
MODULE HANDBOOK

**Master of Science
Engineering and Management
(MEM)**

HS PF Engineering

**Study program director:
Prof. Dr. Ansgar Kühn**

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This is a translation of an original document written in German.
The original document is the binding version

Note on the modules:

The duration of the modules is usually one semester. The section "Semester of study" shows the respective semester. If a module extends over two consecutive semesters, the two semesters in question are shown in the above section. Admission is generally intended for the winter and summer semesters. However, the subjects are only offered once a year. Semesters 1 and 2 can therefore also be completed in reverse order.

Examinations are generally graded on the basis of a grading scale from 1 ("very good") to 5 ("fail"). The exceptions to this are the courses marked "ungraded examination performance" (UPL) in the special section of the study and examination regulations - and in this module handbook. These are graded as "pass" and "fail", see § 24 (1, 2) SPO.

The courses (lectures and seminars) are designed for groups of 20-25 students.

Note on the scope of written work:

The scope of a Master's thesis is typically 70-100 pages. Project theses typically comprise 40-60 pages, whereby other artifacts can also be defined in advance as the expected project result. Term papers typically comprise 20-40 pages.

LIST OF ABBREVIATIONS

CP	Credit according to the ECTS system (1 CP corresponds to 25-30 working hours. This document contains the workload calculations with the maximum possible scope of work. You can also decide to do correspondingly fewer working hours.)
ECTS	European Credit Transfer and Accumulation System
PLH	Examination performance Term paper
PLK	Examination performance Written exam
PLM	Examination performance Oral examination
PLP	Exam performance Project work
PLR	Examination performance Presentation
PLS	Examination performance Course work
PLT	Examination performance Thesis
PVL	Examination prerequisite
PVL-MP	Examination prerequisite for the Master's examination
PVL-PLT	Preliminary work for the thesis
STA1	First stage of study
STA2	Second stage of study
SWS	Semester hour (S) per week
UPL	Ungraded examination performance

1. Leadership

"Leadership"	
Code number	MWI10001
Semester of study	1st semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	MWI10002 Management MWI10003 Leadership in Projects
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	None
Type(s) of examination, duration (only for PLK/PLM)	Management: PLH/PLR Leadership in Projects: PLP/PLH/PLR
Teaching language	Guided Tour: German or English Leadership in Projects: German
Person responsible for the module	Prof. Dr. Kühn
Teachers	Guided Tour: Dr. Dieter Lederer (LB) Leadership in Projects: Mr. Sven Bemmé (LB)
Assignment to the curriculum	MEM - compulsory subject 1st semester
Teaching forms of the courses of the module	Seminar-based teaching, workshop, coaching, real project
Goals	<p>Leadership: The students</p> <ul style="list-style-type: none"> • understand what constitutes leadership focusing on people with their individual abilities and conditioning, • know the importance of leadership for entrepreneurial success, • know their own values and convictions about leadership and have reflected on them, • know the essential elements of leadership communication and have practical experience with them, • can assess the importance of body language for leadership and communication and have reflected on their own body language. <p>Leadership in Projects: Students are able to</p> <ul style="list-style-type: none"> • successfully manage projects, • apply project management tools correctly and appropriately according to the complexity of the project and the stakeholders, • Moderate project meetings/workshops in a targeted manner, • anticipate conflict situations at an early stage, act preventively and/or deal with acute conflicts in an appropriate manner.
Interdisciplinary qualification goals	The module makes a significant contribution to personal development, especially as it strengthens the ability to (self-)reflect, to interact with other people/in a team and other social skills.
Contents	<p>Leadership:</p> <ul style="list-style-type: none"> • Leadership styles • Values and convictions on leadership

	<ul style="list-style-type: none"> • Management communication • Body language <p>Leadership in Projects:</p> <ul style="list-style-type: none"> • Project management tools • Conflict management • Project moderation
Literature	<p>Leadership:</p> <ul style="list-style-type: none"> • From Kopp, D. (2016): <i>Manager - and now what?</i> Springer: Berlin, Heidelberg. • Groth, A. (2014): <i>The boss I will never forget.</i> Campus: Frankfurt/Main. • Purps-Pardigol, S. (2015): <i>Führen mit Hirn: Inspiring employees and increasing corporate success.</i> Campus: Frankfurt/Main. <p>Leadership in Projects:</p> <ul style="list-style-type: none"> • Litke, H. D. (2007): <i>Project Management - Methods, Techniques, Behaviors.</i> Hanser: Munich. • Stöwe, C., Keromosemito, L. (2012): <i>Leading without hierarchy - Lateral leadership. How to motivate teams, lead critical conversations and resolve conflicts without being a superior.</i> Springer Gabler: Wiesbaden. • Lipp, U., Will, H. (2008): <i>Das große Workshop-Buch: Konzeption, Inszenierung und Moderation von Klausuren, Besprechungen und Seminaren.</i> Beltz: Weinheim.
Workload	<p>Workload: 6 ECTS x 30 hours = 180 hours. Attendance time: 4 SWS x 15 weeks = 60 hrs.</p>
Media forms	<p>Slides, flipchart, projector, lecture in the form of presentations, case studies, interactive board</p>

2. Production Strategy

"Produktionsstrategie" / "Production Strategy"	
Code number	MWI10004
Semester of study	1st semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	MWI10005 Production Strategy and Methods MWI10006 Lean Management and Production Strategies
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	Fundamentals of Production Planning and Production Control from the Bachelor's degree course, knowledge of lean production and materials management
Type(s) of examination, duration of examination (only for PLK/PLM)	PLK (90 minutes)
Teaching language	German
Person responsible for the module	Prof. Dr. Kühn
Teachers	Production Strategy and Methods: Dr. Delang (LB) Lean Management and Production Strategies: Prof. Dr. Emmerich
Assignment to the curriculum	MEM - compulsory subject 1st semester
Teaching forms of the courses of the module	Lecture, seminar-based teaching
Goals	<p>Material and resource efficiency and value-oriented product design are seen as key success factors in the manufacture of industrial goods.</p> <p>Using case studies and industry projects, students learn methods for analyzing products, production processes, logistics processes and business processes. Strategies for optimization are developed building on this.</p> <p>In addition to strategic approaches to making production areas more flexible and ensuring competitiveness, innovative approaches and measures in the operational production environment are also discussed in detail. The theoretical approaches are explained and deepened using concrete examples from daily practice.</p>
Interdisciplinary qualification goals	The module contributes to interdisciplinary skills and the interface competence between production and business administration.
Contents	<p>Production Strategy and Methods: material and resource efficiency in production operations, value stream mapping as a tool for streamlining logistical processes, business process management to increase the efficiency of company processes, value engineering to rationalize products and processes.</p> <p>Lean Management and Production Strategies: teaching different production strategies and production systems against the background of "lean philosophies" depending on market requirements and types of production, methods, procedures and tools for increasing flexibility and</p>

	productivity in manufacturing companies, practical examples.
Literature	<p>Production Strategy and Methods:</p> <ul style="list-style-type: none"> • VDI Society (2011): <i>Value Analysis-The Tool in Value Management</i>. Springer. (ISBN-10: 3540795162) • Rother, M., Shook, J. (2015): <i>Learning to see: increasing value creation and eliminating waste with value stream design</i>. 4th ed., Lean Management Institute. (ISBN-10: 3980952118) <p>Lean Management and Production Strategies:</p> <ul style="list-style-type: none"> • Warnecke, H. J. (1996): <i>The fractal factory. Revolution of corporate culture</i>. Rowohlt: Reinbek. • Takeda, H. (1996): <i>The system of mixed production</i>. Verlag Moderne Industrie: Landsberg.
Workload	<p>Workload: 6 ECTS x 30 hours = 180 hours. Attendance time: 4 SWS x 15 weeks = 60 hrs. 120 hours of lecture preparation and exam preparation.</p>
Media forms	Lecture with discussion, case studies with seminar exercises in small groups.

3. Research Methods & Innovation

"Forschungsmethoden & Innovation" / "Research Methods & Innovation"	
Code number	MWI10007
Semester of study	1st semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	MWI10008 Research Methods MWI10009 Product Strategy/Product Development
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	English B2
Type(s) of examination, duration (only for PLK/PLM)	Each PLH/PLR/PLK (60 minutes)
Teaching language	German or English
Person responsible for the module	Prof. Dr. Henning Hinderer
Teachers	Research Methods: Prof. Dr. Ludwig Martin/Prof. Dr. Rebecca Bulander Product Strategy/Product Development: Prof. Dr. Henning Hinderer/Prof. Dr. Rainer Wunderlich
Assignment to the curriculum	MIM, MEM - compulsory subject 1st semester
Teaching forms of the courses of the module	Seminar-based teaching and exercises, intensive block course with follow-up dates, project
Goals	<p>Research Methods: Students are familiar with the variety of research approaches and can classify them in terms of scientific theory. Students can design (smaller) research projects and draw up project plans based on their specialist knowledge of common qualitative and quantitative methods.. Students can recognize associated ethical issues and formulate solutions. They are also able to critically evaluate and classify their own results, as well as those of others, likewise with regard to applied methodology and methods. Students are aware of the special interdisciplinary nature of the study program with regard to research approaches and know how to deal with this, likewise in terms of the admissibility of different perspectives and creative solution finding. They can also classify their own contributions from a specialist perspective through the connection to specialist knowledge from the elective modules of the study program.</p> <p>Product Strategy/Product Development: After a methodical introduction to strategic product planning strategic product planning, creativity methods and methods of market-oriented product development, students are able to systematically develop a new product from the idea to marketing. Important components are the creative generation of ideas and the derivation of the contents of a suitable business model and a market launch strategy. The aim is to develop your own product idea in small groups, which is to be developed into a prototype for a planned market launch. There is the option of presenting the product ideas in further modules, e.g. IDP or Master's thesis with a business plan.</p>

<p>Interdisciplinary qualification goals</p>	<p>The module contributes to the further development of students' understanding of methods and the development and marketing of products. The connection between the application and understanding of methods (research and product development) and the corresponding results is trained. This also applies to the evaluation of areas of application of methods and their limitations.</p>
<p>Contents</p>	<p>Research Methods: The prevailing paradigms of knowledge acquisition are explained and differentiated from one another. Various approaches and related methodologies are explained through a research problem-oriented approach to the topic. Engineering as well as social science (incl. business research) approaches and related methods are introduced, deepened and discussed using exercises and case studies, Questions regarding the validity and reliability of various methods and procedures are discussed with reference to empirical research. Questions of scientific ethics are explored and solutions are developed using examples. Basic forms of good scientific practice (e.g. declarations of consent in surveys, avoiding plagiarism, dealing with generative AI) are dealt with. The procedure for classifying one's own contribution in existing knowledge (state of the art / state of science) is explained and practiced. Source work and the critical processing of what has been read into own texts is demonstrated and consolidated through exercises.</p> <p>Product Strategy/Product Development: Methods of strategic product planning and market-oriented product development are explained, discussed and applied experimentally with the aim of preparing the strategic and market-oriented development of a product based on an individual idea. Strategic product planning: - Approaches to agile product development (scenario creation, design thinking approaches, BMC) - Practical application of strategic methods in the context of a product concept</p> <p>Procedure for generating ideas: - Analysis of trends and innovative technologies as approaches for generating ideas - Design thinking and other creativity methods</p> <p>Methods of market-oriented product development: - Product development methods - Market research and testing methods - Market launch strategy with communication plan</p>
<p>Literature</p>	<p>Research Methods: - Leedy, P. D., Ormrod, J. E. (2016): <i>Practical Research: Planning and Design</i>. 11th Edition, Pearson. - Bryman, A., Bell, E. (2015): <i>Business Research Methods</i>. 4th Edition, Oxford University Press: Oxford. - Kornwachs, K. (2010): <i>Technological Knowledge - Emergence, Methods, Structures</i>. Acatech/Springer: Berlin. (PDF available online) Lindenlauf, F. (2022): <i>Scientific work in engineering and natural sciences</i>. Springer Spektrum: Berlin. - Various texts that are provided on E-Learning</p> <p>Product Strategy/Product Development:</p>

	<ul style="list-style-type: none"> - Porter, M. E. (2013): <i>Competitive Strategies</i>. 12th ed., Campus: Frankfurt/Main. - Lewrick, M., Link, P., Leifer, L. (2018): <i>The Design Thinking Playbook</i>. 2nd ed., Vahlen: Munich. - Osterwalder, A., Pigneur, Y. (2011): <i>Business Model Generation</i>. Campus: Frankfurt/Main. - Gerstbach, I. (2016): <i>Design thinking in the company. A Workbook for the introduction of Design Thinking</i>. Gabal: Offenbach. - Bland, D. J., Osterwalder, A., Smith, A., & Papadakos, T. (2020). <i>Testing business ideas</i>: Wiley: Hoboken. - Ulrich, K. T., Eppinger S. D. (2012): <i>Product design and development</i>. 5th Edition, McGraw-Hill: New York.
Workload	<p>Workload: 6 ECTS x 30 hours = 180 hours. Attendance time: 4 SWS x 15 weeks = 60 hrs.</p>
Media forms	<p>PowerPoint, reprints, interactive group tasks, individual tasks, interactive teaching discussion, research work (incl. library), discussion of models and drafts.</p>

4. Interdisciplinary Innovation/Research Project

"Interdisziplinäres Innovations-/Forschungsprojekt" / "Interdisciplinary Innovation / Research Project"	
Code number	MWI10010
Semester of study	1st/2nd semester
Level	Professionally qualifying academic level
Credits	9
SWS	6
Associated courses	MWI10011 Innovation/Research Project Concept MWI10012 Innovation/Research Project Realization
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	Parallel participation in the courses MWI10008 Research Methods and MWI10009 Product Strategy/Product Development
Type(s) of examination, duration of examination (only for PLK/PLM)	PLP in each case
Teaching language	German or English
Person responsible for the module	Prof. Dr. Kühn
Teachers	Innovation/Research Project Concept: all lecturers in the Industrial Engineering and Management department Innovation/Research Project Realization: all lecturers in the field of industrial engineering and management
Assignment to the curriculum	MIM, MEM - compulsory subject 1st/2nd semester
Teaching forms of the courses of the module	Project in small groups (4 people) under the intensive supervision of a teacher across both courses
Goals	<p>Students are familiar with the variety of research approaches and can classify these in terms of scientific theory and apply them to specific projects. They are also familiar with a variety of innovation methods. Students can design (smaller) research/innovation projects and implement them prototypically to clarify relevant issues based on their specialist knowledge of common qualitative and quantitative methods.. Students will be able to recognize any ethical issues that may arise and develop solutions.</p> <p>They are also able to critically evaluate and classify their own results, as well as those of others, likewise with regard to applied methodology and methods. Students are aware of the special interdisciplinary nature of the study program with regard to innovation and research approaches and know how to deal with this, likewise in terms of the admissibility of different perspectives and creative solution finding and feedback with the stakeholders of an envisaged market. They can also classify their own contributions professionally through the connection to specialist knowledge from the compulsory and elective modules of the study program.</p> <p>Students can develop, satisfactorily document and present solutions in an innovation project / a research project (also in cooperation with external companies). This also includes the possibility of publishing the work or its results.</p>
Interdisciplinary qualification goals	The module contributes to management skills, teamwork and project management skills. It strengthens the ability to reflect critically and to solve problems creatively.

<p>Contents</p>	<p>Possible research/innovation projects are presented by various lecturers at the beginning of the module. The research/innovation projects can be of a different nature and involve a wide variety of problems.</p> <ul style="list-style-type: none"> • The lecturers teaching the elective modules specify the topics of the research/innovation project, which can also be carried out jointly with external companies. • The problems are always solved on a scientific basis and the project documentation is written as a scientific paper or as product documentation in a suitable form (drawing, parts list, product description, manual, etc.). • The project work ideally concludes with a scientific article worthy of publication or a concrete and detailed product/business idea, if possible including a functional prototype. <p>The lecturers are available to the students as mentors,</p> <p>Innovation/Research Project Concept: The prevailing paradigms of knowledge acquisition are explained and differentiated from one another. Various approaches and related methodologies are explained through a research problem-oriented approach to the topic. Engineering as well as social science (incl. business research) approaches and related methods are introduced and intensively discussed using exercises and case studies. All aspects of product development are discussed with reference to innovation and application-oriented development - this includes methods of market research and target group analysis, documentation and validation of requirements as well as an iterative approach in the project. Questions regarding the validity and reliability of various methods and procedures for projects involving empirical research are also discussed.</p> <p>Innovation/Research Project Realization: Students work on a research/innovation project based on the knowledge gained in the Innovation/Research Project Design course and document it conclusively., Market and user feedback in innovation projects should, where possible, be determined on the basis of functional prototypes and taken into account in further development.</p>
<p>Literature</p>	<p>Innovation/Research Project Concept:</p> <ul style="list-style-type: none"> • Leedy, P. D., Ormrod, J. E. (2016): <i>Practical Research: Planning and Design</i>. 11th Edition, Pearson. • Bryman, A., Bell, E. (2015): <i>Business Research Methods</i>. 4th Edition, Oxford University Press: Oxford. • Kornwachs, K. (2010): <i>Technological Knowledge - Emergence, Methods, Structures</i>. Acatech/Springer: Berlin. (PDF available online) • Großklaus, Rainer H. G. (2014): <i>From product idea to market success : planning, introducing and successfully managing innovations</i>. - 2nd ed. 2014 - Wiesbaden : Gabler Verlag, 2014. • Further literature as required <p>Innovation/Research Project Realization:</p> <ul style="list-style-type: none"> • - Bland, D. J., Osterwalder, A., Smith, A., & Papadacos, T. (2020). <i>Testing business ideas</i>: Wiley: Hoboken. • Engeln, Werner (2006): <i>Methods of product development</i>. Munich : Oldenbourg-Industrieverlag.

	<ul style="list-style-type: none">• Schwarz, Erich J.; Dummer, Rita; Krajger, Ines (2007): <i>From the business idea to market success</i>. Vienna : Linde Verlag• Subject-specific literature depending on the respective project work.
Workload	Workload: 9 ECTS x 30 hours = 270 hours. Innovation/Research Project Concept: 3 ECTS Innovation/Research Project Realization: 6 ECTS Attendance time: 6 SWS x 15 weeks = 90 hours or attendance time in consultation with supervisor / project leader
Media forms	Depending on the respective project work / supervisor: Power-Point, reprints, interactive group tasks, physical or IT-based prototypes, interactive teaching discussion, research work (library).

5. Value-oriented Corporate Management

"Value-based Corporate Management" / "Value-based Management"	
Code number	MWI10013
Semester of study	2nd semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	MWI10014 Corporate Management MWI10015 Key Figure Management
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	<ul style="list-style-type: none"> • Literature study: Weber, J., Schäffer, U. (2016): <i>Introduction to management accounting</i>. 15th edition, Schäffer-Poeschel: Stuttgart. • Basic knowledge <ul style="list-style-type: none"> ○ of controlling (e.g. the controller's way of thinking and acting, basic instruments) ○ in cost and activity accounting as well as bookkeeping and accounting ○ in financing and investment decisions
Type(s) of examination, duration (only for PLK/PLM)	PLK/PLH/PLR (45 minutes)
Teaching language	English
Person responsible for the module	Prof. Schnell
Teachers	Value-oriented Corporate Management: Prof. Schnell Key Figure Management: Prof. Dr. Binder
Assignment to the curriculum	MEM - compulsory subject 2nd semester
Teaching forms of the courses of the module	Lecture with case studies (WoUF) and seminar (KPI-M.) with <ul style="list-style-type: none"> • regular, content-related initial presentations by the lecturers • Presentations by the students • Working on case studies using the "inverted classroom" methodology
Goals	<p>Students acquire in-depth knowledge of the profitability and liquidity-oriented management of a company. They are able to analyze the business development of a company using financial ratios and, based on this, formulate recommendations for action to improve profitability and liquidity.</p> <p>In particular, students know how managers use controlling instruments (e.g. key figures, accounting, analysis tools) to measure effectiveness and efficiency in the company and which value-enhancing measures can be introduced as a result.</p>
Interdisciplinary qualification goals	<ul style="list-style-type: none"> • A sense of responsibility for the management and leadership of a company • Sustainable thinking and action in the assessment of strengths, weaknesses, opportunities and risks for long-term value creation • Teamwork and cooperation for the successful implementation of a value-oriented corporate strategy • Analytical skills for the application of key figures and key figure systems to assess the value of the company • Planning and budgeting skills for targeted and value-oriented corporate planning

	<ul style="list-style-type: none"> • Effective decision-making based on cost accounting tools to identify potential for increasing profitability • Communication skills to convey value-oriented corporate management to stakeholders and employees • Strategic thinking and action to focus the company on long-term value creation and sustainable growth • Innovative ability to identify new approaches and technologies to increase the company's value • Ability to reflect and continuous willingness to learn in order to adapt to the challenges of the changing business world
Contents	<p>Value-oriented Corporate Management:</p> <ul style="list-style-type: none"> • Overview of the tasks as well as the way of thinking and acting of a management accountant (controller) • Analysis of strengths, weaknesses, opportunities and risks as a prerequisite for increasing the value of the company • Company valuation with key figures and key figure systems • Corporate planning, budgeting, forecasting as a prerequisite for value-oriented corporate alignment • Decision costing as an instrument for recognizing potential for increasing profitability <p>Key Figure Management:</p> <ul style="list-style-type: none"> • Important values at a glance • Key figures for value-oriented corporate management: net income, EVA, SVA, ROI, CFROI • Capitalized earnings value versus net asset value method: Company valuation • Liquidity figures: Determination and analysis • Analysis of the net asset value in detail on the basis of consolidated financial statements, taking into account the legal framework, such as international accounting regulations (IFRS, US-GAAP) • Key figures and key figure systems of the company and its functional areas of procurement, production, marketing/sales and research and development • Key figures in business plans, cockpit charts and controller reports
Literature	<p>Value-oriented Corporate Management:</p> <ul style="list-style-type: none"> • Weygandt, J., Kimmel, P., Kieso, D. (2018): <i>Managerial Accounting</i>. 8th Edition, Wiley: Hoboken, N. J. • Drury, C. (2015): <i>Cost and Management Accounting</i>. 9th Edition, Cengage Learning: London. • Horngren, C., Foster, G., Datar, S. (2017): <i>Cost Accounting, A Managerial Emphasis</i>. 16th ed., Prentice Hall: Upper Saddle River. <p>Key Figure Management:</p> <ul style="list-style-type: none"> • Copeland, T., Koller, T., Murrin, J. (2015): <i>Valuation - Measuring and Managing the Value of Companies</i>. 6th ed., Wiley: New York. • Krause, H. U., Arora, D. (2010): <i>Controlling-Kennzahlen. Key Performance Indicators - Bilingual Handbook German-English</i>. 2nd ed., Oldenburg: Munich.
Workload	<p>Workload: 6 ECTS x 30 hours = 180 hours. Attendance time: 4 SWS x 15 weeks = 60 hrs. 120 hours for preparation and follow-up work for the courses, studying literature and working on case studies</p>

Media forms	Presentations using slides and case studies, working on case studies (partly in groups), inverted classroom
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6. Management of New Technologies

"Management neuer Technologien" / "Management of Emerging Technologies"	
Code number	MWI10016
Semester of study	2nd semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	MWI10017 Technical Concepts MWI10018 Organizational Concepts
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	English B2
Type(s) of examination, duration (only for PLK/PLM)	PLK/PLP (60 minutes)
Teaching language	English
Person responsible for the module	Prof. Dr. Kölmel
Teachers	Technical Concepts: Prof. Dr. Thomas Schuster Organizational Concepts: Prof. Dr. Kölmel
Assignment to the curriculum	MEM - compulsory subject 2nd semester
Teaching forms of the courses of the module	Seminar-based teaching and exercises, intensive block course with follow-up dates. The course is designed to be interactive. Current practical examples illustrate the content. Project (exemplary implementation of a technical prototype).
Goals	The students <ul style="list-style-type: none"> • understand the importance of new technologies for the future of the economy, • can apply the basic concepts of emergent technology management, • can design and implement a technical prototype.
Interdisciplinary qualification goals	<ul style="list-style-type: none"> • Technological competence: Students should develop technological knowledge and understanding in order to recognize, evaluate and successfully introduce new technologies in companies. • Strategic thinking: Emphasis is placed on strategic thinking in order to recognize the potential of new technologies and integrate them into a holistic corporate strategy. • Interdisciplinary collaboration: The course promotes the ability to collaborate between different disciplines in order to master the complexity of new technologies and develop innovative solutions.
Contents	<p>Competition for the development of new technologies is becoming increasingly fierce worldwide. At the same time, product life cycles are becoming shorter. The result: an "innovation race" in which it is important to recognize and seize technological options at an early stage. This is the only way to seize market opportunities and exploit important competitive advantages.</p> <p>This raises the question for companies of how to recognize the potential of new technologies in good time and how to use them as efficiently and effectively as possible. These are key issues in the management of new technologies.</p>

	<p>The course provides an overview of the international development of key new technologies, introduces important methods of technology management and discusses the technical, economic and social significance of emerging technologies. Basic concepts of technology management are introduced and the management of new technologies is deepened using case studies.</p> <p>If you look at the emerging digital business models, you will notice certain similarities in many of their architectures. Cloud services are often used to provide the basis for complete networking. The cloud services provide certain services that generate added value for the end user.</p> <p>Large amounts of data and data streams are generated by many sensors and data streaming when using IoT (Internet of Things). With IoT, however, cloud services are not limited to the storage of "streamed" mass data from sensors and smart objects, but only generate added value for the end user through the processing and provision of further information - e.g. in the context of predictive analytics and control of actuators. Exemplary prototypes are implemented as part of a project.</p>
Literature	<ul style="list-style-type: none"> • Schilling, M. A. (2012): <i>Strategic Management of Technological Innovation</i>. 4th ed., McGraw-Hill Education. • Schuh, G., Klappert, S. (2011): <i>Technologiemanagement - Handbuch Produktion und Management 2</i>. 2nd ed., Springer: Heidelberg. • Wördenweber, W. (2008): <i>Technology and Innovation Management</i>. 3rd ed., Springer: Heidelberg. • Wilder, B. (2012): <i>Cloud Architecture Patterns</i>. O'Reilly and Associates. • Provost, F., Fawcett, T. (2013): <i>Data Science for Business: What you need to know about data mining and data-analytic thinking</i>. O'Reilly and Associates.
Workload	<p>Workload: 6 ECTS x 30 hours = 180 hours. Attendance time: 4 SWS x 15 weeks = 60 hrs. Including 30 hours of concept and method teaching and 30 hours of use of methods and presentation of emergent concepts. 120 hours of project development and elaboration as well as preparation of the final presentation</p>
Media forms	<p>Slides, flipchart, videos, active board, university e-learning platform.</p>

7. Cross Border Cooperation

"Cross Border Cooperation"	
Code number	MWI10019
Semester of study	2nd semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	None
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	English B2
Type(s) of examination, duration (only for PLK/PLM)	PLP
Teaching language	German or English
Person responsible for the module	Prof. Dr. Kühn
Teachers	Prof. Dr. Kühn
Assignment to the curriculum	MEM - compulsory subject 2nd semester
Teaching forms of the courses of the module	Seminar-based teaching/project work in cooperation with a company, in combination with an excursion abroad
Goals	<p>Globalization has significantly changed both the market environment and the corporate structures of companies. Companies expect global competition to intensify further and have to face the major challenges of a globalized world: Tapping into new foreign markets, establishing and expanding foreign production sites, but also constantly growing cost pressure.</p> <p>The highly dynamic nature of the changing business environment and international cooperation require new structures and place new demands on management. As a consequence, international management, a better understanding of intercultural aspects and cooperation with foreign colleagues and partners as well as the cross-border management of employees are becoming increasingly important and are becoming more and more important in management training and the professional practice of internationally active managers.</p> <p>The aim of the course is to provide students with a better understanding and appropriate preparation for future management tasks.</p> <p>This includes:</p> <ul style="list-style-type: none"> • A good understanding of how different cultures influence cooperation in international projects. • Management of interdisciplinary and international projects: <ul style="list-style-type: none"> ○ Expansion of problem-solving skills ○ Acquiring knowledge through "experimental learning" ○ Communication within the team and understanding the dynamics ○ Achieving outstanding results both in writing and in the final presentation to the project sponsor.
Interdisciplinary qualification goals	The module contributes to an understanding of other countries/company cultures. By combining it with an excursion/project work on site, the sense of togetherness as well as group identity and the ability to work together are significantly promoted.

<p>Contents</p>	<p>Real case studies (usually in cooperation with companies) are worked on by international project teams. The aim is to promote both the professional and personal development of students in the following areas.</p> <ul style="list-style-type: none"> • Global internationalization strategies • Operational topics related to cross-border/international business activities: organizational development in an international context, international human resources management, marketing and sales, global sourcing, global supply chain management, operations management • International and intercultural management • Recognizing and coping with complex intercultural situations and effective leadership in intercultural teams. <p>The course is held in cooperation with annually changing partners (companies or universities) in neighbouring countries. As part of the seminar, students work in project groups on real problems posed by companies. The seminar includes both face-to-face events in Germany and abroad as well as autonomous project work by the teams (self-organization by the project teams). Interaction with company representatives as well as interim and final presentations are planned.</p>
<p>Literature</p>	<ul style="list-style-type: none"> • Dülfer, E. (2011): <i>International management in different cultural areas</i>. Oldenbourg: Munich and others. • Hill, C. (2013): <i>International Business - competing in the global marketplace</i>. McGraw-Hill: New York. • Hofstede, G., Hofstede, G. J. (2010): <i>Culture and organizations - Software of the mind</i>. McGraw-Hill: New York et al. • Trompenaars, A., Hampden-Turner, C. (2011): <i>Riding the waves of culture - Understanding cultural diversity in business</i>. Brealey: London. • Further special literature may be necessary depending on the real case studies. (this usually arises in the course of the project)
<p>Workload</p>	<p>Workload: 6 ECTS x 30 hours = 180 hours. Attendance time: 4 SWS x 15 weeks = 60 hrs.</p>
<p>Media forms</p>	<p>Project work in small groups (approx. 4 to 6 people), which is carried out both virtually and during face-to-face events. The face-to-face events are supplemented by lectures as required, and the project work is supervised by appropriate individual project coaching for the subgroups.</p>

8. Managing the Value Chain

"Managing the Value Chain"	
Code number	MWI10020
Semester of study	1st/2nd semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	MWI10021 Business Process Management MWI10022 Strategic Purchasing
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	English B2
Type(s) of examination, duration (only for PLK/PLM)	Business Process Management: PLH/PLK/PLP/PLR (60 minutes) Strategic Purchasing: PLH/PLR/PLP
Teaching language	Business Process Management: German Strategic Purchasing: English
Module coordinator	Prof. Dr. Bulander, Prof. Dr. Peter
Teachers	Business Process Management: Prof. Dr. Bulander Strategic Purchasing: Prof. Dr. Peter
Assignment to the curriculum	MEM, MIM - compulsory subject 1st/2nd semester
Teaching forms of the courses of the module	Lecture and seminar-style teaching
Goals	<p>Business Process Management: Students can</p> <ul style="list-style-type: none"> • Explain business process management and its key components, • carry out process analysis, modeling and optimization, • explain the key aspects of process mining. <p>Strategic Purchasing: Students know</p> <ul style="list-style-type: none"> • the basics, concepts and methods of corporate procurement, • the strategic procurement process, • the main challenges in international procurement, • how to develop, optimize and implement purchasing strategies • how to evaluate and select suppliers, • how to negotiate key contractual elements.
Interdisciplinary qualification goals	The module promotes thinking in terms of processes and workflows and helps to view, analyze, map and improve end-to-end processes from suppliers to customers from different perspectives.
Contents	<p>Business Process Management: introduction to business process management, process management, process modeling, process analysis and optimization, process simulation, implementation of projects in process management. Introduction to process mining.</p> <p>Strategic Purchasing:</p>

	<p>Procurement marketing, procurement market research, procurement strategies in an international environment, supplier development, analysis of technical products with regard to make or buy.</p>
Literature	<p>Business Process Management:</p> <ul style="list-style-type: none"> • Allweyer, T. (2009): <i>BPMN 2.0</i>. 2nd ed., Books on Demand: Norderstedt. • Gadatsch, A. (2010): <i>Grundkurs Geschäftsprozess-Management</i>. 6th ed., Vieweg+Teubner: Wiesbaden. • Freund, J., Rücker, B. (2010): <i>Praxishandbuch BPMN 2.0</i>. Hanser: Munich et al. • Van der Aalst, W. (2016): <i>Process Mining: Data Science in Action</i>. 2nd Edition. Springer: Munich and others. <p>Strategic Purchasing:</p> <ul style="list-style-type: none"> • Chopra, S. (2018): <i>Supply Chain Management: Strategy, Planning and Operation</i>. 7th Edition, Pearson: London. • Heizer, J., Render, B. (2016): <i>Operations Management</i>. Global Edition, 11th Edition, Pearson: London. • Van Weele, A. J. (2014): <i>Purchasing and Supply Chain Management</i>. 6th Edition, Cengage Learning: London. • Handfield, R. B., Monczka, R. M., Giunipero, L. C., Patterson, J. L. (2016): <i>Sourcing and Supply Chain Management</i>. 6th Edition, Cengage Learning: Florence, KY. • Lecture notes of the lecturer
Workload	<p>Workload: 6 ECTS x 30 hours = 180 hours. of which total attendance time: 4 SWS x 15 weeks = 60 hrs.</p> <p>Business Process Management: Attendance time (see above, 2 SWS share 30 hours) 40 hours of preparation and follow-up work for lectures, projects and case studies 20 hours Preparation and implementation of the final presentations and examinations</p> <p>Strategic Purchasing: 40 hours of preparation and follow-up work for lectures, projects and case studies 20 hours Preparation and implementation of the final presentations and examinations</p>
Media forms	<p>Slides, flipchart, projector, active board, university e-learning platform (Moodle), PC pool, sample machine for learning on the technical object.</p>

9. Compulsory Elective Subjects "Focus"

Subjects amounting to 9 ECTS must be selected from the Master's courses offered by the WI department and/or other departments/faculties of the university in consultation with the head of the study program and the respective lecturer. Subjects are to be reported to the Examinations Office via a list or, if necessary, individually via a form.

Individual courses can be combined individually as well as entire elective modules. There is no entitlement to freedom from overlaps. A list of the possible elective subjects and modules in the study program can be viewed at the program management assistant's office.

"Wahlpflichtfächer "Fokus"" / "Electives "Focus""	
Code number	MWI10023
Semester of study	1st/2nd semester
Level	Professionally qualifying academic level
Credits	9
SWS	6
Associated courses	MWI10024 Focus A MWI10025 Focus B MWI10026 Focus C
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	Technical and organizational questions, especially for Master's courses that are not offered by the WI department, must be clarified in advance with the lecturer.
Type(s) of examination, duration of examination (only for PLK/PLM)	In each case PLH/PLK/PLP/PLR (duration of exam according to the elective list)
Teaching language	German or English
Person responsible for the module	Prof. Dr. Kühn
Teachers	The respective lecturers of the selected Master's courses on the elective list.
Assignment to the curriculum	MEM, MIM - Compulsory Elective Subject 1st/2nd semester
Teaching forms of the courses of the module	Seminar-style teaching, lecture or project depending on the courses chosen.
Goals	Students acquire additional, in-depth knowledge within the framework of specialization subjects of their choice. The wide range of Master's courses offered by Pforzheim University gives students the opportunity to set individual priorities.
Interdisciplinary qualification goals	Depending on the selected courses
Contents	These depend on the courses selected from the elective list. Courses can be chosen from the Master's courses offered by all 3 faculties of the university in consultation with the head of the study program and the respective lecturer. The selectable subjects are placed in a list (elective list). Courses can be combined individually or taken as complete elective modules. There is no entitlement to admission or freedom from overlaps.
Literature	This depends on the courses selected from the elective list.
Workload	Workload: 9 ECTS x 30 hours = 270 hours. Attendance time: 6 SWS x 15 weeks = 90 hours attendance time

Media forms	Depending on the selected courses.
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10. Capstone

"Capstone Seminar"	
Code number	MWI10027
Semester of study	3rd semester
Level	Professionally qualifying academic level
Credits	6
SWS	4
Associated courses	MWI10028 Capstone Seminar COL6996 Scientific Colloquium
Participation requirements according to SPO	Admission to the Master's program
Recommended prerequisites	In-depth knowledge through successful completion of the lectures from all areas of the MEM curriculum.
Type(s) of examination, duration of examination (only for PLK/PLM)	Capstone Seminar: PLH/PLR/PLP Scientific Colloquium: UPL
Teaching language	German or English
Person responsible for the module	Prof. Dr. Kühn
Teachers	Capstone Seminar: Alternating lecturers from the field of industrial engineering Subject-specific Colloquium: Examiners can be all full-time professors.
Assignment to the curriculum	MEM, MIM - compulsory subject 3rd semester
Teaching forms of the courses of the module	Project work, seminar, case study seminar, individual performance, preferably in cooperation with companies
Goals	<p>Capstone Seminar: The MEM curriculum aims to provide students with a consecutive and generalist education, combined with the students' individual areas of interest and development goals. The latter are achieved through the selection of elective subjects and, under certain circumstances, courses at partner universities abroad. At the end of their studies, all students should apply and deepen the breadth of their acquired knowledge and skills as part of the capstone seminar and work out the interdependencies between the individual subject areas.</p> <p>Scientific Colloquium: Students should set individual, subject-specific priorities or reduce identified weaknesses within the framework of individual achievements. Aspects of individual career planning are given special consideration. The ability for critical self-reflection is encouraged.</p>
Interdisciplinary qualification goals	The module contributes to teamwork and (self-)reflection skills.
Contents	<p>Capstone Seminar: The seminar is organized by the supervising professors depending on the number of participants and the topics to be dealt with. Project work and/or case study seminars are used for this purpose. The topics as well as the timing and proportion of attendance phases are determined at an early stage.</p> <p>Scientific Colloquium: The content depends on the individual student. In particular, aspects of academic or professional qualifications, e.g. additional qualifications that go beyond the curriculum, should be taken</p>

	into account here. Key topics are determined in consultation with the supervising professors.
Literature	Will be announced in good time.
Workload	Workload: 6 ECTS x 30 hours = 180 hours. of which attendance time: 4 SWS x 15 weeks = 60 hrs.
Media forms	Seminar / project or interactive teaching discussion

11. Master's Thesis

"Master's Thesis"	
Code number	THE6880
Semester of study	3rd semester
Level	Expert level
Credits	24
SWS	0
Associated courses	None
Participation requirements according to SPO	The Master's thesis can be submitted in the 2nd semester at the earliest.
Recommended prerequisites	Solid technical and scientific knowledge from the Master's program.
Type(s) of examination, duration (only for PLK/PLM)	PLT
Teaching language	German or English
Person responsible for the module	Responsible professor
Teachers	All professors in the department.
Assignment to the curriculum	MEM, MIM - compulsory subject 3rd semester
Teaching forms of the courses of the module	Thesis
Goals	<p>The Master's thesis should demonstrate that students are able to work independently on an industrial engineering problem using scientific methods and solve it precisely and efficiently within a specified period of time.</p> <p>They are able to research available scientific findings and develop their own theoretical concepts and models. They are proficient in the methods and procedures required for this. They select suitable methods and apply them correctly, adapt them, develop them further and check their viability when dealing with complex problems.</p>
Interdisciplinary qualification goals	<p>Students are able to present complex topics in a differentiated manner from various perspectives and prepare them according to academic standards. They demonstrate their sound analytical thinking skills and critical judgment using scientific methods in their thesis. They are able to plan and carry out an academic thesis project over a longer period of time and demonstrate their resilience in doing so.</p> <p>Students also demonstrate that they can formulate their results clearly and write them down in an academically appropriate form.</p> <p>Students are able to critically compare their own results with other approaches, evaluate their own results and thus make a significant contribution to the scientific field or provide a solution with high practical relevance.</p>
Contents	As a rule, a topic belonging to the faculty's main research areas is given to the students to work on or alternatively proposed by the students. In terms of subject content, it must be assigned to the field of economics and/or engineering and cover current subject-specific or interdisciplinary issues and topics.

	Students independently research the available scientific findings, carry out their own analyses and formulate theses. They also carry out their own empirical or theoretical research in order to achieve the objectives of the Master's thesis. To this end, they develop their own theories and models, which they verify or refute from a scientific point of view.
Literature	Topic-specific literature, to be chosen by the students.
Workload	Processing time 6 months, 24 ECTS x 30 hours = 720 hours of work including documentation.
Media forms	Printed and electronic copies.