

Module Handbook Master's Program (M.Sc.)

Digital Factory and Operational Excellence

Digital Factory and Operational Excellence

Full-time / Part-time

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Glossary

BP	Internship
BS	Block seminar
ECTS	European Credit Transfer System
BL	Blended learning
GA	Group work
GBWL	Fundamentals of Business Administration
HA	Term paper
KO	Colloquium
KR	Short presentation
LN	Performance record
CP	Performance point
LVA	Course
LVF	Course form
MoP	Module examination
mP	Oral examinations
PA	Project work
PL	Practice-oriented courses
PR	Presentation
PZ	Presence time
R	Department
S	Seminar
SK	Language courses
SoSe	Summer semester
SP	Study Plus
sP	Written examinations
SPJ	Study project
SSt	Self-study
SHW	Semester hours per week
UE	Exercise
VL	Lecture
VWL	Economics
WiSe	Winter semester
WL	Workload

Introductory information on studying at the HDBW

Objective	Students are able to deal with a topic in a conceptually comprehensive and in-depth manner and to apply the theoretical knowledge gained from this to a practical issue
Information possibilities	Prospective students can obtain basic information about the content of the degree program, the structure of the degree program, the course of study, application and examination matters at www.hdbw-hochschule.de . Subject-specific study counselling, in particular with regard to the contents of the degree program and elective options, is provided by the subject counsellors of the respective departments.
Study and examination regulations	Knowledge of and compliance with the regulations of the examination regulations is mandatory for a successful course of study. Examination regulations are available for download at www.hdbw-hochschule.de .
Lecture language	The lectures can be offered in German or English. For this purpose, a language level of B2 or adequate proof must be provided by the student.
Study structure Modules Teaching content Courses	The degree program in full-time mode is designed for a standard study period of 3 semesters, in part-time mode of 5 semesters (recommended study plan). Each module consists of one or more courses (lectures, seminars, exercises, etc.). These include compulsory and elective courses. Detailed descriptions of the module and course contents can be found in the module handbook of the respective degree program.
Credit points / Workload	The Master's degree program comprises 90 ECTS points. Credit points (CP) are awarded for the workload associated with each module according to the European Credit Transfer System (ECTS). The general rule is: 30 hours of WL = 1 CP. Each module is completed by a module examination (MoP), which consists of course-related certificates of achievement (LN). LNs are usually graded. A performance is considered to have been passed if it has been assessed with at least the grade 4.0. For the final module, 20 CP are awarded (18 for the Master's thesis and 2 for the defence). Detailed descriptions of the required units per module can be found in the module handbook of the respective degree program. Regulations on the forms of examination can be found in the study and examination regulations of the respective degree program. The workload in full-time study is approx. 900 hours (30 ECTS per semester). Part-time students must choose from 3 to a maximum of 6 modules per semester. Thus, it is possible to complete the course between 3 and 6 semesters as a part-time student. The displayed curriculum shows a recommendation over 5 semesters.
Lecture and examination period	The lecture period comprises 16 weeks. The winter semester (WiSe) usually begins at the beginning of October. The summer semester (SoSe) usually begins in mid-March. The examination period takes place from the 16th to the 18th week of lectures (1st examination date). Also examinations can be take place during the semester period. This will be announced at the beginning of each semester.
Crediting of periods of study and practical activities	The examination board is responsible for the recognition of periods of study and practical activities.
Examinations and Repetition Exams	Students are automatically registered for the examinations of the respective semester. Deregistrations are to be addressed to the program administration.

Content of the study program

The *Digital Factory and Operational Excellence* program is designed as a consecutive Master's program in the field of industrial engineering. Students learn fundamental analysis and design options in production, logistics and the entire supply chain. In addition to optimization methods of lean production, the focus is also on digital applications of factory planning, business management methods of labour sciences as well as investment and decision theory.

The digitalisation of the value chain (Smart Logistics, Big Data, process simulation, Industry 4.0) is to be integrated into the subject area as part of the technology lectures.

The students learn a comprehensive view of value chains from a business management, information technology and process perspective.

The degree awarded is the Master of Science (M.Sc.).

The Master's program is assigned to the profile type "application-oriented". The basic content of this degree program is the combination of information technology, entrepreneurial process flows along the value chain and business analysis and evaluation methods. The focus is on modern factory and process design in the context of industrial engineering in national and international production and logistics networks.

Therefore, the degree program includes the following qualification objectives:

1. The students know the components and action dimensions of factory design, planning and optimization.
2. The students are familiar with classical analysis and design methods as well as digital tools for planning and optimising production and logistics areas (programming, simulation, Industry 4.0).
3. Students can develop strategies in the international production network and supply chain and evaluate them on the basis of key figures.
4. Students will be able to apply the methods of Lean Management / Lean Production as well as other leadership methods.
5. The students know the business and legal basics of investment theory and work science.
6. The students know the terminology of business intelligence, big data and the associated information technology applications as well as basics of cyber security.
7. Students learn the specifics of international and intercultural project work.
8. The students have an application-oriented understanding of the aspects listed in 1.-7. and are able to implement them independently as employees in responsible positions in production and logistics.

Design and structure of the study program

The Master's program *Digital Factory and Operational Excellence* comprises 90 ECTS points with a total workload (WL) of 2.700 hours.

The study program consists of three subject blocks "Management, Leadership and Strategy", "Industrial Engineering, Production and Value Creation Design" and the associated "Information Technologies". The courses are application-oriented. All courses follow a clear pattern in their didactic concept:

1. In each course, the relevant theoretical-conceptual basics of the respective subject are first taught on the basis of the current state of science and practice.
2. By means of practice-oriented course components (e.g. speakers from the field, case study discussion), an application-oriented basic understanding is created.
3. All courses are interactive and include assessed or non-assessed project work components of varying degrees. Since this is the philosophy of the entire, application-oriented Master's program and of each course, an explicit separation between lectures and exercises was deliberately avoided.
4. Corresponding project work should support the connection between theoretical knowledge and practical relevance.

Master's thesis

The degree program concludes with a Master's thesis, in the context of which students should demonstrate that they are able to deal with a topic in a conceptually comprehensive and in-depth manner and apply the theoretical knowledge gained to a practical business issue. Therefore, the preparation of the Master's thesis consists of the following components:

1. The independent preparation of a Master's thesis of up to 80 pages (without index and appendix).
2. The defence and presentation of the results of the Master's thesis with an examination discussion, in the context of which the contents of the Master's thesis are also placed in connection with other contents of the degree program. The duration shall not exceed 10 minutes. The total duration of the defence shall not exceed 30 minutes.

This Master degree program can be pursued on a full-time or part-time basis.

The following figure provides an overview of the structure of **full-time studies (FT)**:

Full-Time - Master Degree Course: Digital Factory and Operational Excellence (90 ECTS)					
1. Semester (Analysis, Business Processes, Production Strategy, Project Management)					
Business Analysis and Optimization Processes (5 ECTS / 4 SHW)	Production Strategy and Manufacturing in Global Networks (5 ECTS / 4 SHW)	Business Planning, Finance and Entrepreneurship (5 ECTS / 4 SHW)	Work Science (5 ECTS / 2 SHW)	Big Data, Analytics, Business intelligence (5 ECTS / 4 SHW)	Agile Project Management in International Project Teams (5 ECTS / 2 SHW)
2. Semester (Optimization, Digital Supply Chain, Performance Management)					
Lean Production and Production Optimization (5 ECTS / 4 SHW)	Global Supply Chain Management, Risk Management, Global Procurement Sourcing (5 ECTS / 4 SHW)	Employee Management and Change Management (5 ECTS / 4 SHW)	Decision Theory and Key Performance Indikator Development (5 ECTS / 4 SHW)	Digital Value Chain and Smart Logistics (5 ECTS / 4 SHW)	Project Work (5 ECTS / 2 SHW)
3. Semester (Planning, Data Management, Master Thesis)					
Digital Factory Planning and Process Simulation (5 ECTS / 4 SHW)	Introduction to Cyber Security (5 ECTS / 4 SHW)	Master's Thesis and Final Examination (20 ECTS)			

Management, Leadership, Strategy
Industrial Engineering / Production Management
Information and Data Management
Project Work / Project Management

bold: block week (presence)

SHW semester hours per week
ECTS European Credit Transfer and Accumulation System

Courses held in block weeks could change. The number per semester can also be varied.

The following figure provides a recommended overview of the structure of **part-time studies (PT)**:

Part Time - Master Degree Course Digital Factory and Operational Excellence (90 ECTS)			
1. Semester (Analysis, Project Management)			
Business Analysis and Optimization Processes (5 ECTS / 4 SHW)	Agile Project Management in International Project Teams (5 ECTS / 2 SHW)	Work Science (5 ECTS / 2 SHW)	Big Data, Analytics, Business intelligence (5 ECTS / 4 SHW)
2. Semester (Optimization, Digital Supply Chain)			
Lean Production and Production Optimization (5 ECTS / 4 SHW)	Project Work (5 ECTS / 2 SHW)	Employee Management and Change Management (5 ECTS / 4 SHW)	Digital Value Chain and Smart Logistics (5 ECTS / 4 SHW)
3. Semester (Business Processes, Production Strategy, Planning)			
Digital Factory Planning and Process Simulation (5 ECTS / 4 SHW)	Production Strategy and Manufacturing in Global Networks (5 ECTS / 4 SHW)	Business Planning, Finance and Entrepreneurship (5 ECTS / 4 SHW)	Introduction to Cyber Security (5 ECTS / 4 SHW)
4. Semester (Supply Chain, Performance Management)			
Global Supply Chain Management, Risk Management, Global Procurement Sourcing (5 ECTS / 4 SHW)	Decision Theory and Key Performance Indikator Development (5 ECTS / 4 SHW)		
5. Semester (Master Thesis)			
Master's Thesis and Final Examination (20 ECTS)			

Management, Leadership, Strategy
Industrial Engineering / Production Management
Information and Data Management
Project Work / Project Management

bold: block week (presence)

SHW
ECTS

semester hours per week
European Credit Transfer and Accumulation System

Part-time students must choose from 3 to a maximum of 6 modules per semester. Thus, it is possible to complete the course between 3 and 6 semesters as a part-time student. The displayed curriculum shows a recommendation over 5 semesters.

Courses held in block weeks could change. The number per semester can also be varied.

Course forms

Lectures* (VL)

Lectures serve to convey theoretical knowledge, which is usually supplemented by exercises or laboratory instruction. Associated lecture notes and slides can be made available to students online on the corresponding platform. Lectures usually end with an examination. The type of examination is determined by the respective lecturer.

Seminars* (S) and Block Seminars* (BS)

Seminars are interactive teaching events in which various topics and teaching content are worked on together in small groups. Components of the cooperation are, for example, exercises, discussions and presentations. Seminars conclude either with the writing of a paper, the completion of an assignment or a written examination. Active participation is required for successful completion of the course. Block seminars use the same teaching methodology as seminars. In contrast to normal seminars, however, block seminars usually comprise a workload of 8 hours and take place on fixed days.

Exercises* (UE)

Exercises mainly serve to support lectures. Depending on the module, they can also be offered without an associated lecture. Theoretical knowledge is repeated and consolidated through exercises. Active participation is required for successful completion of the course.

Practice-oriented courses* (PL)

Practice-oriented courses serve to acquire subject-specific application knowledge and key qualifications. As a rule, they include the same teaching methods as seminars and exercises. In addition, they can take the form of excursions, workshops and trainings.

Study Project* (SPJ)

Study projects are courses with an increased workload. They are carried out, for example, within the framework of a research project or group work and promote, in particular, the independent application of typical research methods, which is why they often also serve to identify topics for final theses. Study projects are implemented in the sense of self-study and therefore generally do not require fixed attendance times.

Self-study (SSt)

Self-study serves the independent preparation and follow-up of lectures and is required for all modules.

Colloquium (KO)

Colloquia usually comprise interactive discussion rounds within which topics are lectured and presented. They always take place in a classroom setting. They often serve to support the preparation of the Bachelor's thesis during the completion of the degree.

Learning Management System (LMS)

The learning management system (LMS) is an electronic, web-based system that presents course content in structured form on a platform and provides teachers and participants with interactive functions for collaborative work. It includes participant administration, document management, performance measurement functions, calendar functions and the possibility to integrate interactive learning units. Further information on the LMS can be obtained from the student advisory service of the respective department.

All course forms marked with * are offered in the didactic concept of blended learning (BL). Blended learning events serve to present and work on larger areas of material, which is why they also take place as part of lectures and often as a supplement to exercises. However, they also serve to deepen theoretical content with case studies and exercises. Blended learning events include all teaching methods in the form of both face-to-face and virtual events. Various learning materials such as scripts and tutorials as well as audios and videos can be made available to participants via the learning management system (LMS). The detailed description of the course of instruction as well as the dates for the classroom events are made available at the beginning of the respective semester in the LMS and at the responsible subject advisory service. Throughout the current semester, the tutors are available to answer questions regarding content and organisation.

Examination

Module examination (MoP)

Each module can be composed of one or more courses (LVA). There is one module examination (MoP) per module, which can comprise the components of one or more LVA. The MoP can consist of different certificates of achievement (LN). These can be of a course-related nature or be completed during the examination period at the end of the semester. The module grade is calculated from the performance achieved in the MoP according to the scheme announced at the beginning of the module. The following forms of examination can be taken as an LN within the framework of the MoP (the prescribed form of examination can be found in the handbook for the respective modules):

Written examinations (sP)

Written examinations usually take place at the end of the semester. They are usually set and assessed by the lecturers of the corresponding courses. For written examinations, the student ID card including an official ID card with photo must generally be carried along.

Oral examinations (mP)

Oral examinations take place either in individual discussions or in the form of groups. Depending on the importance of the examination, they cover different periods of at least 15 and a maximum of 60 minutes. They usually take place towards the end of the semester.

Term paper / Case Studies (HA)

Term papers are written elaborations on a topic agreed upon with the responsible lecturer. They can be between 5 and 25 DIN-A 4 pages long. The processing time for homework is a maximum of four weeks, but can be extended for individual modules. The deadline will be announced accordingly in the respective lecture.

Unit (R)

Presentations are oral examinations in which a topic previously agreed upon with the responsible teacher is presented to the fellow students of the course. The content should be scientifically researched. All theses of the presentation should be summarised on a thesis ball for the fellow students. The duration of a presentation is between 20 and 45 minutes, depending on the agreement with the responsible lecturer. Presentations can also be prepared and held in groups. It is usually supplemented by a written elaboration in the form of a term paper.

Short presentation (KR)

Short presentations differ from papers only in terms of length: they are no longer than 10 minutes. All other aspects are the same.

Presentation (PR)

Presentations can be made either as an individual performance or in the form of group work. The results of the work are presented to the fellow students and the head of the corresponding course. In contrast to the presentation, the presentation is more comprehensive in content, methodology and presentation.

Project work (PA)

Project work can be done as a term paper or as a presentation. The topic of the project work is determined in advance with the responsible teacher or lecturer. Project work can be carried out either as an individual performance or in the form of group work.

A combination of more than one examination per lecture is possible.

Literature

The lecturer of the respective course determines which accompanying literature is required before the start of the semester. This information is announced at the beginning of the course or via the Moodle. Further supporting materials (e.g. scripts, exercises, lecture slides, etc.) will be made available in good time via the Moodle and this handbook.

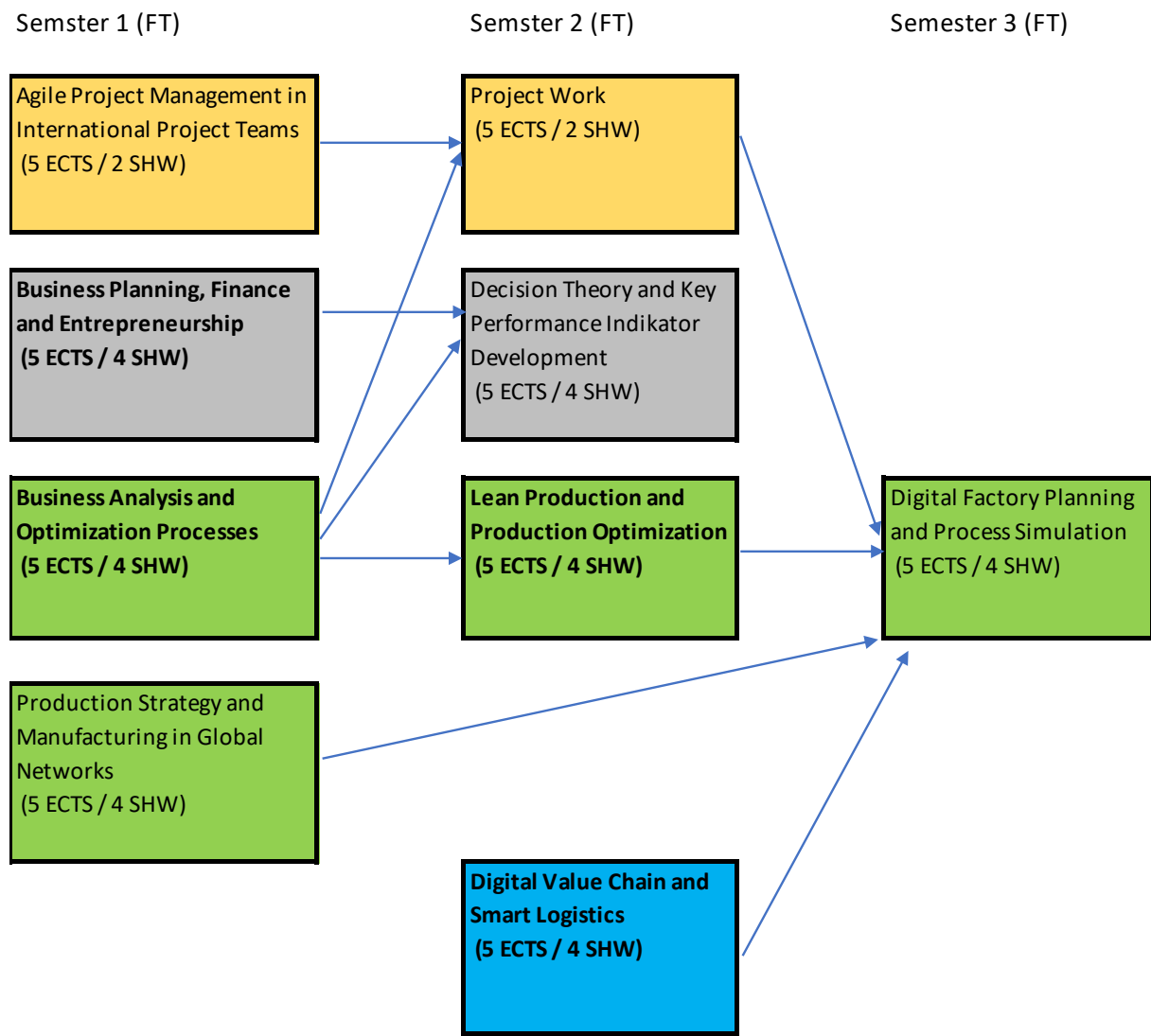
Module overview

MoNo.	Course / Module	Lectures	SHW	Exam	ECTS	Sem (FT)	Sem (PT*)
DFOE01	Business Planning, Finance and Entrepreneurship			sP 60-120 min or mP 15-30 min or PR 15-30 min	5	1	3
DFOE01	Business Planning, Finance and Entrepreneurship	VL/UE	4				
DFOE02	Business Analysis and Optimization Processes			sP 60-120 min and PA 5-10 P.	5	1	1
DFOE02	Business Analysis and Optimization Processes	VL/UE	4				
DFOE04	Big Data, Analytics, Business Intelligence			PA 10-20 P. and PR 10-30 min	5	1	1
DFOE04	Big Data, Analytics, Business Intelligence	VL/UE	4				
DFOE16	Work Science			sP 60-120 min and PA 20-30 P.	5	1	1
DFOE16	Work Science	VL/UE	4				
DFOE11	Agile Project Management in International Project Teams			PA 10-30 P. and PR 20-40 min	5	1	1
DFOE11	Agile Project Management in International Project Teams	VL/SPJ	2				
DFOE17	Production Strategy and Manufacturing in Global Networks			sP 60-120 min or mP 15-30 min or PR 15-30 min	5	1	3
DFOE17	Production Strategy and Manufacturing in Global Networks	VL/UE	4				
DFOE10	Employee Management and Change Management			sP 60-120 min or mP 15-30 min or PR 15-30 min	5	2	2
DFOE10	Employee Management and Change Management	VL/UE	4				
DFOE07	Lean Production and Production Optimization			sP 60-120 min or mP 15-30 min or PR 15-30 min	5	2	2
DFOE07	Lean Production and Production Optimization	VL/UE	4				
DFOE09	Digital Value Chain and Smart Logistics			sP 60-120 min or (PA 20-40 S. and PR 20-40 min)	5	2	2
DFOE09	Digital Value Chain and Smart Logistics	VL/UE	4				
DFOE12	Project Work			PA 20-40 P. and PR 20-30 min	5	2	2
DFOE12	Project Work	SPJ	2				
DFOE03	Global Supply Chain Management, Risk Management, Global Procurement Sourcing			sP 60-120 min or mP 15-30 min or PR 15-30 min	5	2	4
DFOE03	Global Supply Chain Management, Risk Management, Global Procurement Sourcing	VL/UE	4				
DFOE14	Decision Theory and Key Performance Indicator Development			sP 60-120 min or mP 15-30 min or PR 15-30 min	5	2	4
DFOE14	Decision Theory and Key Performance Indicator Development	VL/UE	4				
DFOE08	Digital Factory Planning and Process Simulation			sP 60-120 min or (PA 15-30 P. and PR 15-30 min)	5	3	3
DFOE08	Digital Factory Planning and Process Simulation	VL/UE	4				
DFOE15	Introduction to Cyber Security			sP 60-120 min or (PR 10-20 min and mP 10-20 min)	5	3	3
DFOE15	Introduction to Cyber Security	VL/UE	4				
DFOEMT	Master's Thesis						
DFOEMT1	Master's Thesis	SSt		HA 70-120 P.	18	3	5
DFOEMT2	Final Examination	mP		mP 15-30 min	2		

Recommended sequence of core modules

Certain study modules (core modules) build on each other in terms of subject matter. These are recommended in the sequence as illustrated.

The study plan is structured according to this sequence (for full-time students as well as for part-time students).



The remaining modules can be taken flexibly.

Module descriptions

Business Analysis and Optimization Processes	
Module number	DFOE2
Subject area	Industrial Engineering
Semester (FT)	1
Semester (PT)	1
Duration	1 semester
Person responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Prof. Dr. Matthias Pfeffer / Prof. Dr. Florian Egger / Patrick Eichenseer, Msc
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2 SHW) & UE (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	This course provides an insight into classical and modern business analysis and optimization methods. In the process, students learn how different sources of success affect the company. The student learns different types of business analysis as well as computational procedures for optimising business processes.
Liability	Mandatory
Module content	<p>In this module, students learn about various mathematical and quantifiable influencing factors for business analysis and evaluation. The aim is to identify sustainable operational successes in order to give them priority in the optimisation process.</p> <p>The following knowledge is imparted during the course:</p> <ul style="list-style-type: none"> • Optimisation basics • Insight into optimisation techniques based on general business analytics and operations research methods • Mathematical and statistical analysis methods • Forecasting methods • Basics of production analysis • Production and Logistics-related analysis and optimization methods • Quantification improvement potentials and derivation optimization measurements • Financing theory models • Profit and loss analysis • Balance sheet analysis
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> - Pakdil, Fatma: Six Sigma for Students, Springer, 2020 - Lunau, Stephan (Ed.): Six Sigma+Lean Toolset, Springer, 2013 - Cadle, James; Paul, Debra and Turner, Paul: Business Analysis Techniques, BCS, 2014

	<ul style="list-style-type: none"> - Muralidharan, K.: Six Sigma for Organizational Excellence, Springer, 2015 - Whittington, Richard et. al: Exploring Strategy, Pearson, 2020 - Hoshmand, Reza A.: Business Forecasting, Routledge, 2009 - Weber, J./ Schäffer, U.: Introduction to Controlling, Schäffer Poeschel, 2015
Other Information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Business Planning, Financing and Entrepreneurship	
Module number	DFOE1
Subject area	Management, Leadership, Strategy
Semester (FT)	1
Semester (PT)	3
Duration	1 semester
Person responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Prof. Dr. Jost Jacoby
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2 SHW) & UE (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	The students understand the essential entrepreneurial planning and control instruments of companies and can deal with them. In particular, the start-up of technology-oriented companies is addressed in order to understand the essential elements of corporate financing and financial planning and control and to try them out in an application-oriented manner. Students should be able to develop a business plan for a technically oriented company.
Liability	Mandatory
Module content	<p>The following knowledge and skills are taught during the course:</p> <ul style="list-style-type: none"> - The Strategic Management Process (Analysis, Strategy, Implementation, Controlling) - Basics of setting up a business: success factors, management, product, processes, market access - Innovation: identification, formulation, implementation - Definition and sources of USP (Unique Selling Proposition) - Discovery and creation of business opportunities - Business model development - Business planning - Market entry and positioning - Resourcing and growth - Foundation and participation options - Funding instruments and sources - Financing, cash flow and balance sheet planning - Financial control and optimization <p>Discussion of best practices as well as processing of group and case study work to teach application competence</p>
Literature	<ul style="list-style-type: none"> - Brealey R., Myers S., Allen F. : Principles of Corporate Finance, McGraw Hill, 2014 - Tse, T.: Corporate Finance, The Basics, Taylor & Francis 2017 - Smith R. : Entrepreneurial Finance, Stanford Books, 2019 - Lerner, J.: Venture Capital, Private Equity and the Financing of Entrepreneurship, Wiley 2012 - Abrams, R.: Successful Business Plan, Secrets & Strategies, Planning Shop, 2010 - Barringer, B.: Preparing Effective Business Plans, Pearson 2015

	<ul style="list-style-type: none"> - Berry, T.: Hurdle, the Book on Business Planning, Palo Alto Software, Inc, 2006 - Evans, V.: (Financial Times Essential Guide to) Writing a Business Plan, FT Press, 2010 - Finch, B.: How to write a Business Plan, Kogan Page, 2019 - Pinson, L.: Anatomy of a Business Plan, Out of Your Mind & Into The Marketplace, 2013 - Shelton, H. : The secrets to writing a successful business plan, Summit Valley, 2014 - Bauerle, J.: Accounting Quick Start Guide, ClydeBank, 2018 - Piper, M.: Accounting made simple, Simple Subjects 2010 - Piper, M.: Corporate finance made simple, Simple Subjects 2020
Other information	The preparation of a business plan can be part of the examination performance.
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	Digital Business Modelling and Entrepreneurship (MA)
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Big Data, Analytics, Business Intelligence	
Module number	DFOE4
Subject area	Information and Data Management
Semester (FT)	1
Semester (PT)	1
Duration	1 semester
Responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Prof. Dr. Jianmin Chen / Dipl.-Ing. Stefan Aigner
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2 SHW) & UE (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	Students have an understanding of the basic concepts of business intelligence, business analytics and data management. They have the ability to generate meaningful, business-relevant information from "raw data" and understand methods for evaluating big data. The students develop an understanding of which problems can be tackled with business intelligence/big data/data analytics and which tools and methodological approaches are available to solve them. They are able to select and manage these and evaluate the results.
Liability	Mandatory
Module content	<p>Students learn the basics of Business Intelligence, Business Analytics and Data Management in this module. They develop an understanding of interrelationships and can transform raw data into meaningful information.</p> <p>The following knowledge is imparted in the course:</p> <ul style="list-style-type: none"> • Basic terms • Business environment • Integrated overall approach • Connection with corporate goals • Database concepts • Data warehouse concept • Methods Business Analytics • Introduction into Artificial Intelligence • R Programming • Statistical methods and algorithms
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> - Lantz, B.: Machine Learning with R"; 3. Auflage; Packt Birmingham 2019 - Walkowiak, S.: Big Data Analytics with R; Packt Birmingham 2016 - Juretig, F.: R Statistics: Cookbook; Packt Birmingham 2019 - Fischetti, T.: Data Analysis with R; 2. Auflage, Packt Birmingham 2018 - Wickham, H.; Grolemund, G.: R für Data Science; 1. überetzte Auflage; dpunkt.verlag 2018 - Nwanganga, F.; Chapple, M.: Practical Machine Learning in R; John Wiley and Sons, Inc. 2020

	<ul style="list-style-type: none"> - Bruce, P.; Bruce, A.; Gedeck, P.: Praktische Statistik für Data Scientists - 50+ essentielle Konzepte mit R. 2. übersetzte Auflage; dpunkt.verlag 2021 - Francois, Ch.; Allaire, J. J.: Deep Learning mit R und Keras - Das Praxis-Handbuch; mitp Verlag 2018 - Krispin, R.: Hands-On Time Series Analysis with R: Perform time series analysis and forecasting using R; Packt Birmingham 2019 - Jeyaraman, B. P., Olsen, L. R., Whambugu, M.: Practical Machine Learning with R: Define, build, and evaluate machine learning models for real-world applications; Packt Birmingham 2019
Other information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	Digital Business Modelling and Entrepreneurship (MA); Cyber Security (MA)
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Work Science	
Module number	DFOE16
Subject area	Management, Leadership, Strategy
Semester (FT)	1
Semester (PT)	1
Duration	1 semester
Person responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Dipl.-Ing. Matthias Miesbeck
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2*1 SHW) + UE (2*1 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	In this course, students learn about approaches and procedures in labour sciences. They can analyse and critically question these. Furthermore, they know methods for planning, designing and evaluating work systems and can implement different forms of work organisation and concepts of ergonomics. This module also teaches the basic knowledge of labour law and how to apply labour law options as a manager.
Liability	Mandatory
Module content	In this course, students are taught the basics of labour science. They learn to apply various concepts and models in practice. Furthermore, an insight into the legal framework is guaranteed. The following knowledge is imparted during the course: <ul style="list-style-type: none"> • Fundamentals of work science • Ergonomics in the workplace • Work organisation • Designing change processes • Understanding of human information reception, processing and implementation • Communication management • Assessment of measurement and evaluation methods • Time management and time recording (e.g. REFA, MTM) Additionally it can also be included the basics of labour law.
Literature	A final literature selection is made by the respective lecturer. - Schick, Christopher/ Bruder, RaCPh/ Luczak, Holger: Arbeitswissenschaft, Springer, 2018 - Bodyspace Anthropometry, Ergonomics and the Design of Work, Third Edition - CRC Press 2018 - Stephen Pheasant, Christine M. Haslegrave - Handbook of Standards and Guidelines in Human Factors and Ergonomics, Second Edition - CRC Press 2021 - Anna Szopa, Marcelo M. Soares, Waldemar Karwowski - Optimization of Manufacturing Processes - Springer International Publishing 2019 - Kapil Gupta, Munish Kumar Gupta

Other information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Agile Project Management in International Project Teams	
Module number	DFOE11
Subject area	Project Management / Project Work
Semester (FT)	1
Semester (PT)	1
Duration	1 semester
Person responsible for the module	Prof. Dr Matthias Pfeffer
Lecturer(s)	Prof. Wolfgang Decker
Frequency of offer	Each academic year
SHW / LVF	2 SHW: VL (2 SHW)
Workload (WL)	150h
LP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	<p>The course aims to equip students with a comprehensive understanding of the nature of complex agile projects.</p> <ul style="list-style-type: none"> • Grasp the Dynamics of International Projects: Understand the intricacies of project dynamics in the context of complex international projects. • Acknowledge the Cultural Dimensions of Global Teams: Gain insights into the cultural aspects of working in international environments, leveraging models like Hofstede's, and the importance of cultural sensitivity in ensuring project success. • Comprehend the Agile Framework: Develop a foundational understanding of Agile methodologies, their application in software projects, and the roles and responsibilities within agile teams. • Navigate Large Scale Agile Implementations: Delve into the nuances of scaling agile practices in large organizations, with a focus on models like the "Spotify Model", and the challenges and benefits associated with them. • Understand the concept of technical debt, its implications on project timelines and quality, and strategies to manage and mitigate it effectively. • Gain a preliminary understanding of Design Thinking and DevOps, and how they complement agile practices, especially in the context of international teams. • Engage in hands-on activities and case studies to apply theoretical knowledge to real-world scenarios, fostering adaptability, problem-solving skills, and cross-cultural communication proficiency.
Liability	Mandatory
Module content	<p>The following knowledge is imparted during the course:</p> <p>Setting the Stage for International Agile Projects</p> <ul style="list-style-type: none"> • Delving into the intricacies of project dynamics, such as the rework loops or the impact of overtime. • Introducing Hofstede's model and the importance of cultural sensitivity in international agile projects.

	<ul style="list-style-type: none"> Emphasizing the importance of effective communication in conveying the value and challenges of agile methodologies in global settings. <p>Diving into Software and Agile Frameworks</p> <ul style="list-style-type: none"> Laying the foundational understanding of the software development life cycle and its challenges. Exploring the principles, benefits, and challenges of Agile, with a focus on Scrum and other frameworks. <p>BPMN and Roles in Agile Teams</p> <ul style="list-style-type: none"> Introducing the Business Process Model and Notation and its relevance in agile projects. Understanding the roles and responsibilities within agile teams, including Scrum Master, Product Owner, and Development Team. <p>Scaling Agile and Addressing Technical Challenges</p> <ul style="list-style-type: none"> Delving into the Spotify model and understanding how to adapt it to different organizational contexts. Addressing the concept of technical debt, its implications, and strategies for effective management. <p>Complementary Approaches and Agile Architectures</p> <ul style="list-style-type: none"> Gaining insights into how these concepts complement agile practices in international settings. Understanding the importance of flexibility, scalability, and maintainability in agile architectures. <p>Practical Application and Course Conclusion</p> <ul style="list-style-type: none"> Hands-on activities and simulations to foster adaptability and problem-solving skills. Providing real-world scenarios for students to apply their knowledge and insights.
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> Darja Smite, Nils Brede Moe, Viktoria Stray, "Integrating Agile with an Offshore Strategy", 2018 (via https://leanpub.com). Geoff Watts, "Scrum Mastery: From Good to Great Servant-Leadership", 2013 Mark C. Layton, "Agile Project Management for Dummies", 2012 Jez Humble and David Farley, "Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation", 2010 Eric Ries, "The Lean Startup", 2011 Lyssa Adkins, "Coaching Agile Teams: A Companion for Scrum Masters, Agile Coaches, and Project Managers in Transition", 2010
Other information	This course should be completed before the project work.
Prerequisite Award of LP	Passed MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final

	examination. As a rule, the weighting corresponds to the share of the LP (ECTS) in the total number of 90.
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Production Strategy and Manufacturing in Global Networks	
Module number	DFOE17
Subject area	Industrial Engineering
Semester (FT)	1
Semester (PT)	1
Duration	1 semester
Responsible for the module	Prof. Dr Matthias Pfeffer
Lecturer(s)	Dipl.-Ing. Ralf Puehler / Prof. Dr. Matthias Pfeffer
Frequency of offer	Each academic year
SHW / LVF	4 SHW: VL (3 SHW) + UE (1 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	In this course, students are taught competences for strategy development, especially for production and location strategy in international networks. They know different methods and instruments for the development of a holistic production strategy and learn to implement them in practice. Furthermore, operational and strategic optimization strategies for production and logistics are developed.
Liability	Mandatory
Module content	<p>In this module, students learn how to develop production strategies in international company networks. They know different planning and control strategies as well as the complexity of international cooperation.</p> <p>The following knowledge is to be imparted in the course:</p> <ul style="list-style-type: none"> • Planning and control strategies in international corporate networks • Methods of analysis • Benchmarking • Fundamentals of international production networks • Fundamentals of strategic management • Development of production and logistics strategies • Implementation of strategies • Development of a Global Footprint • Basics of performance measurement systems in production networks
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> - "Global Operations and Logistics: Text and Cases" by A. Ravi Ravindran and Donald Warsing (Latest Edition: 2014) - "Global Operations Strategy: Fundamentals and Practice" by Günter Prockl and Ralf W. Seifert (Latest Edition: 2017) - "The Handbook of Global Outsourcing and Offshoring" edited by Ilan Oshri, Julia Kotlarsky, and Leslie P. Willcocks (Latest Edition: 2015) - "Global Production Networks: Operations Design and Management" by Ander Errasti, Alvaro Pina-Stranger, and Jose Ignacio Alarcon (Latest Edition: 2019) - "Global Production: Firms, Contracts, and Trade Structure" by Pol Antràs and Elhanan HeCPman (Latest Edition: 2018)

	- Abele, Eberhard / Meyer, Tobias / Näher, Ulrich / Strube, Gernot / Sykes, Richard: Global Production, Springer 2008
Other information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Employee Management and Change Management	
Module number	DFOE10
Subject area	Management, Leadership, Strategy
Semester (FT)	2
Semester (PT)	2
Duration	1 semester
Responsible for the module	Prof. Dr Matthias Pfeffer
Lecturer(s)	Dr. Barto Korpak
Frequency of offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (3 SHW) + UE (1 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	<p>The students master the internationally established basic knowledge of relevant problem areas, instruments and theories of personnel management and organisational design. They know the essential management-related task fields of personnel departments including the instruments of personnel development, personnel assessment and personnel release. Furthermore, they have basic knowledge of personnel deployment and personnel cost management.</p> <p>In this module, students also learn how to deal with far-reaching change in companies - change management. Dealing with this requires knowledge of change management instruments, which are critical for the success of the change process. In this course, students learn to understand these organisational aspects and to analyse them in the entrepreneurial application case and to align the organisation accordingly.</p>
Liability	Mandatory
Module content	<p>Within the framework of the course, basic knowledge of operational and strategic human resource management as well as the associated sub-areas is imparted. The students get to know the essential fields of activity of personnel departments and deal with methods of personnel development.</p> <p>In this module, students learn about the interdisciplinary (i.e. management, psychology, IT) view of change processes and the associated challenges in companies. They are familiar with application-oriented concepts of change management. Discussions of best practices as well as processing of group and case study work are carried out to convey the application competence.</p>
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> - Kotter, John/ Akhtar, Vanessa/ Gupta, Gaurav: Change, Wiley, 2021 - Hiatt, Jeffrey/, Creasey, Timothy: Change Management, Prosci, 2012 - Stolzenberg, Kerstin/, Heberle, Krischan: Change Management, Springer, 2022 - Hodges, Julie: Managing and Leading People through Organizational Change, Kogan Page, 2021 - Dessler, Gary: Human Resource Management, Pearson, 2016

	<ul style="list-style-type: none"> - Armstrong, Michael/ Taylor, Stephen: Armstrong's Handbook of Human Resource Management, Kogan Page, 2020 - Schmidt, Lars: Redefining HR – Transforming People Teams to Drive Business, Kogan Page, 2021 - Beaven, Karen: Strategic Human Resource Management, Kogan Page, 2019 - Leatherbarrow, Charles/ Fletcher, Janet: Introduction to Human Resource Management, Kogan Page, 2018
Other information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Lean Production and Operational Excellence / Production Optimization	
Module number	DFOE07
Subject area	Industrial Engineering
Semester (FT)	2
Semester (PT)	2
Duration	1 semester
Responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Prof. Dr. Matthias Pfeffer / Dipl.-Ing. Matthias Miesbeck
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2 SHW) + UE (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: DFOE2
Learning outcomes of the module	Students learn about the different concepts and methods of Operational Excellence in the context of Lean Management. The aim of the course is the analysis and approaches to optimization and dimensioning according to Lean aspects. The focus is on the Toyota Production System.
Liability	Mandatory
Module content	<p>In this module, students are taught approaches and concepts for optimising production and logistics structures. In doing so, their opportunities and risks in different situations are considered on the basis of various key figures.</p> <p>Through different practical examples, they learn methods for the operational implementation and sustainable implementation of lean corporate structures.</p> <p>The following knowledge is imparted in the course:</p> <ul style="list-style-type: none"> • Understanding of lean production and operational excellence • Lean methods and tools (5S, Kaizen, standardisation, value stream mapping, SMED) • Six Sigma, Lean Six Sigma • Total Productive Maintenance • Total Quality Management • Lean Administration • Change Management • Explanation of the concept of lean production systems • Supply chain analysis • Identify and eliminate waste • Production control • Illustration of the importance of standardisation and stability for lean production processes • Developing of key performance indicators (KPI) • Optimization of administration with process calculation • Assessing the applicability of different methods and concepts • Evaluation of approaches and methods used
Literature	<p>A final literature selection is made by the respective lecturer.</p> <p>- Ohne, Taiichi: Toyota Production System: Beyond Large Scale-Production, CRC 2019</p>

	<ul style="list-style-type: none"> - Hänggi, R.; Fimpel, A; et al.: LEAN Production – Easy and Comprehensive: A practical guide to lean processes explained with pictures, Springer 2022 - Helmold, M.: Lean Management and Kaizen: Fundamentals from Cases and Examples in Operations and Supply Chain Management; Springer 2020 - Kato, Siao; Smalley, Art: Toyota Kaizen Methods: Six Steps to Improvement; CRC 2017 - Schonberger, R.: Best Practice in Lean Six Sigma Process Improvement – A deeper look; 2018 - Janoski, T.;M Lepadatu, D.: The Cambridge International Handbook of Lean Production; 2021 - Rother, M; Shook, J.: Learning to See: Value Stream Mapping to add value and eliminate muda; Lean Enterprise Institute 2003 - Koether, Reinhard/ Meier, Klaus, J.: Lean Production für die variantenreiche Einzelfertigung, Wiesbaden 2017. - Bertagnolli, Fank: Lean Management, Wiesbaden 2018 - Fiedler, Martin: Lean Constructions - The Management Handbook, Springer 2018 - Issar, Gilad/ Navon, Liat, R.: Operational Excellence, Springer, 2016 -
Other information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Digital Value Chains and Smart Logistics	
Module number	DFOE09
Subject area	Information and Data Management
Semester (FT)	2
Semester (PT)	2
Duration	1 semester
Responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Prof. Wolfgang Decker
Frequency of the offer	Each academic year
SHW / LVF	4 SHW: VL (2 SHW) + UE (2 SHW)
Workload (WL)	150h
LP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	<p>The course aims to equip students with a comprehensive understanding of the multifaceted nature of digital transformation across various industries.</p> <p>By the end of this module, students will:</p> <ul style="list-style-type: none"> • Understand the Significance of Data-Driven Decision Making: Understand the pivotal role of data and information in shaping the strategies and operations of modern enterprises. • Appreciate the Nuances of Industry 4.0: Delve into how digital technologies are revolutionizing value creation, particularly in manufacturing, and the broader implications for businesses. • Navigate the Balance between Legacy and Innovation: Develop insights into the challenges and opportunities of integrating new digital strategies with existing systems and business models, emphasizing the concept of "wise pivots." • Understand Digital Transformation in Supply Chain Management: Gain a deep understanding of the innovations in logistics and supply chain processes due to digital transformation, and how sustainability can be enhanced through these changes. • Engage in Practical Application: Apply theoretical knowledge to real-world scenarios, fostering critical thinking and problem-solving skills through group work exercises and case studies.
Liability	Mandatory
Module content	<p>In this course, students learn to understand and practically apply the following knowledge and skills:</p> <p>Foundations of the Digital Transformation</p> <ul style="list-style-type: none"> • Information Driven Enterprise: Understanding the role of data and information in shaping modern enterprises. • Value Creation in Industry 4.0: Exploring how digital technologies are revolutionizing value creation in manufacturing and beyond. • Storytelling Refresher: Emphasizing the importance of effective communication in conveying the value and impact of digital transformation initiatives. <p>Navigating Legacy and Innovation</p>

	<ul style="list-style-type: none"> • Wise Pivots in Digital Transformation: Balancing the nurturing of legacy business models while innovating for the future. • Industrial Retrofi– - The Dilemma with Legacy: Addressing the challenges of integrating new digital strategies with existing systems and business models. <p>Digital Transformation in Supply Chain and Logistics</p> <ul style="list-style-type: none"> • Basic Supply Chain Considerations: Laying the foundational understanding applicable across industries and roles. • Impact of Digital Transformation on Logistics and Supply Chain Management: Delving into the innovations and changes i34anagementcs and supply chain processes due to digital transformation. <p>Leading in the Digital Era</p> <ul style="list-style-type: none"> • Supply Chain Sustainability: Understanding the role of digital transformation in enhancing supply chain sustainability. • Group Work Exercise Case Study: Engaging students in real-world scenarios to apply their understanding and insights. <p>Preparing for the Assignment and Wrapping Up</p> <ul style="list-style-type: none"> • Case Clarification and Discussion: Offering insights into the assignment case and clarifying any ambiguities. • Team Assembly: Facilitating the formation of student teams and ensuring a balanced distribution of roles. • Q&A Session: Addressing questions or concerns students might have about the course or the assignment.
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> • Siebel, T.M., Digital Transformation: Survive and Thrive in an Era of Mass Extinction, Rosetta Books, 2019. • Rogers, D.L., The Digital Transformation Playbook: Rethink Your Business for the Digital Age, Columbia University Press, 2016. • Gupta, S., Driving Digital Strategy: A Guide to Reimagining Your Business, Harvard Business Review Press, 2018. • Greenway, A., Terrett, B., Bracken, M. and Loosemore, T., Digital Transformation at Scale: Why the Strategy Is Delivery, MIT Press, 2019. • Raskino, M. and Waller, G., Digital to the Core: Remastering Leadership for Your Industry, Your Enterprise, and Yourself, Routledge, 2019. • McFarlane, D. and Giannikas, V., "Intelligent logistics: involving the internet of things within logistics and supply chain management," in Kopanos, G.M. (Ed.) Emerging Technologies and Applications for Smart Logistics and Manufacturing, IGI Global, 2021, pp.1-26. • Schrauf, S. and Bertram, P., Industry 4.0: Building the Digital Enterprise, 2016 (2nd edition published 2018).
Prerequisite Award of LP	Passed MoP
Use of the module (in other degree programs)	Digital Business Modelling and Entrepreneurship (MA)

Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the LP (ECTS) in the total number of 90.
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Project Work	
Module number	DFOE12
Subject area	Project Management / Project Work
Semester (FT)	2
Semester (PT)	2
Duration	1 semester
Person responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Prof. Dr. Matthias Pfeffer
Frequency of offer	Usually each academic year; depending on when the course starts
SHW / LVF	2 SHW: SPJ (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: DFOE2; DFOE11
Learning outcomes of the module	The objective is the elaboration of a planning/optimization project in the context of production and logistics. The students learn to independently delineate the topics in problem areas and to independently develop, present and relate solution approaches with the heCP of various business management methods and approaches. During the planning and implementation of the project, the chosen approaches are critically examined by the students.
Liability	Mandatory
Module content	In this module, students learn to independently plan, document and critically reflect on projects. The planning, organisation and approach is documented and explained in writing. The following knowledge is to be imparted in the course: <ul style="list-style-type: none"> • Structure of a project plan • Application analytical methods • Consolidation of the data • Evaluation and interpretation of the data • Concept development • Structure of management presentations • Risk assurance and quality assessment in the project • Team dynamics
Literature	A final literature selection is made by the respective lecturer. - Nieto-Rodriguez, Antonio: Harvard Business Review: Project Management Handbook – How to launch, lead, sponsor successful projects; 2021 - Project Management Institute: The Project Management and A Guide to the Project Management Body of Knowledge (PMBOK Guide); 7. Edition; 2021
Other information	If suitably qualified, project work may be recognised.
Prerequisite Award of CP	Passed all MoP

Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Decision Theory and Key Performance Indicator Development	
Module number	DFOE14
Subject area	Management, Leadership, Strategy
Semester (FT)	2
Semester (PT)	4
Duration	1 semester
Responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Prof. Dr. Markus Kleinschwaerzer
Frequency of offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2 SHW) + UE (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: DFOE1; DFOE2
Learning outcomes of the module	The students know the basics of decision theory and are able to develop evaluation and performance measurement systems. They can plan, structure, measure and control entrepreneurial goals. Furthermore, they are able to prepare decision-making processes with different methods and instruments.
Liability	Mandatory
Module content	<p>Students learn to analyse, prepare, assess and make decisions regarding the evaluation of different properties. They understand business contexts, know different concepts and procedures and can critically question methods.</p> <p>The following knowledge is to be imparted in the course:</p> <ul style="list-style-type: none"> • Methods and instruments for decision-making processes • Structuring complex decision-making situations • Evaluation of alternatives • Establishment of a key figure and evaluation system • Target measurement • Indicator-based business analysis
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> - Marchau, V.: Decision Making under Deep Uncertainty: From Theory to Practice; Springer; 2019 - Bacci, S.: Introduction to Statistical Decision Theory: Utility Theory and Causal Analysis; CRC Press; 2021 - Rutherford, A.: Learn Game Theory: A Primer to Strategic Thinking and Advanced Decision-Making. (Game Theory Series Book 1) (English Edition); 2021 - Hillier, F.: Introduction to Operations ResearchH; 11. ED.; MCGRAWHILL; 2020
Other information	
Prerequisite Award of CP	Passed all MoP

Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Global Supply Chain Management, Risk Management and Global Procurement Sourcing	
Module number	DFOE03
Subject area	Industrial Engineering
Semester (FT)	2
Semester (PT)	4
Duration	1 semester
Person responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Dipl.-Vw. Carsten Hirschberg
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (3 SHW) & UE (1 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	<p>Students recognize that global supply chain management is becoming an important issue for many companies with increasing globalization and offshore sourcing. They recognize the specificity of global supply chain management, which encompasses not just a local or national focus, but a worldwide interest and suppliers.</p> <p>Industrial value creation networks are subject to constant change and, in addition to their promising opportunities, also harbor considerable risks. The students learn to recognize operational and strategic risks and can derive strategies to eliminate/minimise them.</p>
Liability	Mandatory
Module content	<p>In this module, the students deal with the following questions:</p> <ul style="list-style-type: none"> • What are the characteristics of value creation networks? • How does the transformation of value creation networks take place and which factors have an influence? • What opportunities and risks does increasing networking bring with it? • How can risks be assessed? <p>The following knowledge is imparted as part of the course:</p> <ul style="list-style-type: none"> • Fundamentals of Global Sourcing • Analysis and evaluation of procurement activities • TCO (Total Cost of Ownership) comparison between different procurement alternatives • Risk Management • Outsourcing Reviews
Literature	<p>A final selection of literature is made by the respective lecturer.</p> <ul style="list-style-type: none"> - Hugos, Michael: Essentials of Supply Chain Management - Chopra, Sunil; Meindl, Peter: Supply Chain Management: Strategy, Planning, and Operation - Silver, Edward A.; Pyke, David F.; Thomas, Douglas J.: Inventory and Production Management in Supply Chains - Mentzer, John T. jr: Fundamentals of Supply Chain Management: Twelve Drivers of Competitive Advantage - Lysons, Kenneth; Farrington, Brian: Procurement and Supply Chain Management, 10th Edition 2020 - Baily, Peter; Farmer, David: Procurement Principles and Management in the Digital Age, 2021

	<ul style="list-style-type: none"> - Sollish, Fred; Semanik, John: The Procurement and Supply Manager's Desk Reference - Lynch, Gary S.: Single Point of Failure: The 10 Essential Laws of Supply Chain Risk - Taleb, Nicholas: The Black Swan - The Impact of the Highly Improbable - Hopkin, Paul: Fundamentals of Risk Management -Understanding, Evaluating and Implementing Effective Risk Management - Manners-Bell: John: Supply Chain Risk Management -Understanding Emerging Threats to Global Supply Chains - Lam, James: Enterprise Risk Management
Other information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Introduction to Cyber Security	
Module number	DFOE15
Subject area	Information and Data Management
Semester (FT)	3
Semester (PT)	3
Duration	1 semester
Person responsible for the module	Prof. Dr. Sabine Rathmayer
Lecturer(s)	Prof. Dr. Sabine Rathmayer
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2 SHW) & UE (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: none
Learning outcomes of the module	<p>Students gain insight into the various aspects of cyber security and are enabled to understand the significance and interrelationships of various technical and organizational factors influencing cyber security.</p> <p>With the knowledge acquired, students will be able to make systematic assessments of the need for protection and the security level of</p> <ul style="list-style-type: none"> • of modern IT systems, • IT infrastructures as well as • OT (Operational Technology) <p>This also includes non-technical factors that are often underestimated in practice. In particular, a distinction is made between small, medium-sized and large companies. In addition, an understanding of the various groups of players and their motivation also plays an important role.</p>
Liability	Mandatory
Module content	<p>The following knowledge and skills are taught in the course:</p> <ul style="list-style-type: none"> • Threats and hazards, risk analysis • BSI IT basic protection • Basics of applied cryptography • Security engineering • Security models and mechanisms and their implementation in distributed systems and computer networks • Security of mobile devices • Practical aspects of information security • Security incident response with breach and malware analysis • Social engineering: the human factor in information security from the attacker's perspective • Identity & Access Management, data protection and privacy • Security of outsourced services (e.g., in cloud computing) <p>Classical methods of technical and organizational information security, including.</p>
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> • Whitman, M.; Mattord, H.: Principles of Information Security, 5th Edition, Cengage Learning, Boston 2016

	<ul style="list-style-type: none"> • Graham, J.; Howard, R.; Olson, R.: Cyber Security Essentials, CRC Press, Boca Raton 2011 • Voeller, J.: Cyber Security, Wiley 2014
Other information	
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	Cyber Security Management (MA)
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Digital Factory Planning and Process Simulation	
Module number	DFOE08
Subject area	Industrial Engineering
Semester (FT)	3
Semester (PT)	3
Duration	1 semester
Person responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Dipl.-Ing. Yassine Sellami
Frequency of the offer	Usually each academic year; depending on when the course starts
SHW / LVF	4 SHW: VL (2 SHW) + UE (2 SHW)
Workload (WL)	150h
CP (ECTS)	5
MoP / LN	See Module overview
Recommendation for participation	Formal: none; Content: DFOE7; DFOE9; DFOE12; DFOE13
Learning outcomes of the module	In this module, students are taught the digital factory approach. They learn about different methods and concepts of basic factory planning. The aim of the course is to enable students to simulate logistics processes and plan factory structures from the workplace to the production network. Economic aspects are included in the process.
Liability	Mandatory
Module content	<p>The following knowledge is to be imparted within the framework of factory planning and simulation:</p> <ul style="list-style-type: none"> • Fundamentals of Factory and Logistics Planning (Introduction) <ul style="list-style-type: none"> ○ Terms factory and logistics planning ○ Occasions of factory and logistics planning ○ Realisation stages of factory and logistics planning (planning process) • Structural planning <ul style="list-style-type: none"> ○ Procedure Coarse → Fine ○ Structural concepts / common structures ○ Procedure and evaluation of individual concepts • Factory planning • Site planning • Master planning • Building planning and infrastructure planning • Manufacturing system design <ul style="list-style-type: none"> ○ Planning principles for a manufacturing system design ○ Possibilities for the design of manufacturing systems ○ Production and assembly system planning ○ Simulation • Logistics planning <ul style="list-style-type: none"> ○ Task and scope of logistics planning ○ Storage and transport system planning ○ Value stream design ○ Simulation • Resource planning / organisational planning <ul style="list-style-type: none"> ○ Area of responsibility ○ Basic organisational concepts • Simulation of logistics processes • Modelling of technical systems • Optimization of process flows • Factory and layout design

	<ul style="list-style-type: none"> • Plant structure planning from the workplace to the production network • Ramp-Up strategies • Factory planning exercises • Factory planning case study as project work • Usage of the planning software visTable®
Literature	<p>A final literature selection is made by the respective lecturer.</p> <ul style="list-style-type: none"> - Lödding, H.: Handbook of Manufacturing Control Manufacturing Control, Springer, 2013 - Wiendahl, H-P.; Reichardt, J.; Nyhuis, P.: Handbook Factory Planning and Design, Springer, 2015 - Schenk, M.; Wirth, W.; Müller, E.: Factory Planning Manual: Situation-Driven Production Facility Planning, Springer, 2010
Other information	An independent project assignment can be part of the examination performance.
Prerequisite Award of CP	Passed all MoP
Use of the module (in other degree programs)	
Importance of the grade for the final grade	The module grade is the weighted arithmetic mean of the module performance(s). The overall grade of the Master's examination is the weighted arithmetic mean of the module grades and the grade of the final examination. As a rule, the weighting corresponds to the share of the CP (ECTS) in the total number of 90.

Master's Thesis	
Module number	DFOEMT
Subject area	Final module
Semester (FT)	3
Semester (PT)	5
Duration	1 semester
Responsible for the module	Prof. Dr. Matthias Pfeffer
Lecturer(s)	Supervision depending on the subject (HDBW professor)
Frequency of offer	Every semester
SHW / LVF	
Workload (WL)	600 h
CP (ECTS)	20 (18 CP: Master's thesis; 2 CP: defence)
MoP	See Module overview
Recommendation for participation	
Learning outcomes of the module	Within the framework of the Master's thesis, students should demonstrate that they are able to - Address a topic in a conceptually comprehensive and in-depth manner - and be able to apply the theoretical knowledge gained to a practical business issue.
Liability	Mandatory
Content	The preparation of the Master's thesis consists of two components 1. The independent preparation of a master's thesis of at least 60 pages and a maximum of 80 pages (content based). 2. The defence and presentation of the results of the Master's thesis with an examination discussion, in the context of which the contents of the Master's thesis are also placed in connection with other contents of the degree program. The defence and presentation of the results of the Master's thesis shall not exceed 15 minutes. The total duration of the defence shall not exceed 30 minutes.
Other information	The Master's thesis can be written in German or English.
Prerequisite Award of credit points	Passed Master's thesis and passed defence.
Use of the module (in other degree programs)	
Importance of the grade for the final grade	In this case, the assessment of the Master's thesis is included in the module grade with a weighting of 90% and the assessment of the defence (KO) of the thesis with a weighting of 10%.