Marcus Ulrich Abramowski		
As of 2020-07-23	Language English	
Type Elective	Examination type SMP	CP according to ECTS 5

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	1 / 1 / 2 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	1 / 1 / 2 / 0 / 0

Recommended prerequisites
Basics from Module “Models and Methods for Engineering and Management" Basics from Module
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	40,0 h	40,0 h	10,0 h	150 h

IT-Systems Implementation in Production and Logistics

Learning objectives

Knowledge

- Methods for software selections can be reflected
- Development of the correct implementation strategy in IT-Projects (Big Bang / vs phased)
- Decisions in structural matters of IT-Implementations
- Deflect challenges in IT-solutions
- To manage and align the implementation of IT-solutions in complex and high automized production systems

Skills

- To find and assess alternative solutions and submit proposals for the of the correct IT-level and the corresponding software selection
- Operate in manufacturing execution projects
- Define the correct grade of automisation
- Implement production processes in IT-Systems
- Implement business processes (end to end) in IT-Systems
- To decide between individual and standard software
- To decide between organisational and IT-related changes

Social

- Integration in interdisciplinary teams
- To manage work tasks in working groups
- To perform IT-related management tasks
- Moderation of decision meetings

Autonomy

- To develop internal project teams
- Take responsibility for integrated technical and IT decisions
- To analyze and evaluate learning and work processes
- To design and optimize learning and work

IT-Systems Implementation in Production and Logistics

Content

1. Basics in IT-related logistic processes and harmonization between production and IT-processes
2. IT-Systems I
   Supply Chain Managmenent (SCM) / Enterprise Ressource Planning (ERP) / Manufacturing Execution Systems (MES)
3. IT-Systems II
   Operating Data (MFC) / Programmable Logic Control (PLC) / Automization
4. IT-Systems III
   Interfere and selection of the correct control level for tasks between SCM / ERP / MES and PLC
5. Individual vs. standard software
   Relationship between standardization and automation level
6. Implementation strategies (Big Bang and Phased Projects)
7. Global Templates and standardization of logistical approaches
8. Change Request Management
9. Project phases
10. Test procedures
    Fuctional tests / Integration tests / stress tests / cross system tests / regression tests
11. Acceptance procedures
    Site Acceptance Test (SAT) / Factory Acceptance Tests (FAT)
12. Methods for training and go live in logistic systems
    Knowledge management
13. Systems maintenance and service contracts
14. IT-implementation as a main part of complex site reorganisation projects

IT-Systems Implementation in Production and Logistics

Compulsory literature

- Ake, K., Clemons, J. & Cubine, M. (2004). *Information technology for manufacturing : reducing costs and expanding capabilities*. Boca Raton [u.a.] : St. Lucie Press.
- Akhtar, J. (2016). *Production Planning and Control with SAP ERP*. Galileo.
- Anderson, G. (2009). *SAP Implementation*. SAMS.
- Kappauf, J., Lauterbach, B. & Koch, M. (2011). *Logistic core operations with SAP : procurement, production, distribution logistics and compliance*. Berlin : Springer.
- Kirchmer, M. (1998). Business process oriented implementation of standard software. Berlin u.a.: Springer.
- Kletti, J. (2007). *Manufacturing Execution System - MES*. Springer.
- Martin, R. (2003). *Agile software development : principles, patterns, and practices*. Upper Saddle River, N.J. : Pearson Education.
- Mende, U. (1999). *Software development for SAP R/3 : data dictionary, ABAP/4, interfaces*. Berlin [u.a.] : Springer.
- Regh, J. (2008). *Programmable Logic Controllers*. Pearson.
- Ruhe, G. (2014). *Software Project Management: Setting the Context*. Springer.
- Scholten, B. (2009). *MES Guide for Executives: Why and How to Select, Implement, and Maintain a Manufacturing Execution System*. International Society of Automation.

Suggested literature

IT-Systems Implementation in Transportation Systems

Module name			
IT-Systems Implementation in Transportation Systems			
Degree course Technical Management	Degree Master of Engineering		
Module responsible(s) Prof. Dr. rer. pol. Jens Wollenweber			
As of 2020-07-23	Language English		
Type Elective	Examination type SMP		CP according to ECTS 5

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	1 / 1 / 2 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	1 / 1 / 2 / 0 / 0

Recommended prerequisites
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	85,0 h	0,0 h	5,0 h	150 h

IT-Systems Implementation in Transportation Systems

Learning objectives

Knowledge

- Students will be able to explain how applications of IT systems in transport work and interact with systems from the same and neighbouring domains.

Skills

- Students can develop concepts for solving IT-related issues in the transport sector.
- Students can apply industry-specific software and reflect results obtained.
- They can run largely self-directed IT-related projects in transportation.

Social

- Students can exchange ideas with each other, work together in small groups cooperatively and autonomously to solve subject-specific problems.
- They can present subject-specific problems and solutions to a target group and represent them in an argumentative manner to experts.

Autonomy

- Students can analyze and work on complex topics autonomously.
- This elaborate solid arguments to convince/motivate decision makers and can speak freely about technical topics.

Content

1. systematisation of IT-systems in transportation
2. advanced technologies for IT-systems in individual transport - models, implementation, examples
3. traffic flow simulation on different levels
4. rail traffic operation simulation and IT-systems in the public transport environment
5. modern communication technologies in passenger information - chances, risks and new traffic data resource
6. harmonised data models and data formats for data exchange between applications

Compulsory literature

IT-Systems Implementation in Transportation Systems

Suggested literature

- Girnau, G. (2001) - VDV-Förderkreis e.V. Düsseldorf (Hrsg.). Telematics in public transport in Germany = Telematik im ÖPNV in Deutschland. Düsseldorf. Alba
- Hansen, I. & Albrecht, T. (2014). *Railway timetabling & operations : analysis, modelling, optimisation, simulation, performance evaluation* (2., rev. and extended ed.). Hamburg : Eurailpress.
- Scholz, G. (2016). IT-Systems in Public Transport - Information Technology for Transport Operators and Authorities. dpunkt
- several handbooks and documentations for the used software tools (as announced in the lessons)

Management of Transport Companies

Module name			
Management of Transport Companies			
Degree course Technical Management	Degree Master of Engineering		
Module responsible(s) Prof. Dr. rer. nat. Christian Liebchen & Prof. Dr. rer. pol. Jens Wollenweber			
As of 2020-01-15	Language English		
Type Elective	Examination type KMP	CP according to ECTS 5	

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 1 / 1 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 1 / 1 / 0 / 0

Recommended prerequisites
Models and Methods for Engineering and Management
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	39,0 h	49,0 h	2,0 h	150 h

Management of Transport Companies

Learning objectives

Knowledge

- Know and understand selected basic theories relevant to the field of leadership, and practical applications and concepts used in organizations of all sizes
- Know and understand the key responsibilities of entrepreneurs in transportation companies, and techniques to implement these within the company's organization

Skills

- Make use of selected quantitative decision making software tools

Social

- The students are able to expediently communicate with others and reach goals together
- The students make some personal experience during active exercises such as generation of ideas (creative techniques), decision making, and short role plays (occasionally)

Autonomy

- Autonomously search for material, critically analyze texts and achieve reasonable results.

Content

1. Responsibility in Transportation Companies (Financial, Safety, ECM)
2. Processes and Organisation (Safety, Service & Operations Planning, Qualification, Documentation, Flexibility)
3. Controlling (Finance, Resources, Market Division, Transparency, KPIs)
4. Leadership (Obligations, Motivation, Employees' Rights)
5. Selected Decision Making Tools and Techniques
6. Interfaces to typical External Partners

Compulsory literature

Suggested literature

- Bertsimas, D. (2000). Data, Models, and Decisions", Dynamic Ideas
- Stippler, M., Dörffer, T. & Bertelsmann Stiftung. (2011). *Leadership - approaches, developments, trends*. Gütersloh : Verl. Bertelsmann-Stiftung.

Mobility Concepts

Module name			
Mobility Concepts			
Degree course	Degree		
Technical Management	Master of Engineering		
Module responsible(s)			
Prof. Dr. rer. nat. Christian Liebchen & Prof. Dr. rer. pol. Jens Wollenweber			
As of	Language		
2019-04-30	English		
Type	Examination type		CP according to ECTS
Elective	KMP		5

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 2 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 2 / 0 / 0 / 0

Recommended prerequisites
Models and Methods for Engineering and Management
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	29,0 h	59,0 h	2,0 h	150 h

Mobility Concepts

Learning objectives

Knowledge

- Knowledge of the relevant stakeholders in the transportations market
- Knowledge of the relevant parameters for transportation systems, including shared mobility

Skills

- Ability to locate some particular transportation service in the general map of transportation services according to its relevant features
- Combining the relevant data in order to set up a transportation model, including features for shared mobility

Social

- Manage work tasks in working groups
- Interacting with external partners

Autonomy

- Collecting the relevant information about transportation services
- Collecting the relevant data to set up a transportation model (demand, network), including features for shared mobility
- Distilling key facts of scientific studies and interpreting them

Content

1. Flavors of shared mobility on a scale between motorized individual traffic and public transport
2. How selected types of shared mobility emerge from the past towards future
3. Stakeholders in shared mobility (operators, authorities, users)
4. Commercial aspects of mobility
5. Quality aspects of mobility
6. Recent scientific studies regarding shared mobility
7. Selected methods for managing mobility
8. Aggregator companies to consolidate billing of users (optional)
9. Case study

Compulsory literature

Suggested literature

- Matthias Finger and Maxime Audouin, "The Governance of Smart Transportation Systems", Springer, https://doi.org/10.1007/978-3-319-96526-0
- Gereon Meyer and Susan Shaheen, "Disrupting Mobility", Springer, 2017, https://doi.org/10.1007/978-3-319-51602-8

Product Life Cycle Management

Module name			
Product Life Cycle Management			
Degree course Technical Management	Degree Master of Engineering		
Module responsible(s) Prof. Dr.-Ing. Marcus Ulrich Abramowski & Prof. Dr. rer. pol. Jens Wollenweber			
As of 2020-07-23	Language English		
Type Elective	Examination type KMP	CP according to ECTS 5	

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 1 / 1 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 1 / 1 / 0 / 0

Recommended prerequisites
Basics from Module “Models and Methods for Engineering and Management"
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	40,0 h	40,0 h	10,0 h	150 h

Product Life Cycle Management

Learning objectives

Knowledge

- Methods for product developments can be reflected
- Development of a target oriented ramp up stratey
- Reflection of the relationship between complex product development projects, product data management and ERp-Systems
- Deflect the complexity of the release strategy of configurable materials in the logistic chain

Skills

- Evaluate the use of PLM-System in different industry sectors
- Operate in product life cycle management projects
- Define the strategy for configuration- release and change management
- Implement PLM processes between CAD and ERP
- Reflect the use of document management systems

Social

- Integration in interdisciplinary teams
- To manage work tasks in working groups
- Moderation of decision meetings

Autonomy

- To develop internal project teams
- Take responsibility for integrated technical and IT decisions
- To analyze and evaluate learning and work processes
- To design and optimize learning and work

Product Life Cycle Management

Content

1. Product development strategies
2. Management methods (=> Collaborative Engineering, Simultaneous Engineering)
3. Methods for product development and construction
4. Product life cycle
   from the development until the “end of life"
5. Ramp up management
6. Product change management and release strategies
7. Configuration management
8. Product classification
9. Correlation between configuration- release and change management
   SAP Example with high product complexity
10. History of Product Data Management systems
11. Distinction CAD, DMU, Rapid Prototyping, PDM and PLM
12. PLM-Systems (Siemens / SAP)
13. Use of PLM-Systems
14. PLM system implementation
15. PLM in several Industries
    Food industry vs. discrete manufacturing

Compulsory literature

- Stark, J. (2015). *Product Lifecycle Management, Volume 1. 21st Century Paradigm for Product Realisation*. Springer International Publishing.
- Stark, J. (2016). *Decision Engineering*. Springer International Publishing.
- Saaksvouri, A. (2018). *Product Lifecycle Management*. Springer.
- Hirz, M. (2013). *Integrated Computer-Aided Design in Automotive Development*. Springer.
- Vila, C. (2009). *Project-Based Collaborative Engineering Design and Manufacturing Learning with PLM Tools*. Springer.

Suggested literature

Production Systems and Networks

Module name			
Production Systems and Networks			
Degree course Technical Management	Degree Master of Engineering		
Module responsible(s) Prof. Dr.-Ing. Marcus Ulrich Abramowski & Prof. Dr. rer. pol. Jens Wollenweber			
As of 2020-07-23	Language English		
Type Elective	Examination type SMP		CP according to ECTS 5

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 2 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 2 / 0 / 0 / 0

Recommended prerequisites
Basics from Module “Models and Methods for Engineering and Management" Basics from Bachelor-Studies: Basics in Production, Logistics and Quality Management
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	80,0 h	0,0 h	10,0 h	150 h

Production Systems and Networks

Learning objectives

Knowledge

- Decision management in companies can be reflected
- Development of new concepts and processes regarding horizontal and vertical integration of companies
- Decisions in site and structural matters of organisation networks
- Deflect challenges in SCM-Systems
- Understand modern management processes and the related management functions

Skills

- To manage and to solve complex problems in terms of virtual organisations
- Define business objectives
- Implement overall business processes (end to end) in IT-Systems
- Working in comprehensive and complex projects

Social

- To manage work tasks in working groups
- To perform simple management tasks

Autonomy

- To develop overall project teams
- Take responsibility for decisions and groups
- To analyze and evaluate learning and work processes
- To design and optimize learning and work

Production Systems and Networks

Content

1. Basics
   From Taylorism to Virtiual Factories / Production Strategies / Lean Production
2. Planning for Manufacture and Assembly I
3. Planning for Manufacture and Assembly II
4. Flexibility, Modularity and Transformability of Production Systems
5. Production Networks
6. Strategic Network Planning
7. Supply Chain Collaboration
8. Added Value in Cooperative Networks
9. Controlling of Production Networks
10. Coordinated product & supply chain design
11. Innovation and Upgrading in Supply Chains
12. Global Available to Promise
13. Software solutions for Production Networks
    From EDI to SCM-Systems
14. Digital Plant Planning and Simulation

Compulsory literature

- Ong, S. (2004). *Virtual and augmented reality applications in manufacturing*. London : Springer.
- Smith, H. & Fingar, P. (2007). *Business process management : the third wave* (4. anniversary ed.). Tampa, Fla. : Meghan-Kiffer Press.
- Hammer, M. & Champy, J. (2004). *Reengineering the Corporation : a manifesto for business revolution*. New York : HarperBusiness Essentials.
- Walker, W. (2005). *Supply chain architecture : a blueprint for networking the flow of material, information, and cash*. Boca Raton [u.a.] : CRC Press.
- Davim, P. (2018). *Progress in Lean Manufacturing*. Springer.
- Kirchmer, M. (1998). Business process oriented implementation of standard software. Berlin u.a.: Springer.
- Vollmann, T. (2004). *Manufacturing planning and control for supply chain management* (5, ed.). Boston, Mass. [u.a.] : McGraw-Hill.
- Walter, M. (2015). *Multi-Project Management with a Multi-Skilled Workforce*. Springer.

Suggested literature

Supply Chain Management

Module name			
Supply Chain Management			
Degree course	Degree		
Technical Management	Master of Engineering		
Module responsible(s)			
Prof. Dr. rer. pol. Jens Wollenweber & Prof. Dr.-Ing. Thorsten Brandes			
As of	Language		
2020-07-23	English		
Type	Examination type		CP according to ECTS
Elective	FMP		5

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 2 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 2 / 0 / 0 / 0

Recommended prerequisites
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	30,0 h	58,0 h	2,0 h	150 h

Supply Chain Management

Learning objectives

Knowledge

- Overview of contemporary concepts related to SCM
- IT applications and functions within the enterprise application architecture relevant for SCM purposes
- Aquisition of basic knowledge for the use of SCM functionality within SAP ERP

Skills

- Ability to select SCM concepts appropriate to challenges in an enterprise environment
- Ability to adapt and enhance SCM concepts according to business requirements
- Understanding of systems dynamics in supply networks

Social

- Ability to develop a road map for challenges given within a SCM context
- Ability to deliver a significant contribution in team work
- Ability to perceive individual agendas related to SCM projects

Autonomy

- Ability to develop a road map for challenges given within a SCM context

Content

1. SCM as a management concept vs. category of enterprise software
2. Subjects covered may include but are not restricted to:
   - Understanding of systems dynamics (e.g. by utilizing a management game)
   - Contemporary management concepts associated with SCM (MRP I, MRP II, VMI, SMI, CPFR, Pearl Chain, Postponement, Lean SCM etc.)
3. Subjects will be delivered by a combination of lectures and case studies; whenever possible the course will work on real life challenges from industry partners

Compulsory literature

- (o.D.). *Depending on specifics of case studies or real life projects within the individual semester*.

Suggested literature

System Dynamics in Production and Logistics

Module name			
System Dynamics in Production and Logistics			
Degree course Technical Management	Degree Master of Engineering		
Module responsible(s) Prof. Dr.-Ing. Gaby Neumann & Prof. Dr.-Ing. Thomas Masurat			
As of 2020-10-06	Language English		
Type Elective	Examination type KMP	CP according to ECTS 5	

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 2 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 2 / 0 / 0 / 0

Recommended prerequisites
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	28,0 h	60,0 h	2,0 h	150 h

System Dynamics in Production and Logistics

Learning objectives

Knowledge

- understand the needs for networked/system thinking
- understand chances and opportunities from scenario management

Skills

- model, analyse, manage complex socio-economic systems
- apply scenario management procedure, methods, tools for planning, managing and controlling implementation and launching of logistics systems
- make decisions in complex situations
- elaborate solid arguments to convince and motivate decision makers
- select the proper partners and then plan and coordinate the project to implement the solution

Social

- communicate conclusions, knowledge and final reasoning in front of specialist and non-specialist audiences clearly and unambiguously
- work collaboratively in a group

Autonomy

- face a new problem under a scientific perspective
- ability to learn enabling them to continue studying in a manner which is largely self-supervised or independent
- integrate knowledge and face the complexity of making judgements from incomplete or limited information
- reflect on the social and ethical responsibilities linked to the application of knowledge and judgements

System Dynamics in Production and Logistics

Content

1. Introduction: System Thinking in Logistics and Supply Chain Management
2. Scenario Management
   - 2.1 Introduction
   - 2.2 Scenario techniques
     - 2.2.1 Basics
     - 2.2.2 Preparation
     - 2.2.3 Scenario field analysis
     - 2.2.4 Scenario prognostics
     - 2.2.5 Scenario development
     - 2.2.6 Information based for scenario development
     - 2.2.7 Transfer of scenarios
3. System dynamics modelling and simulation
   - 3.1 Introduction, terminology, motivation for complex system thinking
   - 3.2 Structure and behaviour of dynamic systems - feedback as a problem
   - 3.3 Stocks and flows
     - 3.3.1 Causal loop diagrams
     - 3.3.2 Stocks, flows, and accumulation
     - 3.3.3 Dynamics of stocks and flows
   - 3.4 Modelling and simulation
     - 3.4.1 Steps of the modelling process
     - 3.4.2 Formulating a dynamic hypothesis
     - 3.4.3 Formulating a simulation model
     - 3.4.4 Validation and model testing
     - 3.4.5 Policy design and evaluation
   - 3.5 Dynamics of simple structures
     - 3.5.1 Path dependence and positive feedback
     - 3.5.2 Delays

Compulsory literature

Suggested literature

– Sterman, J. (2000). *Business Dynamics. Systems Thinking and Modeling for a Complex World*. Mc Graw Hill Education.

Transportation Technologies

Module name			
Transportation Technologies			
Degree course	Degree		
Technical Management	Master of Engineering		
Module responsible(s)			
Dr. Thomas Kopsch			
As of	Language		
2024-03-19	English		
Type	Examination type	CP according to ECTS	
Elective	SMP	5	

Study type	Semester	SWS	L / E / L / P / S
Full-time	2	4	2 / 2 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	2	4	2 / 2 / 0 / 0 / 0

Recommended prerequisites
- -
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
60,0 h	30,0 h	56,0 h	4,0 h	150 h

Transportation Technologies

Learning objectives

Knowledge

- Knowledge of relevant engine technologies
- Knowledge of emission calculation
- Understand and calculate emissions in certain usage scenarios
- Explain the role of different technologies in a worldwide context

Skills

- Describe, analyze and modify complex calculation schemes in a structured and directed manner
- Perform the transfer of various methods to new fields of application.
- Be able to direct the search for worldwide data sources and extract relevant information.
- Be able to structure a complex new task, divide it into subtasks and priorize these tasks.

Social

- Be able to work in teams, organize team work and manage a project team
- Be able to critically reflect and self-organize learning processes
- Be able to communicate in a team work context and to present results

Autonomy

- Be able to analyze and work on complex topics autonomously.
- Be able to speak freely about technical topics.
- Be able to adopt and assess critically specialized, advanced knowledge.

Content

1. Overview of engine technologies for cars, busses and trucks
   - 1.1 Combustion engines
   - 1.2 LNG engines
   - 1.3 Hydrogen engines
   - 1.4 Electric engines
2. Importance/dispersion of technologies, trends and future developments
   - 2.1 Worldwide market situation
   - 2.2 Trends related to engine technology
3. Emission situation
   - 3.1 Analysis of product lifecycle
   - 3.2 Emission analysis during driving situations
   - 3.3 Production emissions
4. Case study - use cases

Transportation Technologies

Compulsory literature
– Rodrigue, J., Comtois, C. & Slack, B. (2017). *The geography of transport systems* (Fourth edition). London ; New York : Routledge.
Suggested literature

Master's Colloquium

Module name		
Master's Colloquium		
Degree course Technical Management	Degree Master of Engineering	
Module responsible(s) Prof. Dr. rer. pol. Jens Wollenweber		
As of 2019-10-01	Language English	
Type Compulsory	Examination type SMP	CP according to ECTS 6

Study type	Semester	SWS	L / E / L / P / S
Full-time	3	0	0 / 0 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	3	0	0 / 0 / 0 / 0 / 0

Recommended prerequisites
Master's thesis
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
0,0 h	0,0 h	179,0 h	1,0 h	180 h

Master's Colloquium

Learning objectives

Knowledge

– Students can

– identify and present the main contents and results of their master thesis.
– apply technical and methodological knowledge to explain or justify their work.

Skills

– Students can
– prepare the essential contents and results of their master thesis in a structured, comprehensible and descriptive way in the form of a presentation.
– design the scope of the presentation according to the specified time fund.

Social

– Students can
– present the essential contents and results of their master thesis in a focused, comprehensible and understandable manner.
– answer specialist questions about your master's thesis and its methodological environment in a factual manner.
– discuss factual contexts.

Autonomy

– Students can
– critically reflect on their work, their approach and their results.

Content

1. Contents, procedure, results, findings of the master thesis

Compulsory literature

Suggested literature

Master's Thesis

Module name		
Master's Thesis		
Degree course Technical Management	Degree Master of Engineering	
Module responsible(s) Prof. Dr. rer. pol. Jens Wollenweber		
As of 2018-12-17	Language English	
Type Compulsory	Examination type SMP	CP according to ECTS 24

Study type	Semester	SWS	L / E / L / P / S
Full-time	3	0	0 / 0 / 0 / 0 / 0
Study type	Semester	SWS	L / E / L / P / S
Part-time	3	0	0 / 0 / 0 / 0 / 0

Recommended prerequisites
Special regulations

Workload breakdown				
Presence	Self-study	Projects	Exam	Total
0,0 h	0,0 h	720,0 h	0,0 h	720 h

Master's Thesis

Learning objectives

Knowledge

Skills

- Students can conduct scientific work in accordance with established scientific standards.

Social

- Students are empowered to indenpendently work on a conrete problem, which as far as possible corresponds to their personal interest, and develop their own solutions. The
  offered and chosen topics should reflect on current problems and focus on practical applications.

Autonomy

- Students will work on their master's thesis for a restricted time period of 20 weeks during their third semester. The master's thesis is part of the academic record. Students demonstrate their ability to independently work on a specific problem within their fields of study according to established scientific standards.

Content

1. Tasks, problems and actions in science and practice

Compulsory literature

Suggested literature